

Registered professional nurses experiences of computer-assisted learning in a private healthcare organisation.

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DECLARATION

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ABSTRACT

Registered professional nurses are expected to maintain competence. Organisations are employing computer-assisted learning to fulfil this requirement. It was observed that staff experienced challenges such as technical difficulties, insufficient computer literacy, lack of opportunity and access to complete computer-assisted learning activities in a private healthcare organisation. These challenges may have implications for the effective learning and development of registered professional nurses.

The aim of the study was to explore the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation. The research question was: “What are the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation?” The following objectives were set to:

- Explore the experiences of registered professional nurses in computer-assisted learning related to
 - Organisational support
 - Human interaction
 - Programme design
 - Computer literacy

A qualitative approach with a descriptive, exploratory design was applied. A purposive sample of seven ($n=7$) participants from a population of thirty five ($N=35$) were recruited. A pre-test was completed. Ethical principles were adhered to. A semi structured interview guide based on the objectives of the study was developed by the researcher and validated by a panel of experts in research methodology and nursing education. Data was collected in the form of individual interviews and a demographic questionnaire by the researcher and one research assistant. Content analysis was applied to analyse the data, with six themes emerging. These were access, opportunity, applied support, programme content and design, social learning and computers.

The findings demonstrated that registered professional nurses experienced inadequate access and opportunity to computer-assisted learning activities. The lack of computer literacy and human interaction affected the learning experience of some, but not all participants. Technical problems and disturbances in the learning environment were major contributors to the negative experiences in computer-assisted learning. Positive experiences included the convenience and ease of use of intranet-based computer-assisted learning activities.

The conceptual framework of Knowles' Andragogy supported the findings of the study. Recommendations were to provide intranet access at work and home, internet access at work and also formalised opportunity to complete computer-assisted learning activities. Technical problems should be minimised. Learning environments should be separate from work environments.

Key words: Computer-assisted learning, registered professional nurse, challenges, technical difficulties, computer literacy, opportunity, access, learning environment.

OPSOMMING

Daar word van geregistreerde professionele verpleegkundiges verwag om vaardigheid te behou en organisasies wend rekenaar-ondersteunde leer aan om die vereiste te vervul. Dit was waargeneem dat personeel uitdagings ervaar soos tegniese probleme, onvoldoende rekenaargeletterdheid en 'n tekort aan geleentheid en toegang om rekenaar-ondersteunde aktiwiteite te voltooi by 'n privaat gesondheidsorg organisasie. Hierdie uitdagings mag implikasies inhou vir effektiewe leer en ontwikkeling van geregistreerde professionele verpleegkundiges.

Die doel van die studie was om die ervaringe van geregistreerde professionele verpleegkundiges in rekenaar-ondersteunde leer, by 'n privaat gesondheidsorg organisasie te ondersoek. Die navorsingsvraag was: "Wat is die ervaringe van geregistreerde profesionele verpleegkundiges in rekenaar-ondersteunde leer by 'n privaat gesondheidsorg organisasie?" Die volgende doelwitte was gestel om:

- Die ervaringe van geregistreerde professionele verpleegkundiges in rekenaar-ondersteunde leer te ondersoek in verband met
 - Organisasie ondersteuning
 - Menslike interaksie
 - Program ontwerp
 - Rekenaargeletterdheid

'n Kwalitatiewe benadering met 'n beskrywende, ondersoekende ontwerp was toegepas. 'n Steekproefgroep van sewe (n=7) deelnemers is doelbewus geselekteer vanuit 'n populasie van vyf en dertig (N=35). 'n Voortoets is voltooi. Etiese beginsels is nagevolg. 'n Semi-gestruktureerde onderhoudsgids gebaseer op die doelwitte van die studie is ontwikkel deur die navorser en bekragtig deur 'n paneel deskundiges in navorsingsmetodiek en verpleegonderrig.

Data was ingesamel deur middel van individuele onderhoude en 'n demografiese vraelys deur die navorser en een navorsingsassistent. Inhoudsanalise was toegepas om die data te analiseer met ses temas wat na vore gekom het. Hierdie was toegang, geleentheid, toegepaste ondersteuning, program ontwerp en inhoud, sosiale leer en rekenaars.

Die bevindinge het daarop gedui dat geregistreerde professionele verpleegkundiges onvoldoende toegang en geleentheid tot rekenaar-ondersteunde leer aktiwiteite ervaar het. Die gebrek aan rekenaargeletterdheid en menslike interaksie het sommige, alhoewel nie alle

deelnemers se leerervaring geaffekteer. Tegniese probleme en verstourings in die leeromgewing het hoofsaaklik bygedra tot negatiewe ervarings in rekenaar-ondersteunde leer. Positiewe ervarings het ingesluit die gerieflikheid en bruikbaarheid van intranet-gebaseerde rekenaar-ondersteunde leer aktiwiteite.

Die konseptuele raamwerk van Knowles se Andragogie ondersteun die bevindinge van die studie. Aanbevelings is om internet toegang by die werk, intranet toegang tuis en by die werk te voorsien asook formele geleenthede te skep om rekenaar-ondersteunde leer te voltooi. Tegniese probleme behoort tot die minimum beperk te word. Leeromgewings behoort apart te wees van werksomgewings.

Sleutelwoorde: Rekenaar-ondersteunde leer, geregistreerde professionele verpleegkundige, uitdagings, tegniese probleme, rekenaar geletterdheid, toegang, leeromgewing.

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ACRONYMS

CAL	Computer-assisted learning
RPNs	Registered professional nurses
SANC	South African Nursing Council
SETA	Sector Education Training Authority

CHAPTER 1: SCIENTIFIC FOUNDATION OF THE STUDY

1.1 INTRODUCTION

Computer-assisted learning (CAL) is the utilisation of information technology to facilitate learning and it has developed exponentially over the past 17 years (Holmes & Gardener, 2006:35). This form of learning may include the use of the internet, intranet, computer programmes, CD-ROMs, video conferencing, virtual networks and lecturing via satellite broadcast (Lain & Aston, 2004:2). Organisations worldwide are using CAL as a cost effective manner of staff development and training (Lain & Aston, 2004:3). In South Africa, this approach assists organisations to comply with legislation as discussed in the rationale. In addition, CAL accommodates the need of adults to learn at their own pace and in a self-directed manner (Merriam, Caffarella & Baumgartner, 2007:423).

CAL has developed globally into a useful tool to support nursing education and lifelong learning (McVeigh, 2009:92). This is especially apparent in countries such as the United Kingdom, Australia, Canada and the United States of America (McVeigh, 2009:92; Axley, 2008:12; Hegney, Buikstra, Eley, Fallon, Gilmore, & Soar, 2007:24; Canadian Nurses Association, 2006:8). It is evident in research that learners perceive CAL as a positive experience, which improves their knowledge and skill (Koch, Andrew & Salamonson, 2010:584-590; Chen, Stocker, Wang, Chung & Chen, 2009:704-709; McVeigh, 2009:91-99). On the other hand, some learners experienced several challenges with CAL such as technical difficulties, uncertainty of operating a computer and missing peer or instructor interaction (Johnson, Gueutal & Falbe, 2009:546).

CAL is a novel approach to nursing training and development in the South African nursing context. Hence, limited information is available on the experiences of South African nurses in CAL, notably in the Western Cape. The researcher obtained only three studies conducted in South Africa: Maboe and De Villiers (2011:93-104), Akimanimpaye (2012:1-102) and Mgutshini (2013:1-7). It is the researcher's personal experience that CAL programmes are designed by the private healthcare organisation in this study, based on research not conducted in this country. If effective CAL programmes are to be developed, it is imperative to understand what registered professional nurses (RPNs) experiences of CAL are.

1.2 SIGNIFICANCE OF THE STUDY

In this study, an appreciation of RPNs views on CAL transpired. Recognising and acknowledging their positive and negative experiences promotes the development of more effective CAL activities. This would in turn improve the competency and knowledge of nurses

rendering care to patients, thus improving patient outcomes. This supports the study's uniqueness and significance.

The study increased the insight of CAL experiences of RPNs within the study setting in a private healthcare organisation. The completion of this study raised the employer's awareness of the identified CAL shortcomings, which could contribute to policy guidelines to support CAL and the development of staff.

1.3 RATIONALE

Facilitating learning through CAL is growing rapidly worldwide (National Bureau of Statistics of China, 2013:np; Johnson *et al.*, 2009:545-566; Lain & Aston, 2004:1-44). The nursing profession is in step with this trend and instituting CAL activities directed at theoretical knowledge and practical skills. For example, the Canadian Nurses Association embarked on a two year CAL project from 2004-2005 to support the continued development and education of nurses. The recommendation on completion of the project included close collaboration of government, nursing education institutions and nursing regulatory bodies to support CAL opportunities and increase computer literacy levels of nurses (Canadian Nurses Association, 2006:6).

In the South African nursing landscape, CAL is still a novel approach to learning. The researcher obtained three recent studies investigating CAL in under- and post-graduate nursing education in South Africa, namely Maboe and De Villiers (2011:93), Akimanimpaye (2012:9) and Mgutshini (2013:1). These studies did not investigate CAL in the nursing workplace, but rather in a tertiary nursing education setting with nursing students as participants. However, the researcher did obtain three recent studies that aimed to investigate CAL in the South African workplace and formal education sector, albeit not in the nursing context, namely Chinyamurindi (2007:20), Takalani (2008:2) and Mbuli (2013:9). Several sources (Vlietstra, 2014:np; Crafford, 2013:np), including the researcher's own experience, confirmed that CAL programmes are being developed and implemented for nurses at South African private healthcare institutions.

During the 1980's the British government started CAL programmes in schools (Holmes & Gardener, 2006:43-44) and countries such as the United States, Japan and Holland had already instituted CAL for nurses in 1985 (Townsend & Norman, 1985:167-168). Furthermore, CAL grew exponentially as the World Wide Web became established (Gillies & Cailliau, 2000:264). Recent evidence suggests that CAL is now a multibillion dollar growing industry worldwide (American Society for Training and Development 2007 in Johnson *et al.*, 2009:545).

The Skills Development Act 97 of 1998 (Republic of South Africa, 1998:24) states that an employer who developed an occupation based skills programme may apply to the Sector Education Training Authority (SETA) for a grant. Therefore the implementation of the Skills Development Act in 1998 incentivised South African employers to explore innovative methods to implement training programmes (Sector specialist guide, 2010:np).

The Nursing Act 33 of 2005 (Republic of South Africa, 2005:29) makes provision for the continuous professional development of nurses. Similarly, Searle (2005:197,199) suggests that although the nurse is responsible to maintain professional competence, the employer in turn has the obligation to create opportunities for professional development. It was confirmed in a discussion with a head nurse educator at a private healthcare organisation, that various private hospital groups in South Africa are developing CAL resources for their nurses (Crafford, 2013:np).

Literature suggests that several factors may influence the CAL process. Challenges such as lack of computer literacy (Adams & Timmins, 2006:15), insufficient organisational support (McVeigh, 2009:96), very little or no human interaction (Cobb, 2011:116) and the design and content of the CAL activity may adversely affect the learning experience (Maboe & De Villiers, 2011:100).

In the researcher's own experience at the healthcare organisation in this study, nurses often struggled to use basic technology such as a keyboard and mouse during a CAL activity. In addition, due to operational demands, it was sometimes unfeasible to allow nurses to attend CAL activities. Nurses were also hesitant to answer course facilitator questions if they could not see them face to face. At times technology failed and that impeded instruction.

In order to provide recommendations to improve CAL, the experiences of RPNs must be investigated.

1.4 PROBLEM STATEMENT

Burns and Grove (2011:146) describe a problem statement as a specific area of knowledge that is lacking, which creates a concern for practice. In addition, the problem statement also forms the foundation of the purpose of the research (Burns & Grove, 2011:146).

As discussed in the rationale, the private healthcare organisation in this study is developing and implementing CAL programmes for nurses. However very little is known about how RPNs are experiencing CAL and they may experience lack of support, challenges with utilising computers, insufficient human interaction and difficulties relating to the design of the CAL programme and its content.

Observations of the researcher and the rationale of the study supported the necessity to investigate the experiences of RPNs in computer-assisted learning in a private healthcare organisation in this study.

1.5 RESEARCH QUESTION

The following research question guided the study: “What are the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation?”

1.6 AIM

The aim of this study was to explore the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation in the Cape Metropole.

1.7 OBJECTIVES

The following objectives were set to explore the experiences of RPNs in the following aspects of CAL:

- Organisational support
- Human interaction
- Programme design
- Computer literacy

1.8 CONCEPTUAL FRAMEWORK

Figure 1.1 graphically demonstrates the conceptual framework used in the study with the subsequent discussion.

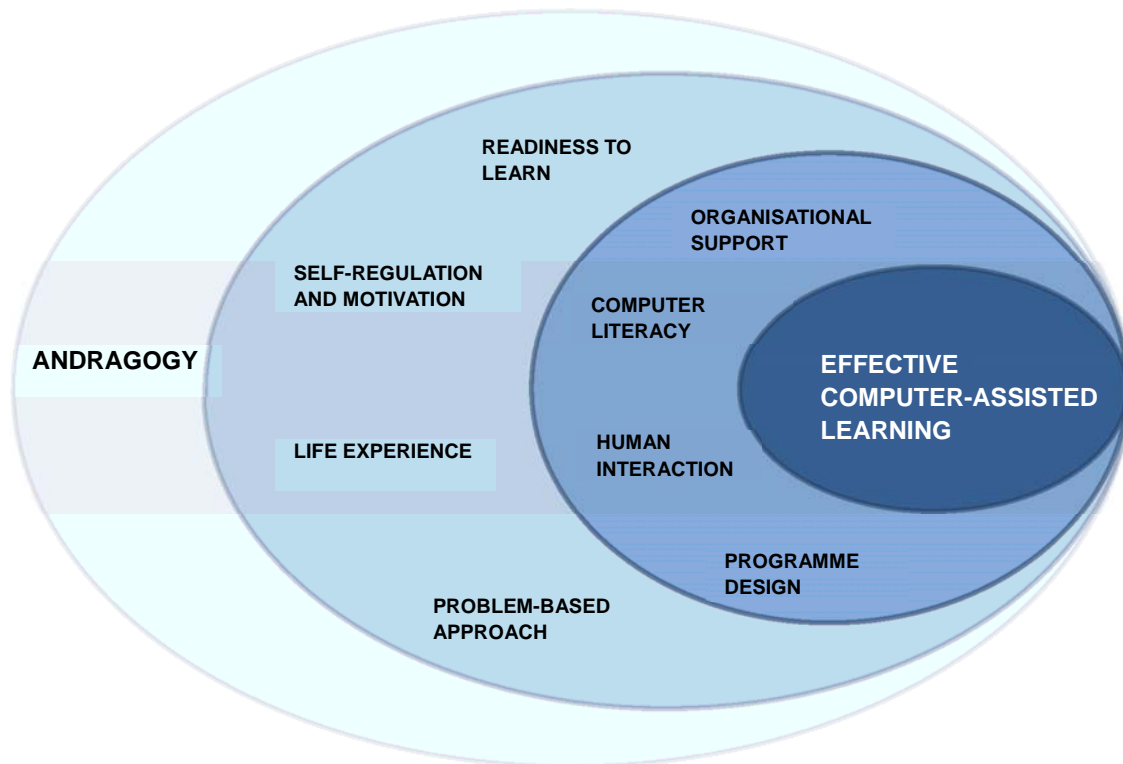


Figure 1.1: Diagram illustrating the conceptual framework based on andragogy as foundation for effective computer-assisted learning.

Source: Knowles, Holton & Swanson, 2011:4

The study aimed to investigate RPNs experiences of CAL. Malcolm Knowles' theory of Andragogy was selected as the theoretical foundation for the study. Knowles identified various unique characteristics of adult learners that effect their experience and effectiveness of learning (Knowles, 1990:57-63), such as their preference for problem-based learning, self-regulation and motivation to learn, life experience and their readiness to learn as illustrated in Figure 1.1. In addition the theory of Constructivism also supports the adult learning theory as indicated in the discussion below. The principles of adult learning are interlinked with the objectives of the study as indicated in Figure1.1. The framework indicates that should the principles of adult learning be adhered to in CAL, and the factors that influence CAL are favourable, effective CAL learning will take place.

1.8.1 Readiness to learn

Knowles (1976:44) suggests that adults will learn when they experience a need to do so. Therefore the content must be applicable to the adult's life circumstances. Also, Ahedo (2009:69) states that although adults require learning to be relevant, they also need time and opportunity to reflect on the information presented. Knowles (1976:46) implies that by

ensuring an adequate learning climate, both physical and psychological, it will support the notion of reflection on learning. Constructivists are of the opinion that learning should be learner-centered which would include an environment conducive to learning (Young & Paterson, 2007:11). The RPNs in this study depend on their employer to provide them with time, venue and opportunity to perform CAL activities. Furthermore the employer should provide CAL activities that are relevant to the working environment of RPNs. The adult's readiness to learn is therefore linked to the objective of organisational support.

1.8.2 Self-regulation and motivation

The motivation for participating in a learning activity is largely internal such as increased job satisfaction (Quinn & Hughes, 2007:28). Therefore adults need stimulation to participate in learning activities as they may already be settled in social and work routines (Ahedo, 2009:69). Knowles (1976:43) confirms that adults have an inherent need to be self-directed and that independent learning fulfils this need. Constructivists add to this principle of adult learning by suggesting that learning is more effective when the learner is responsible for their own learning experiences (Pass, 2004:108). In CAL these principles are supported, as it provides the learner with independence and stimulation. The learner is exposed to new technology and they have the opportunity to improve their computer literacy.

1.8.3 Life experience

Adults bring a vast amount of life experience to the learning environment and they attach meaning to learned experiences (Knowles, 1976:44). They prefer to learn in a way that guides and facilitates learning, not dictates it (Knowles, 1976:45). CAL may consist of little or no human interaction and Cobb (2011:116) suggests that this may have a negative impact on the experience in CAL. According to constructivists learners should build on their existing knowledge and experience in order to reach their potential, and should not just be handed information by a teacher (Friesen, 2009:81). Therefore an adult's life experience interlinks with their experiences of CAL in relation to human interaction.

1.8.4 Problem-based approach

Adults prefer to learn through a problem-based approach such as presenting case studies (Knowles, 1976:58). Ahedo (2009:70) states that learning activities should adopt techniques such as problem-based discussions, on-line and distance programmes to fulfill the need of adults to learn via a problem-based approach. Constructivists suggest that effective learning methods should integrate dialogue and interaction with the learning material (Chinyamurindi, 2007:48). In the design of a CAL activity these techniques may be utilised to ensure effective learning.

1.9 RESEARCH METHODOLOGY

A brief description of the applied methodology is provided in this chapter and a detailed discussion is contained in chapter 3.

1.9.1 Research approach and design

The study followed a qualitative approach with a descriptive, exploratory design that enabled the researcher to explore RPNs lived experiences of CAL.

1.9.2 Population and sampling

The target population included all RPNs who participated in CAL activities in two of the six hospitals of a private healthcare organisation (N=35) in the Cape Metropole.

For this study, an initial purposive sample of eight participants were selected for individual interviews and five (n=13) for a focus group interview from two of the six hospitals. However data saturation was reached after six individual interviews. Four participants did not arrive for the focus group interview. The only participant at the focus group interview was interviewed individually as explained in chapter 3. Therefore the final sample consisted of seven participants (n=7). Only participants who attended a CAL activity in the three months preceding data collection was included in the sample.

1.9.3 Sampling criteria

Participants consisted of male and female RPNs with at least four years' experience in nursing. This ensured that the participants had experience in the nursing environment and were able to converse with ease regarding nursing matters, including how CAL interlinked with nursing circumstances. These RPNs were employed by the selected private healthcare organisation in the Cape Metropole, and had been exposed to CAL within the three months preceding data collection. Recent exposure to CAL not only ensured that participants could recall their experience with ease, but also had enough time to reflect on their experiences.

1.9.4 Trustworthiness

Validity or truthfulness of the study findings was assured by adherence to the principles credibility, transferability, dependability and confirmability as suggested by Lincoln and Guba (1985:290).

1.9.5 Instrumentation

Interviews were conducted based on a semi-structured interview guide (Annexure B and C). The interview guide was scrutinised by a panel of experts in research methodology, as well as the supervisor and co-supervisor of the study.

1.9.6 Pre-test

According to Burns and Grove (2011:544) a pre-test is a smaller version of the main study and implemented before the principle study is commenced to test the study methodology. In this study, pre-testing consisted of a single interview with one participant. The pre-test met the criteria of the study and no pitfalls were identified. Also, the sampling technique and methodology used in the main study was also implemented in the pre-test. Therefore, the results of the pre-test were included in the principle study (Thabane, Ma, Chu, Cheng, Ismaila, Rios, Robson, Thabane, Giangregorio & Goldsmith, 2010:6).

1.9.7 Data collection

All interviews were conducted at the hospitals or at a location selected by the participant. The researcher was the principle facilitator at the interviews and the research assistant took notes at four interviews. All interviews were recorded on a battery operated and digital recorder simultaneously.

1.9.8 Data analysis and interpretation

The data analysis framework as suggested in Terre Blanche, Durrheim and Painter (2006:322-326) was used in this study. A medical audio typist transcribed all the interviews. In addition, data were examined for themes and repetitive variations.

1.10 ETHICAL CONSIDERATIONS

Researchers have an ethical obligation to protect participants and their human rights (Burns & Grove, 2009:189). Therefore, researchers are directed by three fundamental ethical principles, namely respect for persons, beneficence and justice. These principles were adhered to in the study as follow:

1.10.1 Principle of respect for persons

According to Burns and Grove (2009:189) the right to self-determination is grounded in the ethical principle of respect for persons. Furthermore, the right to autonomy denotes that individuals have the right to independently select whether to participate in a study or not (Brink, 2008:32). Participants' right to autonomy was valued by acquiring informed consent and being advised that they have the right to decline participation or withdraw from the study at any time. Participants were not prejudiced in any way based on their decision to withdraw or participate.

1.10.2 Principle of beneficence

Beneficence signifies that participants have the right to be protected from harm and discomfort, therefore, their safety and well-being must be protected (Brink, 2008:32). In the

study, participants might have felt uncomfortable sharing experiences with strangers. Participants were offered the option to write naïve sketches in an attempt to lessen feelings of discomfort. According to Speziale and Carpenter (2007:41), a naïve sketch can be used so participants can narrate their experiences in the form of a personal written account.

1.10.3 Confidentiality and anonymity

Participants were assured that all information and data collected from them would be held in confidence. The participants and the health care institutions would remain anonymous since only their allocated numbers would be affixed to the extracts drawn from the raw data. All participants' identities were protected by addressing them by aliases during the recorded interviews. Also the transcriptionist and translator signed confidentiality agreements (Annexure H and J). Furthermore, data will be stored and secured in a safe place for at least five years and will only be accessible to the researcher, supervisor and co-supervisor of the study.

1.10.4 Permissions

This research was conducted with the approval of the Health Research Ethics Committee of the Faculty of Health Sciences of Stellenbosch University (reference number S14/02/048 – Annexure G). Furthermore, permission was obtained from the various organisational managers of the health care facilities included in the study. All the participants provided written consent prior to the interview process, including consent to the audio recording of the interviews.

1.11 CLARIFICATIONS OF CONCEPTS

Registered professional nurses (RPNs)

According to the Nursing Act 33 of 2005 (Republic of South Africa, 2005:25) a professional nurse is a person registered under section 31 of the act; who is able to practice independently to the “manner and level prescribed”. Whereas the “register” contains the names of all those registered according to sections 31, 32, 33 and 34 (Republic of South Africa, 2005:6). Thus, a registered professional nurse is a qualified person able to perform actions as required by applicable legislation (Meyer, Naudé, Shangase & Van Niekerk, 2010:5).

Computer-assisted learning (CAL)

According to Meyer and Van Niekerk (2008:144), computer-assisted learning is the utilisation of information technology to facilitate co-operative and experiential learning.

CAL relates to the following concepts: e-learning utilises any form of electronic media to enable learning such as digital versatile disc, compact disc and computers. Web-based learning refers to all learning facilitated by the internet, which may include text, audio-visual materials and images (Yu & Yang, 2006:769).

Computer literacy

This concept relates to a person who has the ability to use current computer applications such as word processing, spread sheets and the internet. Furthermore, it includes the basic skills to use the computer as a resource, for example using the mouse or navigation pads (Nelson, Joos & Wolf, 2013:13).

Intranet-based computer-assisted learning activity

In the researcher's experience the private healthcare organisation in this study presents some CAL activities via their intranet. These activities consist of practical skills learning activities and competency assessments, such as measuring intake and output of a patient, assessment of skin lesion risk of a patient and assessment of a trauma patient.

Private healthcare organisation

In South Africa hospitals are funded by either the government or private corporations (Hassim, Heywood & Berger, 2007:164). In this study, the latter is referred to as a private healthcare organisation.

WebEx-based computer-assisted learning activity

According to Ericksen (2011:np), WebEx is a software application that facilitates online meetings with any person who has an internet connection. Participants are connected via teleconference and the internet simultaneously. WebEx further enables the sharing of content such as PowerPoint slides and Word documents. Thus, facilitators and participants can hear one another and view identical screen displays. The organisation in this study use WebEx-based CAL activities to deliver lectures for formal courses. However, in the researcher's experience, WebEx-based CAL participants at the organisation in this study are not able to see one another during the session.

Unit manager

According to Booyens (2008:121), a unit manager is the manager of a nursing unit with the necessary training and experience to do so.

1.12 DURATION OF THE STUDY

The duration of the study is depicted below in table 1.1.

Table 1.1: Study plan

Ethics approval	April 2014
Data Collection	June - August 2014
Data analysis	September 2014
Integration of data and report	September - November 2014
Submission of thesis	November 2014

1.13 CHAPTER OUTLINE

Chapter 1: Scientific foundation of the study

Chapter 1 depicts the background and motivation for the study, the research question, aim and objectives. A brief overview of the research methodology and operational definitions are included. Ethical considerations are discussed.

Chapter 2: Literature Review

Chapter 2 contains a discussion and review of the relevant literature.

Chapter 3: Research Methodology

Chapter 3 presents a detailed account of the research methodology used in the study.

Chapter 4: Data analysis, Interpretation and Discussion

Chapter 4 describes the results of the study as well as the analysis, interpretation and discussion thereof.

Chapter 5: Conclusion and Recommendations

In chapter 5 the results of the study are concluded in relation to the study objectives. Recommendations are provided based on the scientific evidence obtained in the study.

1.14 SUMMARY

This chapter includes an initial literature review on (CAL) as well as the rationale for the proposed study. Furthermore, the problem statement, research question, aim and objectives have been articulated to direct the study. The research design, target population, sampling size and method are all discussed within the research design. Focus groups and individual interviews are identified as the means of collecting data. The process of gathering and analysing data are briefly discussed. Pertinent ethical matters are addressed and the management thereof is discussed. In conclusion the study outline and timeframe are described.

1.15 CONCLUSION

The aim of this chapter is to provide a scientific foundation for the study. In chapter 2 the relevant literature is reviewed and discussed in depth, in order to ensure the contextualisation of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 2 contains a review of relevant literature which aims to generate a comprehensive understanding of the research topic. Furthermore the goal of this literature review was to scrutinise similar studies to provide a scientific foundation for this research study (Burns & Grove, 2009:92).

Computer-assisted learning is important as it provides learning interventions within the legal and conceptual framework, which could add value to the functioning of an organisation (Lain & Aston, 2004:17). Therefore this literature review explores the origins and aspects that guide computer-assisted learning.

2.2 REVIEWING AND SELECTING THE LITERATURE

Literature was gathered and considered over a period of 22 months. The search engines used were EBSCOhost (Elton B Stephens Company research database) and SUNSearch (Stellenbosch University Library and Information Service). Journals, periodicals and monographs which were less than ten years old were obtained except for some seminal sources. Search phrases included computer-assisted learning, nurse, e-learning and computer-based learning.

Both international and local studies were reviewed, however limited published research was found in South Africa. Only three studies related to CAL in nursing in South Africa were located, namely Maboe and De Villiers (2011:1), Akimanimpaye (2012:1) and Mgutshini (2013:1).

2.3 PRESENTATION OF THE LITERATURE

The findings from the literature are presented in the following order:

- Defining computer-assisted learning
- Types of CAL
- Theoretical foundation and application
- The history and development of computer-assisted learning
- The status of computer-assisted learning
- Legislative requirements in South Africa
- The advantages and limitations of computer-assisted learning
- The factors that influence the computer-assisted learning experience
- Summary

- Conclusion

2.4 DEFINING COMPUTER-ASSISTED LEARNING

Computer-assisted learning is a broad concept and used in multiple educational platforms (Lain & Aton, 2004:2). Although several definitions of computer-assisted learning exist, it can be deduced that it fundamentally encompasses using any or all forms of information technology to facilitate the learning process. Delivering features may include: software applications, the internet, virtual networks, DVD and CD-ROM and lecturing via satellite broadcast (Holmes & Gardener, 2006:35; Lain & Aston, 2004:2). Johnson, Hornik and Salas (2008:356) define computer-assisted learning as any learning activity which is mediated through computer-based technology.

CAL can be applied individually or in a group setting. The aim of CAL is to provide learning activities and solutions that address learning and development needs of individuals, groups and organisations. Consequently CAL can be applied in an organisation to improve the knowledge and skills of its workforce (Clark & Mayer, 2011:11).

Various other terms are related to CAL; nursing informatics include any use of information technology to plan or implement patient care and education as well as educating nurses (Hannah, Ball & Edwards, 2006:6) whereas e-learning indicates any form of electronic media to facilitate the learning process such as the internet or e-mail (Lain & Aston, 2004:2).

2.5 TYPES OF COMPUTER-ASSISTED LEARNING

There are two major forms of CAL, namely synchronous and asynchronous CAL.

2.5.1 Synchronous CAL

This synchronous form of CAL is more traditional as it is implemented in a planned, timed manner; however it is underused in nursing training and development (Jones, Skirton & McMullen, 2006:100). Examples of this type of CAL would typically include lectures via videoconferencing which accentuates the role of the lecturer and the participants. Jones *et al.* (2006:100) further suggests that this method is more suitable where lecturers or participants are novice computer users and it would benefit the participants as it is similar to face to face contact. However, Hrastinski (2008:52) states that although synchronous CAL supports social interaction, it does not afford participants the individual time they may require to reflect on and perfect their contributions. Consequently the majority of research is focused on asynchronous CAL and further investigation would be required whether a similar situation in South Africa exists.

2.5.2 Asynchronous CAL

The asynchronous form of CAL is flexible. The learner can access the material and implement learning activities in their own time and at their own pace (Hrastinski, 2008:52). Examples include on-line courses which can be accessed at any time and when needed. Hrastinski (2008:52) suggests that participants may feel isolated as it is performed individually with minimal human contact. Regardless of the risk of isolation, Jones *et al.* (2006:100) states that this form of CAL is well established in nursing training. Given the popularity of this delivery method of CAL (Lain & Aston, 2004:14), it is important to investigate its effect on South African RPNs and their experience thereof.

2.5.3 Blended CAL

Blended learning refers to employing assorted media and methods to create a training program for a specific target audience (Hubbard, 2013:93). In CAL this means combining synchronous and asynchronous methods. For example, blending traditional lectures with computer software and video animations to deliver training. This method is gaining popularity but is not widely employed (Lain & Aston, 2004:14).

2.6 THEORETICAL FOUNDATION AND APPLICATION

In order to understand the process of learning and specifically adult learning pertaining to CAL, information should be drawn from relevant learning theories. These theories were selected due to the manner in which they relate to the learner and the learning process through the use of technology. Therefore in this section the constructivist theory and the adult learning theory will be discussed in relation to their application to CAL.

2.6.1 Adult learning theory

Malcolm Knowles used the term 'andragogy' which he defined as the art and science of adult education. According to Knowles *et al.* (2011:6) the concept 'adult' can be interpreted in various ways:

- Adulthood is reached when a human being is able to biologically reproduce.
- The law defines adulthood when a person is of legal age.
- When a person assumes independence they have reached psychological adulthood.
- Social adulthood is attained when adult responsibilities are carried out.

Knowles *et al.* (2011:64) further stipulates the variances in teaching adults versus children, such as the distinct characteristics of adult learners as follows:

- As a person grows to adulthood, they are inclined to take more responsibility for their own learning. This well-developed self-concept enables adults to learn in a more self-

directed manner which is a significant attribute of an adult learner. In CAL adults often have a choice when and where to access materials and courses.

- Adults need to understand the purpose of their learning and apply it to their everyday life. For example if a nurse recognises that CAL can assist her to maintain competence, and then apply the skills acquired in the nursing unit, effective learning will more readily take place. Using problem-related CAL tasks will enable the adult to learn more effectively.
- Adults are exposed throughout their lives to various experiences that influence their learning process. For instance RPNs may have had negative experiences regarding computers and therefore may be more resistant to receive training via this mode, although these accumulated experiences may also serve as a valuable resource for learning.
- In general adults know their abilities and limitations. They are usually aware of what they need to learn. Should an adult be confronted with useless information, they will disregard it and therefore learning will not take place.

However andragogy mostly focuses on the characteristics of adult learners and not the actual learning itself, although these concepts do influence the learning process (Merriam *et al.*, 2007:79).

2.6.2 Constructivist learning theory

Constructivists support the belief of transforming learning from teacher-centred to learner-centred approach (Young & Paterson, 2007:11). Piaget and Vygotsky were main contributors to the theory of constructivism (Pass, 2004:103). They suggested that learners are responsible to construct their own body of knowledge, from their unique encounters and apply it to their individual environments (Pass, 2004:108).

Vygotsky suggested a 'zone of proximal development' that represents the distance from a learner's current development to their potential development. He further stated that learners should initially be guided by an adult or a more informed peer group until they are able to build their own knowledge. He emphasised that providing a learner with information or providing solutions will prevent the learner from reaching their potential (Donald, Lazarus & Lolwana, 2011:59). According to Denton (2012:35) Vygotsky's constructivist principles are supported by CAL. For example learners can access known information and combine it with newly acquired information from a CAL activity to form a new learning sphere. Friesen (2009:81) suggests that CAL is suited to the constructivist theory as it does not rely on learners being handed information, but rather the learner constructs their own knowledge.

However, constructivists also insist that learning must be sustained by interaction and dialogue. In CAL there is constant interaction between the learner and the material, but often conversation is lacking especially in asynchronous approaches (Chinyamurindi, 2007:48).

2.7 HISTORY AND DEVELOPMENT OF COMPUTER-ASSISTED LEARNING

According to Holmes and Gardener (2006:36-37) using technology to access information has become commonplace in our daily lives. Terms such as 'google' are used to describe searching for information on the internet regardless of what search engine is used. However the application of technology in information gathering and learning has a lengthy history. One of the earliest examples is the 'teaching machine' built by behaviourist B.F. Skinner in 1958 which provided feedback to students after learning. He suggested that programmed instruction can be used to determine how stimuli promotes learning and if feedback of learning affects behaviour (Holmes & Gardener, 2006:37). In addition, South African mathematician Seymour Papert, developed a computer language in the 1960's called LOGO which was aimed at supporting child education (Henderson, 2003:206).

Computers were developed from the 1940's onward and were bulky large machines mostly owned by large corporations until the development of the microcomputer in 1974 (O'Regan, 2012:35). The invention of the personal computer enabled the British government to supply computers to schools during 1980 to 1986 which established the department of education and science's micro-electronics education programme (Holmes & Gardener, 2006:43-44). Subsequently, the United Kingdom government then sponsored a number of nursing CAL projects during the 1990's (Lewis, Davies, Jenkins & Tait, 2005:587).

In 1985 the International Symposium on Nursing Use of Computers and Information Science was held in Calgary, Canada. The symposium comprised of information science in practice, education, research and administration (Townsend & Norman, 1985:167). In the conference report it is evident that countries such as Holland, Japan and the United States had already commenced the use of computers in formal and informal nursing education (Townsend & Norman, 1985:167-168). Furthermore, the conference convener, Dr Kathryn Hannah, coined the concept 'nursing informatics' and predicted that it "will ultimately be so profound as to totally change the nature of nursing education" (Townsend & Norman, 1985:168).

The World Wide Web became commercialised in 1995 and CAL grew concomitantly (Gillies & Cailliau, 2000:264). According to Gribbin (2011:30) HotMail (referring to Hyper Text Markup Language) was created in 1996 and by 2008 mobile internet users exceeded desktop internet users. Furthermore, there were an estimated 2.1 billion internet users worldwide in 2011. Holmes and Gardener (2006:51) state that the development in

technologies, such as the internet, transformed our understanding of knowledge, from possessing knowledge to being able to know where to find it. Similarly education has been revolutionised due to the increased access to information, more learning opportunities through CAL and the surfacing of a society of lifelong learners (Holmes & Gardener, 2006:51).

The growth and status of CAL globally and in nursing is elaborated on in 2.8 below.

2.8 STATUS OF COMPUTER-ASSISTED LEARNING

2.8.1 Global status

Evidence suggests that CAL has grown globally over the past years. For example the American Society for Training and Development (2007:np) in Johnson *et al.* (2009:545) estimates that 40 billion dollars are spent annually on CAL and in addition at least 3 million students enrol in web based courses yearly. Furthermore, a literature review conducted in 2004 established that in the United Kingdom during 2001, 28% of companies used their intranet to deliver training and 46% had instituted CAL programmes (Lain & Aston, 2004:4).

In China nearly 2.8 million students were enrolled in internet based courses during 2006 and that number nearly doubled in 2012 to 5.7 million enrolments (National Bureau of Statistics of China, 2013:np). These distance education colleges set up on-line educational support for their students in order to promote independent learning.

Therefore it can be reasoned, that CAL is well established internationally, especially in developed countries. However it cannot be assumed that the same holds true for the African continent. Further investigation is required to determine its status in Africa and in particular South Africa.

2.8.2 African and South African status

Africa has one of the fastest growing economies in the world. According to the World Bank (Africa overview, 2014:np) Sub-Saharan Africa's economic growth rate rose from 5.3% in 2012 to 5.6% in 2013 with an estimated expected growth of 6% in 2014 excluding South Africa.

Despite this growth, the latest e-learning Africa report (Elletson & MacKinnon, 2014:64) indicates that obstacles in CAL in Africa include poor connectivity, lack of infrastructure and lack of electricity. Nevertheless 66% of respondents stated that they use social media to facilitate learning. In addition, educators responded that the greatest form of improvement in

schools would be the establishment of internet connections and computer hardware availability (Elletson & MacKinnon, 2014:65).

In conjunction with this there has been a marked increase in the use of CAL in the workplace in South Africa. One of the major challenges regarding CAL in South Africa relates to infrastructure. Andersson and Grönlund (2009:6) states that such inadequate technological infrastructure may generate decreased accomplishment in CAL. The e-learning Africa report states that the availability of bandwidth remains a crippling effect on CAL (Elletson & MacKinnon, 2014:64). In addition to this only 9.8% of households in South Africa have access to the internet and in the Western Cape 20.3% (Statistics South Africa, 2013:np). Yet the prevalence of workplace CAL in South Africa has increased from 17% in 2003 to 33% in 2010 (Meyer, Probart & Bushney, 2010:np).

Various South African companies are offering CAL solutions services. One of the largest e-learning companies in the Western Cape is The Training Room Online. The company develops CAL solutions for a wide range of companies and is currently in the process of developing an anatomy and physiology module for a private nursing education institution. According to Vlietstra (2014:np), an instructional designer at The Training Room Online, CAL is a multi-million rand business in South Africa and the demand has grown steadily over the past few years.

2.8.3 Status in nursing

Nursing has been at the forefront of developments in CAL. Lewis *et al.* (2005:587) stated that the first recorded CAL in nursing was developed in 1969. There is a definite increase in the utilisation of information technology in nursing (Bembridge, Levett-Jones & Jeong, 2010:20). In 1997 the Australian government advised that information technology be integrated in the nursing curricula (Hegney *et al.*, 2007:24). Likewise, advances in information technology usage in the workplace, has led employers to increasingly expect computer literacy of their employees. This also holds true for the nursing profession. For example, Canadian nurses are required to utilise information technology skills in pursuing continuous professional development (Saskatchewan registered nurses' association, 2013:np).

Searle (2005:197,199) suggests that even though nurses are responsible to maintain professional competence, the employer is in turn obliged to create opportunities for professional development.

Although evidence suggests that e-learning is growing in organisations, little is known about the status of CAL in nursing in South Africa. Three research studies were obtained by the researcher which was conducted in South Africa, namely Maboe and De Villiers (2011:1), Akimanimpaye (2012:9) and Mgutshini (2013:1).

2.9 LEGISLATIVE REQUIREMENTS IN SOUTH AFRICA

The Skills Development Act 97 of 1998 and the Skills Development Levies Act 9 of 1999 was established by the department of labour to improve the skills of the South African workforce in order to grow the economy (Coetzee, 2007:30). The Skills Development Act states that organisations must set up a workplace skills plan and if timeously completed may apply to the Sector Education Training Authority (SETA) for a grant (Republic of South Africa, 1998:24). Furthermore, this act established the SETAs, National Skills Authority and the National Skills Fund.

Figure 2.1 depicts the Skills Development Levies Act process for employers to pay skills levies and in turn receive grants.

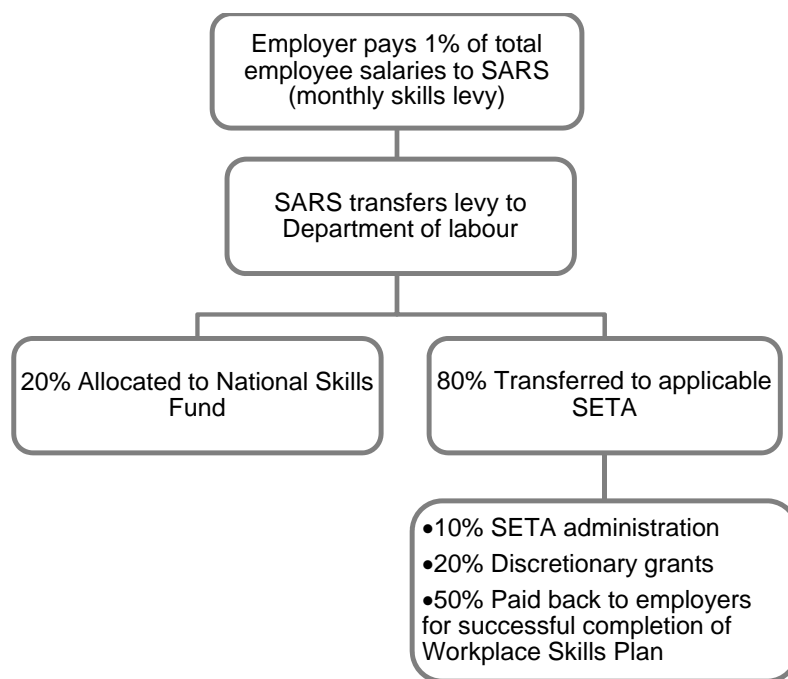


Figure 2.1: Diagram illustrating the process of skills development levies and grants

Source: Coetzee, 2007:35

Therefore the implementation of the Skills Development Act in 1998 incentivised South African employers to explore innovative methods to implement training programmes (Sector

specialist guide, 2010:np). Furthermore the Health and Welfare SETA set skills priorities to employers which include computer literacy (Sector specialist guide, 2010:np). CAL is a cost efficient manner for organisations to deliver training interventions because a greater number of personnel can be reached over a wider platform, expensive transport costs are eliminated and attendees spend less time away from work because travelling time to training venues are also avoided (Mathis & Jackson, 2009:92).

The Nursing Act 33 of 2005 (Republic of South Africa, 2005:29) makes provision for the continuous professional development of nurses. In chapter 2 the act clearly states that the South African Nursing Council (SANC) may determine the conditions for continuous professional development for nurses in order to maintain registration (Republic of South Africa, 2005:29). In turn the SANC states in the charter of nursing practice (SANC, 2004:9) that nurses should participate in self-directed learning activities in order to broaden their knowledge base and should actively participate in lifelong learning. SANC further asserts that nurses should be able to utilise information technology to effectively communicate with patients (SANC, 2004:38).

On 23 September 2013 the department of health published the strategic plan for nurse education, training and practice (Republic of South Africa, 2013:12); it clearly states that continuous professional development and nursing informatics competency forms the cornerstone of creating positive practice environments. All of this paves the way for South African nurses to utilise technology for continuous professional development.

It can be deduced that all of the above legislation and regulatory requirements motivated organisations to develop learning activities that enabled them to comply with these obligations (Bischoff & Govender, 2004:70).

2.10 ADVANTAGES OF COMPUTER-ASSISTED LEARNING

According to Takalani (2008:39) several advantages of CAL exist. Learners can complete learning activities in their own time. Learning can take place anywhere where a computer and an internet connection are available and therefore learners may perform activities at their own pace and in their own time.

Evidence is contradictory whether CAL is a cost efficient mode of delivering learning and development in the workplace. Usually the input cost is relatively high as it takes manpower to design, develop and implement CAL activities. However once these activities are available there is little maintenance and support cost. It does become problematic to determine the

exact cost of training as hours away from work and bandwidth cost is difficult to measure accurately per attendee (Lain & Aston, 2004:29).

One of the major advantages of CAL is that potential and actual learners have increased access to information sources. Learners also tend to be more self-directed and are able to receive instant feedback from on-line assessments (Mbuli, 2013:31).

Businesses become virtual workplaces because information and policy changes are available on intranet. This information is accessible anywhere where there is a computer or an internet connection (Takalani, 2008:40).

2.11 LIMITATIONS RELATED TO COMPUTER-ASSISTED LEARNING

Several limitations of CAL can be identified. For instance it is logical that CAL is dependent on technology, thus a failure in technology will directly affect the CAL process. As mentioned in section 2.8.2, bandwidth availability in South Africa is a primary concern for this learning delivery method. Therefore learners may become frustrated with a slow internet connection or outdated computer (Chinyamurindi, 2007:57).

For learners who are used to, or prefer traditional instructor lead training, participating in CAL may be a challenge and they might fall behind or find it tedious or boring. They may feel that there is no support when they want to ask a question which may lead to feelings of isolation (Akimanimpaye, 2012:37).

According to (Lain & Aston, 2004:29) it is difficult to calculate the return on investment of CAL activities. These programmes are often expensive to develop or acquire and employers often cannot quantify the effectiveness of such programmes.

Should a learner only possess basic or no computer skills, they may feel discouraged or even anxious to attempt CAL activities. Furthermore time constraints in the workplace are often a realistic challenge for employees (Takalani, 2008:60). In addition lack of access to computers or the internet may significantly impede on the CAL process (Takalani, 2008:59).

The above-mentioned studies mainly focused on non-nurses and one study (Akimanimpaye, 2012:9) targeted nursing students.

2.12 FACTORS INFLUENCING THE EXPERIENCE OF COMPUTER-ASSISTED LEARNING

CAL may be influenced by various factors. A discussion of these factors is elaborated on below.

2.12.1 Organisational support

Experience of CAL in the workplace also depends on the support afforded by the employer (McVeigh, 2009:96). The employer permits the employee time to attend learning activities at work, however this relates to direct and indirect costs incurred by the organisation and might interrupt productivity in the workplace (Lain & Aston, 2004:29). Employers might be resistant to release employees to attend training interventions, which may lead to employees developing negative experiences of CAL (Yu & Yang, 2006:772). Although studies indicate that CAL is more cost effective than traditional classroom based instruction, organisations find it difficult to determine the exact return on investment related to CAL (Lain & Aston, 2004:29). This could lead to hesitance in spending money as organisations are already spending an average 3.1% of turnover on training (Meyer *et al.*, 2010:np). Similarly learners depend on employers to provide the facility and infrastructure for CAL. This includes providing a venue, technical support, computers as well as other necessary equipment and assistance. Sufficient facilities and infrastructure leads to positive experiences in CAL (Carroll, Booth, Papaioannou, Sutton & Wong, 2009:239).

2.12.2 Human interaction

The nursing profession philosophy is grounded in caring for people (Muller, 2010:20). Therefore it stands to reason that it would be challenging for nurses to learn without any human interaction, whether it be instructor or peer interaction. A correlational study identified that nurses were disappointed in a CAL programme due to a lack of human interaction (Cobb, 2011:116). According to Carroll *et al.* (2009:238) peer interaction in CAL not only enhances the learning experience but also provides a sense of social wellbeing. Further investigation is required to determine whether nurses in South Africa prefer traditional classroom based learning to CAL based on the level human interaction.

2.12.3 Programme design

In the design of a CAL program various factors need to be taken into consideration to ensure effectiveness of learning, such as the content, structure, visual appearance, usability and access to information (Dennison, 2011:45). In Carroll *et al.* (2009:238) it is evident that users become dissatisfied with CAL when it is presented without apparent effort. Furthermore participants preferred CAL programmes that contained real-life scenarios and actual interactive case studies. According to Dennison (2011:46) developers should gather feedback from participant to constantly improve usability of CAL programmes. A recent study among nursing students in their second and third year revealed that achieving their learning outcomes through CAL was problematic due to the content of the programme (Maboe & De Villiers, 2011:100). Another challenge experienced by learners is the vast quantity of

information in a CAL activity (Khogali, Davies, Donnan, Gray, Harden, McDonald, Pippard, Pringle & Yu, 2011:315). Thus the design of a CAL activity may play a major role in the experience of RPNs in CAL, however this needs to be investigated.

2.12.4 Computer literacy

Multiple research findings predominantly indicate that the lack of computer literacy skills directly relates to negative experiences of nurses in CAL (Cheeseman, 2011:264; Bembridge *et al.*, 2010:246; Chen *et al.*, 2009:706; McVeigh, 2009:94; Wilkinson, While & Roberts, 2009:764; Yu & Yang, 2006:772). Adams and Timmins (2006:15) suggests that participants involved in CAL often spend substantial time acquiring computer skills during the programme or else denies the importance of acquiring these skills. However, the available evidence in other countries about nurses' computer literacy was predominantly collected from the public health sector, whereas in South Africa there is no evidence of CAL in the public health sector (Frans, 2013:np). In addition there is currently no data available in South Africa of the computer literacy levels of RPNs. On the other hand, the private health sector has developed platforms for communication and learning through information technology. For example a private hospital group recently implemented WebEx through Internet Solutions in 2008 (Mediclinic: Local WebEx implementation leads to global adoption, 2011:np).

Even though the internet presents abundant opportunities for nurses to learn, a longitudinal study indicated that Taiwanese nurses spend less than 3.5 hours per week on the internet, which is much lower than the national average (Sheen, Chang, Chen, Chao & Tseng, 2008:198). A recent South African study concluded that 25.6% of nursing students were not computer literate and therefore could not effectively utilise CAL opportunities (Maboe & De Villiers, 2011:98). Further investigation is needed to determine whether access to a computer and internet at home or at work influence's a learner's experience of CAL due to higher computer literacy skills.

2.13 SUMMARY

This literature review includes a discussion on all aspects related to computer-assisted learning. In depth definitions of CAL is considered and an overview of the history and current status of CAL was provided. The legislative background and requirements related to CAL was discussed. Furthermore the advantages, limitations and the factors influencing CAL were presented. Chapter 3 focuses on the research methodology adopted to perform the study and includes the research design, methodology, data collection, data analysis, efforts to ensure trustworthiness and ethical considerations.

2.14 CONCLUSION

While the studies examined in this literature review supplied valuable information regarding the status, challenges and factors influencing CAL, it cannot be assumed that RPNs in the Western Cape will have exactly similar experiences, although it is probable. Further examination is required to contribute to the existing body of knowledge of RPNs experiences in CAL.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter 3 contains an in-depth description of the research methodology that was briefly explained in Chapter 1. Furthermore, the goal of this chapter is to explain in detail how the methodology was applied in the study, underpinned by the literature that supports the methodology.

3.2 STUDY SETTING

The study was conducted during 2014, in Somerset West and Brackenfell, which are urban areas of the Cape Metropole in South Africa. The private healthcare organisation in the study has 52 hospitals in Southern Africa and is one of the largest in the country. They provide computer-assisted learning (CAL) activities for formal education, as well as clinical skills for all categories of nurses but focus mainly on registered professional nurses (RPNs).

The wide variety of CAL interventions presented by the organisation include intranet-based CAL activities, such as assessing a patient's skin lesion risk, interpreting an electro cardiograph and formal courses presented through video conferencing or WebEx-based CAL sessions.

3.2.1 Research aim

The aim of this study was to explore the experiences of RPNs in computer-assisted learning in a private healthcare organisation in the Cape Metropole.

3.2.2 Objectives

The objective of the study was to explore the experience of RPNs in the following aspects of CAL:

- Organisational support
- Human interaction
- Programme design
- Computer literacy

3.3 RESEARCH DESIGN

The research design forms the blue print of the study and improves the probability that the results of the study are an accurate reflection of reality (Burns & Grove, 2009:218). The research design reveals the steps taken to conduct the study.

The study followed a descriptive, exploratory approach through qualitative methodology. Previous similar studies (Pawlyn, 2012:33-37; Carroll *et al.*, 2009:235-241; Chen *et al.*, 2009:704-709) were conducted by means of qualitative methodology. Qualitative methodology was selected for this study as suggested by Burns and Grove (2011:73) as the researcher aimed to explore the unique lived experiences of participants in CAL and the consequent meaning thereof.

A descriptive, exploratory approach was chosen in order to develop theory, explore present challenges and to discover what others in comparable circumstances are doing (Burns & Grove, 2011:256). Furthermore, the researcher intended to obtain a deeper understanding in order to describe the meaning of participants' everyday experiences in CAL (De Vos, Strydom & Fouche, 2011:96).

Burns and Grove (2011:34) describe descriptive research as exploring and describing experiences in real-life circumstances. De Vos *et al.* (2011:96) suggest a descriptive exploratory approach is ideal when investigating particulars of a situation, in order to generate a complete, in-depth view of the phenomenon. In addition, Smythe (2012:5) states that a descriptive approach in research enables the researcher to listen to the opinions of participants, analyse themes and present an outline of the findings. Consequently this approach was chosen due to the study setting and the objectives of the study.

The researcher compiled themes from the interview data that enabled accurate presentation of the findings. Collecting the opinions of the participants was essential to the aim of the study.

3.4 POPULATION AND SAMPLING

3.4.1 Population

The concept population indicates that all constituents that meet the sample criteria must be included in the study (Burns & Grove, 2009:42). The target population was identified from a private hospital organisation, with six (6) hospitals in the Cape Metropole. Two (2) of the six hospitals were selected of which a total of thirty five (N=35) registered professional nurses had been exposed to CAL from April 2014. The population size was determined by contacting the training departments from each of the six hospitals in the organisation. The researcher was previously employed by the organisation in this study at a location geographically removed from the selected population. This minimised bias as the researcher did not personally know any of the participants.

3.4.2 Sampling

Following ethical and organisational approval, the sample for this study was purposely drawn from two of the six hospitals. These hospitals were selected because they are two of the largest in the area, with the most employees and participants in CAL. They also present the most CAL interventions representative of those available in the organisation. In addition, the participants attended CAL interventions during work hours at the selected hospitals. They were supported by facilitators from the selected hospitals, which is typical of the CAL setting in the healthcare organisation (Van der Merwe, 2014:np).

Burns and Grove (2011:313) describe purposive sampling as selecting participants that have in-depth experience of the phenomenon under study. Purposive sampling was used in order for the researcher to gather information from participants with a rich but representative experience of CAL in the nursing context. This meant that participants had recent experience in CAL, had at least four years or more nursing experience, were male and female and were also of a variety of ages. Participants in this study met the terms of these criteria. Furthermore participants were selected based on the typical CAL activities available at the healthcare organisation, namely intranet- and WebEx-based CAL activities.

The names and contact numbers of the RPNs who attended CAL activities within the three months preceding data collection was provided to the researcher by the training consultant of each of the two hospitals. The training consultant is responsible to facilitate CAL in the organisation by preparing the venue, ensuring attendance and maintaining a record of evidence of training for each individual employee. Furthermore, they are responsible for compiling and completing the skills plan under the direction of the organisation's skills development facilitator.

As suggested by De Vos *et al.* (2011:391), sampling commenced once the study had already started. The sample size was based on when data saturation was reached and not as a representation of the population of the study. As CAL is presented on a continuous basis at the organisation, only participants who attended a CAL activity in the three months preceding data collection was included in the sample. This ensured that their experiences were recent and enabled participants to converse with ease on the topic. For this study, an initial purposive sample of eight (8) participants was selected for individual interviews and five (5) for a focus group interview.

3.4.2.1 Sample realisation

Although the researcher had initially intended to do eight (8) individual interviews, data saturation was reached after six (6) individual interviews as no new information arose. In

addition only one participant arrived for the focus group interview, which then turned into an individual interview. This is explained in more detail in section 3.9.

The final sample was therefore seven (7) participants and consisted of the following:

Individual interviews:

- Three participants attended formal lectures via WebEx-based CAL activities
- Four participants took part in intranet-based CAL activities

3.5 INCLUSION CRITERIA

Inclusion criteria for participants consisted of the following:

- All participants were RPNs employed at the selected private healthcare organisation in the Cape Metropole.
- Participants included male and female RPNs.
- Participants had taken part in at least one CAL activity within three months preceding data collection.

3.6 DATA COLLECTION TOOL

LoBiondo-Wood and Haber (2010:80) defines an interview guide as a set of questions and probe words or phrases that direct the data collection process. In this study, a semi structured interview guide (Annexure B) was compiled by the researcher and used for all the interviews. The Afrikaans interview guide was verified by an expert in Afrikaans (Annexure C). According to De Vos *et al.* (2011:351) this form of collection tool enables the collection of multiple, detailed responses, whilst affording the researcher and participants flexibility.

The objectives of the study, as indicated by the conceptual framework, directed the interview guide. Furthermore, the interview guide was scrutinised by the supervisor, co-supervisor and a panel of experts in research methodology. The researcher developed the interview guide supported by years of experience in nursing education and CAL.

The interview guide (Annexure B and C) commenced with an open-ended question regarding the CAL activity the participant completed. The questions that followed addressed each of the study objectives. One question specifically addressed the participants' computer literacy level, whereas the other three questions respectively dealt with the support afforded by the employer, design of the learning programme and human versus computer based instructor respectively. These objectives coincided with the conceptual framework as explained in chapter 1 (section 1.8).

Participants were offered the option to write naïve sketches should they feel anxious sharing their experiences verbally. The researcher was prepared to read out the interview questions and the participants would be allowed to write down in their own words their opinions and experiences related to the interview questions. However all participants declined the use of these naïve sketches as they felt comfortable sharing their experiences verbally.

3.6.1 Pre-test

Burns and Grove (2011:544) describe a pre-test as a reduced form of a study conducted to improve and refine the methodology.

Pre-testing consisted of an interview with one participant. The participant was selected by purposive sampling from the population of the study. According to Burns and Grove (2011:313) purposive sampling is used to select participants that have in-depth experience of the phenomenon under study. The participant was employed by a hospital included in the study and conformed to the sampling criteria. Furthermore the participant had completed two intranet-based CAL activities in the previous month, which ensured that the participant had recent experience of CAL. The participant's demographic details were collected and rights explained before commencing with the interview questions.

The pre-test was conducted in exactly the same manner as was planned for the study. No limitations or pitfalls were identified, as mentioned in Chapter 1 (section 1.9.6). Therefore the participant's data was included in the principle study as the same sampling frame and methodology was used as in the main study (Thabane *et al.*, 2010:6).

The pre-test assisted the researcher in establishing a more accurate estimate of the cost and time involved in the research process (De Vos *et al.*, 2011:390).

3.7 TRUSTWORTHINESS

Validity is often a significant concern in qualitative research, because the researcher often works alone and is therefore more susceptible to bias (Burns & Grove, 2009:392). Lincoln and Guba's model (1985:290) was applied in the study. This model suggests that credibility, transferability, dependability and confirmability must all be used in measuring the "truth value" of the study results. Furthermore, the model provided an indication of how precisely the researcher interpreted the findings of the study.

3.7.1 Credibility

Credibility indicates the extent to which the results of the study and the research methods applied can be trusted (Brink, 2008:118). For the purpose of this study credibility was ensured by implementing two approaches, namely member checking and peer debriefing.

Member checking involved handing participants their interview transcripts and asking them to verify the data. Themes and sub-themes were presented to participants and information amended as required. The theme of 'time' was amended to 'opportunity' as participants stated that it was not only available time, but available opportunities which pose a challenge. Ultimately all participants agreed with the transcripts and interpretation thereof.

Peer debriefing included requesting objective peers with qualitative research experience to examine and study various aspects of the investigation (Lincoln & Guba, 1985:304). This study was circulated electronically to the supervisor and co-supervisor of the study who examined and verified the transcripts.

3.7.2 Transferability

Transferability refers to the degree to which research findings can universally be applied to other studies (De Vos *et al.*, 2011:420). The odds of the findings of one study, replicating that of another is near impossible due to different samples (Burns & Grove, 2009:560). In order to support transferability the study was guided by the literature review and conceptual theoretical framework (De Vos *et al.*, 2011:420), based on andragogic theory. Transferability was strengthened by utilising more than one method of data collection, namely individual interviews and a demographic questionnaire. The researcher did not intend to generalise the findings of the study to a larger population as this is not possible in qualitative research. However, as further suggested by Burns and Grove (2009:24) understanding the experiences of nurses in CAL added value to the understanding of experiences in comparable circumstances.

3.7.3 Dependability

Ensuring dependability necessitates the audit of procedure and processes used by the researcher in the study (Brink, 2008:118). The method for data collection and analysis in the study was validated by the researcher, research assistant and the supervisor. The researcher was trained on interview techniques by an expert in research methodology and the study supervisor. Interviews were conducted according to the interview guide. Recorded interview data was transcribed by a professional audio typist and then verified by the researcher as accurate. Furthermore the supervisor of the study continuously monitored the processes and procedures in the study to ensure dependability.

3.7.4 Confirmability

Confirmability implies that there is conformity between the actual evidence and the results, deductions and recommendations of the researcher (Brink, 2008:119). Therefore the researcher in this study, weighed over a period of time, the importance of collected data and

deducing the meaning thereof (Burns & Grove, 2009:392). The research assistant was trained to ensure accurate capturing of notes during interviews. In addition, transcriptions of the interviews were verified with each individual participant, thus confirming that the data was transcribed accurately and ensured the exclusion of bias. In addition the supervisor also verified the similarity of the themes and sub-themes in comparison to the recordings and the transcripts.

3.8 ETHICAL CONSIDERATIONS

The researcher was directed by three essential ethical principles: respect for persons, beneficence and justice. Thus, consent to conduct the study was obtained from the Health Research Ethics Committee at Stellenbosch University on 15 April 2014 (Annexure G), and from the nursing executive of the organisation under study on 12 June 2014 (Annexure F). In addition, the participants were able to withdraw from the study at any time without consequence or judgement. Participants, who were anxious about sharing their experiences, were afforded the opportunity to write naïve sketches instead of interviewing. During the interview participants were referred to by aliases. All participants were allocated a number which was used in the transcripts and the research report. All data were securely and safely stored.

3.9 DATA COLLECTION PROCESS

According to Burns and Grove (2011:43) data collection is the process of accurate, methodical gathering of information related specifically to the research purpose, objectives, questions or hypotheses of the study. The researcher received training and practice on interviewing techniques from the supervisor of the study and a specialist in qualitative methodology. A colleague with a master's degree assisted the researcher with verifying qualitative data collection procedures and analysis.

After ethics approval, the researcher requested organisational consent. One hospital granted consent within two weeks and the second hospital took one month to grant consent. Thereafter the organisation gave consent in June 2014. Thus data collection was delayed by the time period required for hospital and organisational consent.

Once organisational authorisation was obtained, the nursing managers of the respective hospitals requested that the researcher work through the hospital's training consultants. The training consultant informed the various unit managers regarding the study and the subsequent visits by the researcher. In addition, the training consultant provided the researcher with a list of names and contact details of staff members who have participated in CAL activities from April 2014. The list was checked for gender, age and type of CAL activity

attended. The selected participants were contacted via e-mail and telephonically and the researcher verified that they complied with the sampling criteria. The researcher explained the interview process to each participant and thereafter obtained written informed consent from them in person.

Interviews were done by the researcher personally and the research assistant attended four interviews and took notes during the interviews. Interviews lasted twenty minutes to an hour. Most interviews were conducted while participants were on duty at a location that insured privacy, such as the training department or a unit manager's office. Participants considered these venues as convenient and unit managers and training consultants agreed that these areas may be used. Seven participants were interviewed between June and August 2014. No interviews were conducted during July. The extended data collection period was due to the availability of participants and the researcher's ability to travel to Cape Town. Participants had work commitments that did not allow for immediate availability.

Demographic details were collected from all participants at the start of the interviews, in the form of a questionnaire. Interviews were conducted in the language preferred by the participant. Five interviews were conducted in Afrikaans and two in English. Simple language was used to ensure that all participants clearly understood the questions. Summarisation, reflecting and probing techniques were used during the interview. In addition the researcher also clarified participants' responses to ensure correct understanding of their experiences.

A digital voice recorder and a battery operated recorder were used to record all interviews as a precaution against technical failure, as suggested by De Vos *et al.* (2011:310).

Field notes were written by the researcher directly after each interview and by the research assistant during the interviews. Furthermore, the research assistant was advised regarding the writing of field notes during the focus group interview.

The researcher intended to conduct eight individual interviews. However, data saturation was reached after six participants were interviewed, as no new information arose from the interviews. The researcher also arranged a focus group interview with five participants. The information regarding the venue and time was relayed to participants. All five participants confirmed their attendance. Refreshments were organised and the research assistant attended the planned focus group interview. A sms reminder was sent one hour before the focus group interview. Unfortunately only one participant arrived for the focus group interview. The researcher attempted to contact the other participants telephonically, but was only able to reach two participants. These participants stated that they did not feel

comfortable discussing their experiences in a group. As only one participant was available, the focus group interview turned into an individual interview. This participant also provided information similar to the previous individual interviews. The target population in the study was small, but the researcher contacted ten other participants who met the sampling criteria, to arrange a focus group. These potential participants however declined to take part in the study due to reasons such as work circumstances, availability of time, uneasiness with discussing the topic in front of peers and some stated simply that they were not interested.

The lack of a focus group put the study at risk for systematic variation, however scientific validity was maintained as the final sample was representative of the population and data saturation was reached despite the lack of the focus group. According to Burns and Grove (2009:347) sample attrition is the loss or withdrawal of participants from a study. In this study the attrition rate was 30%. However the researcher found no disparities in the demographic variables of those who remained in the study and those who withdrew (Burns & Grove, 2009:347). The study is also strengthened by providing a reason for the withdrawal of participants (Burns & Grove, 2011:297); namely that they did not feel comfortable sharing their experiences in a group.

The researcher aimed to conduct each interview in a similar pattern. For instance participants were initially asked a broad question: "Tell me about the learning activity you recently completed". This was intended to make the participants feel at ease and comfortable with speaking freely about their experiences regarding CAL.

3.10 DATA ANALYSIS

According to Babbie (2007:378), qualitative analysis includes the non-mathematical investigation and clarification of findings with the aim to identify and process hidden significance and associations.

Interviews were transcribed by a professional medical transcriptionist. Afrikaans interviews were translated by an expert language practitioner. Both the medical transcriptionist and the language practitioner signed confidentiality agreements (Addendum H & J) not to disclose any information regarding the participants or work they performed for this study. Furthermore aliases were used during the interviews to protect participants' identity. Transcription of data included denoting all pauses and expressions such as laughter and sighs. The transcripts contained double margins; on the left the lines were numbered and the right was left blank in order for the researcher to insert comments and memo's regarding the interview and the content thereof. Also, transcripts were numbered according to the participant and interview number (Burns & Grove, 2009:520).

The researcher used the data analysis framework as suggested by Terre Blanche *et al.* (2006:322-326) due to its clarity and usability. This is discussed and illustrated below.

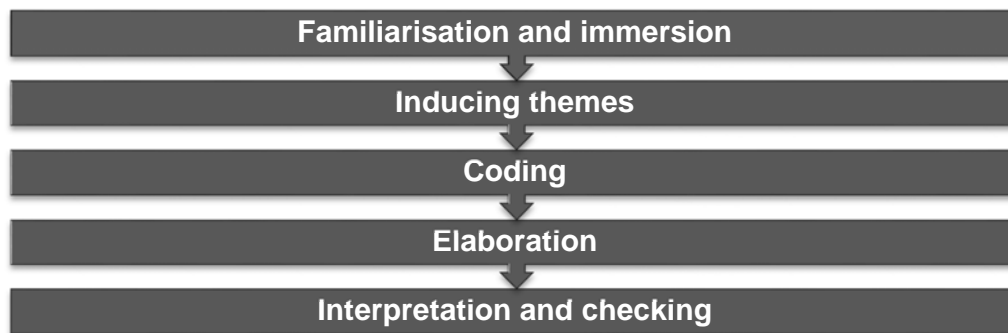


Figure 3.1: Diagram illustrating the data analysis framework of Terre Blanche, Durrheim and Painter used in the study.

Source: Terre Blanche *et al.*, 2006:322-326

3.10.1 Familiarisation and immersion

Transcribed notes were read repeatedly to ensure complete familiarisation with the data. The researcher immersed herself in the data by frequently working with the notes in the margins of the transcribed data. This process enabled the researcher to understand the experiences of RPNs in CAL. In addition, the researcher also repeatedly listened to the recorded interviews while reading the transcripts to become familiar with participants' responses.

3.10.2 Inducing themes

Terre Blanche *et al.* (2006:323) states that a 'bottom up' approach should be used to determine the natural underlying principles to organise the data. Therefore, the interview data was processed and compared to find similarities, patterns and variations. Repetitive words, phrases and expressions were labelled in order to establish categories. Participants' responses were inserted in a spread sheet. Similar responses were grouped together and assigned descriptive terms. Descriptive terms were refined to form the sub-themes and the sub-themes were grouped together to form themes. Then, as Terre Blanche *et al.* (2006:323) suggests, the data was continuously verified in congruence with the research question.

3.10.3 Coding

Coding is when data is organised in separate sections which correspond with the themes and sub-themes (Burns & Grove, 2009:522). According to De Vos *et al.* (2011:411) the researcher should meticulously mark segments in the data using codes. Examples of codes that can be used include abbreviations of key words, coloured labels and numbers.

In this study participants were each coded numerically. This assisted the researcher to distinguish between the data collected from each participant. Furthermore it preserved participant anonymity.

Data was coded by identifying key concepts and then colour coding them. The information was then placed within these concept categories.

3.10.4 Elaboration

The data was systematically re-examined for potential themes that may have previously gone unnoticed. Thereafter the themes were inspected specifically for any preconceived ideas on the part of the researcher. This process was repeated until no new insights emerged.

3.10.5 Interpretation and checking

Burns and Grove (2009:552) state that interpretation of data encompasses the clarification of the meaning thereof. Furthermore, the procedure of interpretation includes scrutinising evidence, ascertaining findings, forming conclusions, searching the importance of the findings, generalising the findings, considering the implications and proposing further research (Burns & Grove, 2009:553). The researcher used the data analysis to compile a written report of the interpretations of the study, which included schematic presentations, narrations and suggestions. Additionally, participants were quoted word for word with subsequent translations where required, as this enhanced the depth of the study (De Vos *et al.*, 2011:352).

3.11 SUMMARY

This chapter included a detailed report of the research process and design, which included the methodology, the population and sampling, the data collection method and the instrument that was applied in the study. The methods applied to ensure trustworthiness were provided, as well as the steps taken to comply with ethical considerations.

The next chapter presents a report of the data analysis and the interpretation of the research findings.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

According to De Vos *et al.* (2011:397) data analysis involves the progression of organising large amounts of data into structure and meaning. In this study, data analysis included the analysis of the data collected during the interviews. The information was analysed and the findings describe the experiences of RPNs regarding computer-assisted learning. This chapter presents the discussion and presentations of the findings.

All the recorded interviews were transcribed verbatim and where applicable translated into English by an expert in English and Afrikaans to authenticate the trustworthiness of the collected data. Data was analysed according to the data analysis process as authored by Terre Blanche *et al.* (2006:322-326). The steps are described in Chapter 3: section 3.9. The interview transcriptions were read over a number of times with the intention to obtain a complete insight of the interviews and to become familiar with the data.

The researcher used inductive reasoning to construct themes from the bottom up. Inductive reasoning refers to the process of inferring general principles from particular occurrences (Terre Blanche *et al.*, 2006:323). Consequently the researcher was able to gather information through observation and compile generalisations based on the evidence.

The results are presented in two sections. Section A comprises a discussion on the biographical data of the participants and Section B describes the themes and sub-themes that arose from the data. Participants are referred to by number to maintain confidentiality. In addition the two hospitals are differentiated as hospital A and B as there are distinct differences related to the access to CAL activities in the institutions.

4.2 SECTION A: BIOGRAPHICAL DATA

4.2.1 Demographic data

The participants (n=7) were RPNs. All the participants were employed by the organisation under study. Participants completed a CAL activity within the three months preceding data collection.

4.2.2 Age groups

The ages of the participants ranged between 26 and 58 years. Two participants were between 22 to 29 years, four between 30 to 49 years and one between 50 to 65 years. Therefore all participants were adult learners as indicated in the conceptual framework.

4.2.3 Gender

There were seven (n=7) participants; one (n=1) male and six (n=6) females. This is consistent with the SANC's geographical distribution report (2013:1) which confirms that the majority of RPNs are female. The report states that there are 129 015 RPNs in South Africa of which 118 198 are female.

4.2.4 Computer literacy

Participants rated their own level of computer literacy. The majority of participants (n=6) indicated that their computer literacy level was average and one participant (n=1) as high. This contradicted the information participants provided during the interviews as discussed below in section B number 4.3.6.

4.3 SECTION B: THEMES AND SUB-THEMES

Six themes emerged from the interviews namely access, opportunity, applied support, social learning, computers and the programme and content of CAL activities. Twenty one sub-themes emerged from the six main themes. The themes with the corresponding sub-themes are presented in Table 4.1 below.

Table 4.1: Themes and sub-themes

Themes	Sub-themes
Access	<ul style="list-style-type: none"> • Availability of computers • User access at work • User access at home
Opportunity	<ul style="list-style-type: none"> • Work circumstances • Employer requirements • Specified time allocation
Applied support	<ul style="list-style-type: none"> • Preparation • Communication • Convenience • Technical aspects • Learning environment
Social learning	<ul style="list-style-type: none"> • Facilitator • Learners

Themes	Sub-themes
Programme and content	<ul style="list-style-type: none"> • Variety • Volume • Applicability • Level • Programme design
Computers	<ul style="list-style-type: none"> • Proficiency of use • Preferences • Employer expectation

4.3.1 Access

This theme relates to the ability of staff members to access the resources necessary to do CAL activities. The two hospitals in the study differ in relation to the access staff members have to computers. At hospital A computers are not freely available to the ward staff and few have user access to the intranet or internet, whereas hospital B some computers are available to staff and all have user access to the intranet and e-mail, however not to the internet. Following on these facts the sub-themes below depict participants' experiences relating to accessing the CAL resources.

4.3.1.1 Access – availability of computers

Participants at hospital A felt that they cannot easily access CAL activities because there are few computers available. If they wish to complete a CAL activity, they must do so at the training department which is currently not on the hospital premises. They were of the opinion that should computers be more readily available, they would be more inclined to complete CAL activities. On the other hand, participants at hospital B stated that although they have reasonable access to computers, there are not enough computers for staff members to share. There is however at least one computer available in all units and also the staff leisure areas, but this is considered an inadequate number to partake in CAL activities. Furthermore, these computers are located in areas which are considered not conducive to learning.

“Each of the nursing stations have one computer obviously it's mostly for the UAA, unit admin assistant who does the stock and each of the tea rooms has a computer as well...other people are in there as well” (participant 7).

Therefore, the limited availability and appropriate placement of computers is experienced by participants as an obstacle to participate in CAL.

4.3.1.2 Access – user access at work

Participants felt frustrated that they are not granted user access at work to the intranet which contains CAL activities. When a staff member wishes to complete a CAL activity at hospital A, the training department personnel must supply them with their personal username and password and log them onto the system. Also, staff members in the units do not have internet or intranet access. Therefore they cannot access CAL activities independently. One participant who is a unit manager remarked that in relation to professional development, she would prefer some of her staff to have intranet and internet access.

“Dit is nogal frustrerend partykeer dat ons nie internet het nie...daar is 'n paar susters hier wat ek sal wil toegang gee, en selfs die intranet” (participant 3).

Translated response:

“It is quite frustrating sometimes that we do not have internet...there are a few sisters here who I would like to give access and even the intranet” (participant 3).

In contrast participants who did have user access to the intranet did not experience user access as an obstacle to CAL.

“Ons almal is, ons het ons e-pos adresse en ons kan log in the internet. As jy nou regtig nie weet wat iets is nie kan jy gou-gou gaan kyk” (participant 6).

Translated response:

“We all have our e-mail addresses and we can log into the internet, if there is something you really do not know, you can quickly go and look” (participant 6).

The responses confirm that lack of user access at work results in participants not having access to CAL activities and therefore cannot access it at will. However, the organisation does support some individuals by granting user access at work, albeit inconsistently.

4.3.1.3 Access – user access at home

All participants confirmed they do not have access to organisational CAL activities at home. Furthermore they agreed that should they be able to, they would complete these activities in their own time at home.

“I would do it at home, but then from home we're not allowed to access the intranet” (participant 7).

The minority of participants felt strongly that they were not willing to spend more time physically at work just to complete CAL activities.

“Ek sal ja, maar ek gaan nie by die werk later bly nie om dit te doen nie ek is jammer” (participant 6).

Translated response:

“I shall yes, but I will not stay later at work to do it I am sorry” (participant 6).

These responses demonstrate that there is a need amongst participants to have user access at home. This would afford them the access they require to undertake CAL activities when they so desire. The conceptual framework supports these findings as adults want to learn in a self-directed manner.

4.3.2 Opportunity

This theme conveys the opinion of participants relating to the limited opportunity they have to perform CAL activities. Participants mentioned that aspects such as lack of provision of time, work circumstances and employer’s requirements impacted on their opportunities to take part in CAL activities.

4.3.2.1 Opportunity – work circumstances

All participants who performed intranet-based CAL activities felt that there is not sufficient time during working hours to do so. Participants felt obliged to complete their work duties before they could do CAL activities. Similarly there is always some form of duty to perform, consequently there is hardly any opportunity available to do CAL.

“Ek voel ek kannie hier sit en aktiwiteite doen nie, want daar’s te veel ander werk om te doen” (participant 1).

Translated response:

“I feel I can’t sit here and do activities, because there is too much other work to be done” (participant 1).

Some participants suggested that the nature of their work is unpredictable and therefore they often cannot complete a CAL activity. They further felt that patient care is a priority above a learning activity and that the learning activity should be stopped should the work circumstances require it. This situation caused participants stress and participants felt that they did not want to attempt CAL activities because they anticipated not completing it due to work circumstances.

“It’s a bit frustrating because I haven’t gone back to the one I finished half way, because you know you are going to be called...It’s just a bit stressful with work and being called out to go and do things” (participant 7).

These quotations confirm that participants feel obligated to complete their work, due to the circumstances thereof, rather than completing CAL activities and this causes them emotional distress.

4.3.2.2 *Opportunity – employer requirements*

Participants agreed that their employer expected them to be at work for their allocated time and that they would feel uncomfortable to request to leave the ward to attend a CAL activity. Moreover participants at hospital A only have the option to attend CAL at the training department, which is not on the hospital premises. Therefore participants' supervisors were resistant to allow them to leave the unit in order to attend a CAL activity.

“Die eenheidsbestuurder sal nie die personeel uit die saal uit laat gaan om hier te kom sit nie” (participant 1).

Translated response:

“The unit manager will not allow staff to leave the ward and sit here” (participant 1).

Also participants suggested that the employer expects of them to maintain competence through an organisational points system, but that they do not afford them the time to do CAL activities. Having staff participate in learning activities impacts the amount of productive hours and therefore has an effect on financial matters of the organisation. Each professional development activity is allocated a certain number of professional development points. Participants felt conflicted between the obligation towards their employer to maintain professional competence and serving the business interests of the employer.

“Presies dit is 'n toutrekkery jy moet punte kry. They strive to develop their people, maar aan die ander kant is dit 'n besigheid” (participant 1).

Translated response:

“Exactly, it is a tug of war; you must get points. They strive to develop their people, but on the other hand it is a business” (participant 1).

These responses confirm that participants experienced that the employer placed them in an internal conflict situation between their responsibilities to maintain competence versus contributing to the profitable operation of the organisation.

4.3.2.3 *Opportunity – specified time allocation*

Participants who attended WebEx-based CAL activities all agreed that there was a specified time arranged for them to attend their sessions. Therefore they could leave the unit and attend their sessions at the training department without experiencing any discord. In contrast

participants who did the intranet-based CAL activities confirmed that they would prefer that their employer allocated them a specific time in which they could do the activity. They felt uncomfortable to do CAL activities in work time without the explicit permission of their employer. Participants agreed, that should their employer allocate a specific time for them to do CAL activities, that their feelings of guilt would be alleviated.

“Ek sal meer gemaklik voel om agter die rekenaar te sit en so iets te doen as my werkgever vir my sê: hierso, vat elke dag 'n uur en gaan doen die aktiwiteit” (participant 1).

Translated response:

“I would feel more comfortable to be behind the computer and do something like this if my employer said to me: here, take an hour every day and go and do the activity” (participant 1).

“That would've been ideal if you were given some formal time, but because it is not a formal course, you can't say I want some time off” (participant 7).

Considering the above quotations WebEx-based CAL participants received adequate support from their employer with reference to time allocated for learning. However those who complete intranet-based CAL activities felt that the employer failed to provide them with a specific allocated time to participate in CAL activities. The lack of organisational support links to the conceptual framework because adults must be ready to learn. By not having adequate opportunity, this need of the adult learner cannot be addressed.

4.3.3 Applied support

This theme relates to the support participants received from the organisation under study including their relevant employees such as lecturers, facilitators, training departments and technical support systems. Participants shared their experiences freely regarding the support afforded by their employer and its sub-structure.

4.3.3.1 Applied support – preparation

Participants felt anxious because they were not sure how the CAL activity functioned. Furthermore the WebEx-based CAL participants did not receive training on the process of the learning activity. One participant stated that initially the lecturer put learners at ease but did not follow through with the promised training preparation for the WebEx-based CAL activity. This resulted in a breakdown of the trust relationship between the lecturer and participants since they felt disappointed and abandoned.

“Ons het gedink die fasiliteerder sou ons fisies help, want dis wat sy gesê het: sy gaan stap vir stap met ons deurgaan. So by die tyd wat ons dit moet doen sal ons presies weet en dit was nie die geval nie”

Translated response:

“We thought that the facilitator would physically help us, because that is what she said: she will go through it step by step with us. So by the time we have to do it we will know exactly and that was not the case” (participant 4).

Moreover one participant stated that she only did the activity because she felt forced to do so. Consequently her frame of mind was negative during her preparation for the activity.

“Nee ek het dit net gedoen want ek moes dit doen” (participant 6).

Translated response:

“No, I only did it because I had to” (participant 6).

These quotations substantiates that it is important for a participants to be informed and trained on how the process of a CAL activity works and that staff should not be forced to complete learning activities.

4.3.3.2 Applied support – communication

According to WebEx-based CAL participants, sessions were organised by an administrative clerk at head office and then presented by various lecturers from different geographical areas around South Africa. Participants experienced a lack of communication between the organisers, presenters of the WebEx-based CAL sessions and themselves. Due to the lack of communication during the start of the course, participants felt that they were annoying WebEx-based CAL organisers.

“Die fasiliteerder van die program het nie vir hulle gesê: luister daar’s mense wat glad nie weet hoe dit werk nie so julle gaan moet leiding gee nie. So ons het aan die begin gevoel, okay sy’s bietjie ongeduldig” (participant 4).

Translated response:

“The facilitator of the programme did not tell them: listen there are people who do not know how it works, so you will have to give guidance. So in the beginning we felt okay, she’s a little impatient” (participant 4).

These responses accentuate the need for adequate communication between all role players in CAL activities.

4.3.3.3 *Applied support – convenience*

Preferably WebEx-based CAL sessions should be available to learners at the private healthcare organisation, if not learners would have to travel to attend lectures elsewhere. This would be costly for the organisation and the learners. In addition, learners would have to spend time away from their families. For instance some lecturers are based in Pretoria and the learner in Cape Town. Participants agreed that CAL activities are very convenient as they do not have to travel to attend classes elsewhere.

“...dit is vir my ideaal. Eerder as om in 'n kar te klim en Kaapstad toe te ry of Stellenbosch toe te ry.” (participant 3).

Translated response:

“...it is ideal for me. Rather than climbing in a car and driving to Cape Town or Stellenbosch” (participant 3).

For the intranet-based CAL activities participants felt that these could be done in their own time, if they had time available. They were appreciative towards their employer for making these activities available to them at work.

“You don't have to wait for a specific person; you can do it in your own time if it's available” (participant 7).

The quotations confirm that the employer created a platform that is mutually beneficial for learners and themselves. For the employer and participants there are financial and time saving benefits.

4.3.3.4 *Applied support – technical aspects*

Various technical difficulties were experienced by most of the participants. Due to telephone line interference, the lecturer was often not audible during the WebEx-based CAL sessions. For example, if a learner was to simply turn a page all the other learners dialled into the WebEx-based CAL session, can hear the action as it is significantly amplified. This contributed to learners not actively taking part in the session nor asking questions.

“That's why we just sit quietly, just to keep everything, not to fiddle around” (participant 5).

As described, the telephone connection was often poor and participants could not hear all the information and felt that they often missed information or had to interrupt the lecture to bring this to the lecturer's attention.

“The line breaks up a lot so you miss some information and you don’t get the clear picture you would have liked” (participant 5).

Participants were constantly nervous of the link being terminated and that they would then miss information shared via the session. Also should all of the learners not be able to dial in timeously due to technical difficulties, the session would go ahead without them. One participant in particular was annoyed with this because it seemed to be unfair.

“Dan het dit nege uur begin, as jy nou aange’log’ is of nie...en ek voel net dis niks wat jy gedoen het nie” (participant 4).

Translated response:

“Then it started at nine, whether you are logged on or not...and I just feel that it is nothing that you did” (participant 4).

The minority of participants who completed intranet-based CAL activities experienced some technical difficulties, however significantly less than WebEx-based CAL participants. Here the challenges were more related to unstable server connections, such as not being able to complete the assessment part of the activity due to a poor system connection.

“Toe wil hy nie die assessment oopmaak nie, toe moes ons die hele proses restart” (participant 2).

Translated response:

“Then it wouldn’t open the assessment, so we had to restart the whole process” (participant 2).

The quotations suggest that several technical challenges existed relating to CAL activities. These challenges were more dominant in participants who completed activities through WebEx-based CAL.

4.3.3.5 Applied support – learning environment

Participants who completed intranet-based CAL activities often experienced disturbances in the venue where they attended the CAL activity. Sometimes people entered the venue and distracted the participants.

“Op daardie spesifieke dag moes ek dit hier voor in die vertrekke doen, wat bietjie moeilik is want mense kom, of as hulle iets moet doen” (participant 2).

Translated response:

“On that specific day I had to do it here in the little room in front, which was a bit difficult because people came in or if they had to do something” (participant 2).

However, the majority of WebEx-based CAL participants stated that the learning environment was quiet and that they were undisturbed. In addition these participants further stated that the training department at their respective hospitals were most supportive with setting up computers for them and arranging for a quiet, undisturbed learning environment.

“Look from their side, they supported us very well because we had our own room with no-one else in it” (participant 5).

An environment conducive to learning is an important contributor to effective learning as explained in the conceptual framework. The conceptual framework indicated that adults' readiness to learn is somewhat dependent on the learning environment. These findings suggest that the employer provides an adequate venue for WebEx-based CAL, however not for intranet-based CAL activities.

4.3.4 Social learning

This theme relates to the experiences of participants relating to lack of human contact during their CAL activity. Participants conversed easily on this topic with at least some of them preferring face to face contact versus face to computer contact.

4.3.4.1 Social learning – facilitator

The majority of WebEx-based CAL participants would have preferred face to face contact with their lecturers. They suggested that should they have been able to see the lecturers face, such as via live video streaming, they would have felt much more at ease during the sessions. Participants were under the impression that they would be able to see the lecturer during the WebEx-based CAL session and were disappointed when this was not the case.

“I think that would really help, because I actually thought that's what WebEx was but no. When I didn't know what she looks like it was difficult” (participant 5).

Participants who completed intranet-based CAL activities were mostly content with minimal social interaction. They stated that they did not have a preference for face to face or face to computer, as they were inherently different and did not view these methods as either good or bad. They further suggested that CAL is a good system because as adults, they have to utilise learning opportunities independently.

“Jy kan nie ge-spoon feed word nie, dit is adult learning” (participant 2).

Translated response:

“You cannot be spoon fed, this is adult learning” (participant 2).

However the same participant mentioned that not all nursing topics should be addressed by using CAL.

“Sekere onderwerpe dink ek gaan 'n mens nie mee wegkom om dit so te doen nie Dan gaan jy nodig hê dat iemand moet by wees.” (participant 2).

Translated response:

“Certain topics, I think one would not get away with doing it like that. Then you are going to need someone to be there” (participant 2).

Participants further suggested that not having a facilitator on hand was a challenge because CAL activities only contain a certain amount of information. If they should want to ask questions or for elaboration on the topic, it would be best served by a physically present facilitator.

“It's always nice to have someone, because you can ask a question that the computer is not going to give you an answer. If you had some interaction with someone it would have been easier to get a different perspective...you are limited with the information that is on the system” (participant 7).

4.3.4.2 *Social learning – learners*

WebEx-based CAL participants were clear that they preferred learning in a group setting. They felt it enabled them to better understand and remember the work and also learn from the questions their fellow learners asked.

“Jy wil eintlik gesels, maar jy weet jy is eintlik in die klas... ja en hoe hulle dink en die tipe vrae” (participant 3)

Translated response:

“You actually want to converse, but you know you are actually in the class...yes and how they think and the type of questions” (participant 3).

However, although the WebEx-based CAL sessions were completed in a virtual group setting, some participants felt that it would be preferable to be in direct interaction with the group. They were of the opinion that it would also be easier to remember the work in a physical group as you pay better attention.

“Jy kan minder notas maak want daar is die heelyd interaksie” (participant 4).

Translated response:

“You can take fewer notes, because there is continuous interaction” (participant 4).

On the other hand participants who completed intranet-based CAL activities were satisfied with no social interaction with others, mostly because they did not expect it from the activity they completed.

“Ek sal nie sê dis vir my beter of slegter, dit is net vir my anders” (participant 1).

Translated response:

“I wouldn't say that it is to me better or worse, to me it is just different” (participant 1).

These findings correlate with the conceptual framework as adults' life experiences as adults prefer to learn in a facilitative environment which CAL can provide.

4.3.5 Programme and content

This theme denotes how the participants experienced the CAL programme and content.

4.3.5.1 Programme and content – variety

Participants who completed the intranet-based CAL activity indicated that they would appreciate a larger variety of topics. They experienced that currently only a few CAL activities are available and that a wider amount of topics would increase the interest in CAL.

“If there is a bigger variety or more options, it's limited. It doesn't speak to everyone who might have a need for knowledge in something different” (participant 7).

4.3.5.2 Programme and content – volume

Some of the CAL activities had too large an amount of information. Participants believed this required greater concentration from them and that they could not recall all the information because it was simply too much for one session.

“Dit was monde vol inligting, information overload” (participant 3).

Translated response:

“It was a lot of information, information overload:” (participant 3).

In addition the WebEx-based CAL participants felt that since their formal courses only contained an average of two to three sessions, their lecturers had to attempt to cover a great deal of work in a very short space of time. Although learners were expected to come to

sessions prepared, they suggested that you could easily fall behind if you were not properly prepared.

“We made sure we did our part beforehand otherwise you would get lost, it is a lot” (participant 5).

These responses indicate that participants felt overwhelmed by the amount of information contained in a CAL activity.

4.3.5.3 Programme and content – applicability

The majority of participants deemed most of the CAL activities to be of little or no value in the sense that it did not contribute to improve their competency or knowledge. They felt the content did not address the actual need in their units. For example participants stated that intranet-based CAL activities mostly focus on the basic principles of topics such as fluid and electrolyte balance, instead of addressing issues such as incorrect recording of fluids.

“Ek het niks daaruit geleer nie” (participant 6).

Translated response:

“I did not learn anything from it” (participant 6).

“Ek sal nie sê hierdie aktiwiteit gaan die probleem oplos in die saal nie” (participant 1).

Translated response:

“I wouldn't say that this activity will solve the problem in the ward” (participant 1).

In contrast, one participant found that the CAL activity not only broadened their knowledge, but also improved their practical skills.

“I could apply it. There was a lot of useful information. I can say that I have learned from that” (participant 7).

Furthermore, WebEx-based CAL participants experienced that lecturers merely went through the basic work and did not elaborate on any information. Learners were already hesitant to ask questions due to disturbances and they felt that they did not learn anything more than what they had already worked out from their objectives.

“Hulle het letterlik net gedek wat vir hulle gegee was om te doen en as niemand gevra het nie dan was daar nie uitgebrei nie” (participant 4).

Translated response:

“They literally only covered which was given to them to do and if no-one asked, then there wasn’t elaborated” (participant 4).

4.3.5.4 Programme and content – level

Participants who completed the intranet-based CAL activities experienced the level of the activity as either too low for RPNs, or too high for other categories of staff. The activities do not clearly state which category are targeted.

“It doesn’t differentiate between categories or ranks it might have benefitted more. It should be made category specific” (participant 7).

In contrast, WebEx-based CAL participants experienced that the content of the programme was at an acceptable level, and they could keep up with the information delivered. However they did state that it was mostly because they went to the sessions prepared.

4.3.5.5 Programme and content – programme design

Participants were not satisfied with various aspects of the design of the CAL activity. One participant completed an on-line assessment and was disappointed that their anonymity will not be protected, even though the programme initially promised anonymity. The participant had to enter their personnel number during the activity and felt that the result of their assessment would then be on record.

“..waar jy ook basies anoniem bly, maar jy sit jou nommer in” (participant 6).

Translated response:

“...where you also basically stay anonymous, but you enter your number” (participant 6).

Another participant experienced that answers were changeable after the assessments. In other words, when learners received their assessment marks, they could go back and change the answers. The participant felt that this did not contribute to the learning process and that this made the assessment pointless.

“Ek weet nie wat jy nou eintlik toets deur dan, ek weet nie wat die doel agter die e-learning dan is...as ek my punt kan manipuleer” (participant 1).

Translated response:

“I don’t know what you then actually test, I do not know what the goal of e-learning is then...if I can manipulate my marks” (participant 1).

Furthermore, participants stated that they did not agree with certain information supplied by the intranet-based CAL activity. This created feelings of uncertainty regarding the reliability of the rest of the information contained in the activity.

“...waar hulle vir jou sê die antwoord is a, c en d, maar volgens my is dit a, b, c en d. Nie net ek het die aktiwiteit gedoen nie en my kollega het dieselfde gevoel” (participant 1).

Translated response:

“...where they (CAL activity) tell you the answer is a, c and d, but according to me it is a, b, c and d. Not only I did the activity and my colleague felt the same” (participant 1).

Participants were also dissatisfied because the intranet-based CAL activity cannot be stopped and saved at a certain point. So if they did not have sufficient time to finish the activity, they would have to stop and start over from the beginning at a later stage.

“It doesn’t allow you to continue where you left it, you have to start right from the beginning again” (participant 7).

Participants’ experienced that the design of the CAL activity is not always conducive to the learning process. It is therefore important to improve the assessment and design of the CAL programme in order to ensure efficient learning takes place. The conceptual framework also indicated that adults prefer to learn through problem-based methods, which the findings support, because participants were satisfied with CAL activities they could apply in practice.

4.3.6 Computers

This theme relates to how participants experienced computers and aspects related thereto.

4.3.6.1 Computers – proficiency of use

As mentioned in paragraph 4.2.4 most participants rated themselves as having average computer literacy. One participant rated herself as highly computer literate. However during the interviews, participants raised several challenges relating to computer literacy. WebEx-based CAL participants felt very unsure of how the process worked such as how to click with a computer mouse on a link. They all confirmed that they would not have been able to manage the sessions without the assistance of the hospitals’ training consultants.

“Ek sou dit nie op my eie kon doen nie... as ek die kennis gehad het sou dit my vyftien minute, waar dit my nou drie ure sal vat” (participant 3).

Translated response:

“I wouldn’t be able to do it on my own...if I had the knowledge it would have taken me fifteen minutes, whereas now it will take me three hours” (participant 3).

Additionally one WebEx-based CAL participant mentioned that she was expected to do a presentation on a subject during a session and was extremely nervous and could not continue until someone assisted her.

“Dit was nogal ’n uitdaging, ek het nie geweet hoe om dit te doen nie...een kollega kon my help” (participant 4).

Translated response:

“It was quite a challenge, I did not know how to do it...one colleague could assist me” (participant 4).

In contrast, participants who completed the intranet-based CAL activities stated that it was very easy to use and that even a person with a low level of computer literacy would not struggle.

“Dit is eenvoudig vir so iemand wat nie blootstelling aan rekenaars het nie, om te kan maklik deur dit gaan” (participant 2).

Translated response:

“It is simple for such a person, who do not have exposure to computers, to easily go through it” (participant 2).

These findings suggest that although participants indicated on the demographic questionnaire that they have average to high computer literacy and that some activities were easy to use; they still struggled with some basic computer proficiencies such as using the mouse to more complex skills like presentations.

4.3.6.2 Computers - preferences

Most WebEx-based CAL participants said they accepted the use of the computer for learning as there were sometimes no alternatives available. The minority of participants expressed a dislike of computers and technology in general. One participant felt that her dislike in computers affected her learning negatively.

“It is too electronic...It is not a computer course, it is a nursing course” (participant 5).

In contrast intranet-based CAL participants enjoyed the use of the computer and felt a high degree of acceptance thereof with regard to the learning process.

“Nee, ek het dit nogal regtig geniet. Ek persoonlik dink vir studie by die werk, is dit vir my ideaal.” (participant 3).

Translated response:

“No, I rather enjoyed it really. I personally think that for studying at work, it is ideal” (participant 3).

“Ek het dit baie positief ervaar” (participant 2).

Translated response:

“I experienced it very positively” (participant 2).

These statements provide evidence that the minority of participants disliked the use of technology whereas most welcomed it.

4.3.6.3 *Computers – employer expectations*

Participants expressed that their employer expects them to be computer literate. Should they not be able to use computers, they will struggle during formal courses. On the other hand formal computer literacy training is not offered by the organisation and personnel are expected to be responsible for their own computer literacy training. A participant who is a unit manager felt obliged to do a computer course in her own time and was concerned about the computer literacy level of her staff.

“Van hulle word ook verwag om rekenaar vaardig te wees...sewentig present van my personeel is nie rekenaar vaardig nie” (participant 4).

Translated response:

“It is expected of them to be computer literate...seventy percent of my staff is not computer literate” (participant 4).

Some participants were unaware that computer literacy is required to complete a formal course that included WebEx-based CAL sessions. Participants were taken aback with the large amount of time they would have to spend using a computer during their formal courses.

“Toe ek aansoek doen vir die kursus, is daar nie vir my gesê dat jy moet rekenaar vaardig wees nie. Jy moes fisies weet waar om in te gaan” (participant 4).

Translated response:

“When I applied for the course I was not told that one would have to be computer literate. You physically had to know where to go in” (participant 4).

The responses above reflected the need felt by participants for their employer to assist them to become computer literate, especially because the organisation expects computer literacy of them. This is reflected in the conceptual framework as the findings suggest that participants would be more motivated to learn, should their computer literacy skills be adequate.

4.3.8 Summary

In this chapter the study findings were discussed. The biographical data and factors relating to CAL in nursing were presented. A collection of six themes emerged from the data.

The results of the study revealed that RPNs at the private healthcare organisation in this study have both positive and negative experiences regarding CAL. Positive experiences included support received from training consultants and ease of use of intranet-based CAL activities. However, participants overwhelmingly experienced that the lack of opportunity and access are both major challenges in CAL. Additional challenges included lack of support from course co-ordinators, frustrations with the design and content of the programme and the lack of social interaction.

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

Previous chapters contained the rationale and literature review to form the foundation of the study. A detailed explanation of the research methodology was discussed followed by the findings of the study.

Chapter 5 draws conclusions regarding CAL within the nursing environment as experienced by Registered Professional Nurses (RPNs) at the private healthcare facility in the study. The achievement of the study objectives are validated by discussing the conclusion based on the objectives. Recommendations are constructed from the empirical evidence with the intention to offer suggestions toward the improved delivery of CAL interventions. Furthermore, this chapter explains specific limitations and incorporate the final conclusions of the study.

5.2 DISCUSSION AND RECOMMENDATION

The aim of the study was to explore the experiences of RPNs regarding CAL in a private healthcare organisation. The discussion on the findings of the study in relation to each study objective is herewith provided:

5.2.1 Objective 1: The experiences of registered professional nurses in computer-assisted learning relating to organisational support

Organisational support plays a pivotal role in the professional development of personnel at work (Newton & Ellis, 2005:386). Personnel depend on their employer to provide them with the necessary resources to take part in CAL activities (Pawlyn, 2012:36). Fundamental elements of organisational support would translate to supplying staff with sufficient computers, user access, opportunity to learn, technical support and an environment which is conducive to learning.

5.2.1.1 Access

The majority of participants agreed that there is a general lack of support from their organisation, specifically related to the availability of computers and user access at home or at work (paragraph 4.3.1). Consequently participants experienced feelings of frustration, because they were not able to access information which would increase their knowledge and competence in the performance of their duties. In contrast, participants who did have access to computers and user access at work did not experience this as an obstacle. Participants

would prefer to have user access at home and were willing to complete CAL activities in their own time.

One of the major advantages of CAL is that it is easily accessible (Rohleder, Bozalek, Carolissen & Leibowitz, 2008:101). The findings of the study confirm that physical and user access is essential for participating in CAL activities. However without adequate, appropriately placed computers and actual access to utilise it, independent CAL will not take place. Even though the organisation supports employees by developing CAL activities; it is vital to ensure that employees will be able to access the learning interventions by providing adequate means.

5.2.1.2 Opportunity

All intranet-based CAL participants agreed that there is minimal opportunity to complete CAL while at work. Participants stated that although their employer expects them to maintain professional competence, they are not afforded the opportunity to complete CAL activities due to the cost implications for the organisation (paragraph 4.3.2.2). Participants felt stressed and conflicted between the expectations from their employer and on the other hand their responsibility to be at work where they are needed. Another challenge for participants was the unpredictability of their work circumstances; Participants cannot leave patients without proper care to do CAL activities (paragraph 4.3.2.1).

Most participants who attended intranet-based CAL activities agreed that they would appreciate it if their employer afforded them a specified time allocation which would alleviate their feelings of guilt. In contrast participants who completed WebEx-based CAL sessions confirmed that their employer supported them adequately by providing specified class times. The classes were planned and there was no expectation of them to simultaneously be at work and attend the learning activity (paragraph 4.3.2.3).

In order to support all learners adequately, they must be afforded the opportunity to participate in CAL activities (Oultram, 2010:43). The findings pointed out that the organisation provides participants the opportunity to attend formal course lectures via WebEx-based CAL. However participants are not afforded adequate opportunity to complete informal CAL activities and they experienced this as a serious lack of organisational support.

5.2.1.3 Applied support

Since CAL is delivered by means of technology, a foundation of technical support plays an important role (Moule, Ward & Lockyer, 2010:2790). All WebEx-based CAL participants experienced some form of technical difficulty at some point during the CAL activity.

Participants felt disadvantaged, because when technical problems arose, the session would continue without them. Consequently they either missed or could not follow the presented information. Moreover, challenges such as poor telephone connections enormously amplified peripheral sounds which caused participants not to actively take part in the lectures for fear of audio interferences. On the other hand, the intranet-based CAL participants experienced minimal technical issues (paragraph 4.3.3.4).

It is important to ensure an appropriate environment for learning. This environment should be non-judgmental, non-threatening, well stocked with resources and quiet (Quinn & Hughes, 2007:202). Intranet-based CAL participants experienced disturbances at the learning venue due to the phone ringing or people entering the venue. This had a negative effect on the learning process as participants were distracted. Yet, WebEx-based CAL participants were provided with an undisturbed, separate venue and felt very supported in this regard (paragraph 4.3.3.5).

WebEx-based CAL participants also experienced insufficient communication and lack of personal preparation regarding the functionality of sessions (paragraph 4.3.3.1 & 4.3.3.2). Furthermore facilitators of sessions were unreliable as experienced by some participants, as assurances were given but not realised. This meant that participants felt disappointed and disillusioned.

All participants agreed that they were appreciative towards their employer for providing a convenient means of participating in learning, namely CAL. This mode of learning was experienced as time- and cost efficient for both the employer and employee (paragraph 4.3.3.3).

The findings show that participants experienced that the organisation supports them by establishing CAL activities that are convenient. However, simply providing the means without additional applicable support, leads to ineffective learning and dissatisfied learners.

As demonstrated in the conceptual framework an adult needs to learn in a self-directed manner. Considering that they experienced CAL as convenient and could do it in their own time supported the need for independent learning. Then again not having adequate support undermines the requirement of self-determination.

5.2.2 Objective 2: Registered professional nurses' experience of computer-assisted learning in relation to human interaction

The lack of human interaction is often viewed as a disadvantage of CAL (Becker, Newton & Sawang, 2013:214). WebEx-based CAL participants mostly agreed that they prefer direct

contact with their facilitator and fellow learners. Also, they felt uncomfortable not being able to see the facilitator presenting the session (paragraph 4.3.4.1).

Even though WebEx-based CAL does afford some degree of group learning, participants still preferred direct interaction with a peer group (paragraph 4.3.4.2).

Similarly intranet-based CAL participants agreed that minimal human interaction has some disadvantages. Shortcomings included: not being able to ask questions, having limited information at their disposal and the inability to gain a broader perspective. However, they did not indicate a strong preference for either direct or no human interaction.

Learning is often more effective in a social context (Carroll *et al.*, 2009:239). Even though WebEx-based CAL provides a form of blended CAL, the findings demonstrate that participants preferred or experienced advantages of direct social interaction with fellow learners and the facilitator. A blended approach may be ideal when delivering CAL activities, albeit not always feasible (Cottrell & Donaldson, 2013:226). Thus the blended approach must be thoroughly considered and planned for effective learning to take place.

The conceptual framework indicates that adults have unique life experiences, which may influence the learning process. This statement is corroborated by the findings which indicated that most participants prefer facilitator and peer group interaction as a matter of personal preference.

5.2.3 Objective 3: Registered professional nurses' experience of computer-assisted learning related to programme design

Carroll *et al.* (2009:240) suggests that the design and content of a CAL activity should be adequately planned developed and executed. Both WebEx- and intranet-based CAL participants agreed that the amount of information in the activities were excessive (paragraph 4.3.5.2). WebEx-based CAL participants were concerned that they would fall behind or lose their way. Correspondingly, intranet-based CAL participants were unsure whether they would be able to recall the information and felt overwhelmed due to the amount thereof.

Participants suggested that they would appreciate an increased variety of intranet-based CAL activities as the current selection is limited (paragraph 4.3.5.1). Bearing in mind that the organisation is still in the process of generating CAL activities and therefore an increase of these activities are likely to materialise.

Most participants but one stated that the content of the CAL was not always applicable to practice and would not improve challenges experienced in the nursing unit (paragraph 4.3.5.3). Intranet-based CAL activities mostly focused on the basic principles of nursing care. Whereas WebEx-based CAL sessions only covered theoretical objectives and if questions were not asked, no elaboration was offered.

Intranet-based CAL participants experienced that the learning activities were not category specific. They were of the opinion that most of the activities were at a level too low for RPNs. However WebEx-based CAL participants confirmed that the content of their sessions were at an acceptable level for the target group: RPNs (paragraph 4.3.5.4).

In addition participants experienced that some information in the intranet-based CAL activity was incorrect. Furthermore, when completing a post assessment, it was possible for participants to change their answer in order to achieve a higher mark, thereby contradicting the purpose of the assessment. Also, a major drawback for participants was that it is not possible to save and continue an intranet-based CAL activity. Their frustration was evident, because each time they were unable to complete an activity, the next time they attempt it they would have to start over (paragraph 4.3.5.5).

The findings corroborate that the design and content of a CAL activity have a profound effect on the learning experience. According to Carroll *et al.* (2009:239) CAL should be designed in a way to meet the needs of participants to ensure effective learning takes place.

Some participants could not apply the content from the CAL activity in their workplace. As indicated by the conceptual framework, adults must be able to apply the information they have learned. Also, adults prefer learning activities that contain problem solving and real life scenarios (Azer, 2011:808).

5.2.4 Objective 4: Registered professional nurses' experience of computer-assisted learning related to computer literacy

Even though the majority of participants rated their computer literacy as average, many of the WebEx-based CAL participants acknowledged that they would not have been able to manage sessions without assistance. On the other hand intranet-based CAL participants concurred that the activities were easy to use, although admittedly they were of the opinion that someone with a low computer literacy level might have struggled (paragraph 4.3.6.1).

The minority of participants did not appreciate the utilisation of technology in the learning process. However, most participants stated that using computers when learning was a positive experience (paragraph 4.3.6.2).

The organisation expects RPNs to be computer literate, however do not provide computer skills training to staff. Consequently staff attempt to gain computer literacy in their own time or not at all. One WebEx-based CAL participant was unaware that computer literacy was an unwritten prerequisite to participate in a formal course. The participant was taken aback by the amount of computer involvement during the course (paragraph 4.3.6.3).

Computer literacy is a natural prerequisite for CAL (Becker *et al.*, 2013:103). However, from the findings it is evident that WebEx-based CAL participants struggled with aspects such as utilising presentations and managing WebEx-based CAL sessions. In contrast the organisations' intranet-based CAL activities were experienced as user friendly.

This objective is aligned with the conceptual framework, which describes that adults have to be 'ready to learn' in order for effective learning to take place. Lack of computer literacy meant that participants were not prepared for the learning experience.

5.3 LIMITATIONS

The study only focused on CAL at one private healthcare organisation. Other institutions including public healthcare facilities, who may offer CAL, were excluded. Also the study excluded other categories of nursing staff by only concentrating on RPN. There was only one healthcare organisation with seven (n=7) participants in the study. In addition, the lack of a focus group interview detracted from the trustworthiness of the findings.

The study could have been more effective if a focus group interview materialised and another healthcare organisation was included to improve the trustworthiness of the research findings.

5.4 RECOMMENDATIONS

The findings of the study guided the recommendations presented by the researchers. Suggestions are made to improve the experience of RPNs in CAL. Furthermore participants contributed several suggestions to resolve their challenges in CAL. These suggestions are included in the recommendations.

5.4.1 Appropriate access

Intranet-based CAL participants experienced a lack of available computers and limited user access. The computers that were available were placed in areas where there are multiple disturbances and no privacy.

It is recommended that there should be an increased availability of computers in the organisation. These computers must be placed in environments that afford learners

undisturbed privacy. Furthermore all staff members should be granted access to the organisation's intranet. The intranet is an organisation-specific web-based platform which contains all relevant information such as policies, procedures and CAL interventions. This will allow employees to gain access to CAL activities which were created for them. Also it should be considered to grant employees user access to the intranet from home. This could be considered for employees with their own internet connection at home.

Providing employees with access to CAL at home will benefit the employee and the organisation. The employee will be able to complete activities undisturbed, without feelings of guilt and be able to decide how much time they would like to spend on CAL. Therefore this will promote continuous professional development. In addition the delivery of nursing care should be based on evidence and providing nurses with internet access will promote evidence-based practice. Similarly the employer will benefit financially as employees do not have to spend on-duty time doing CAL. Also the employer will benefit from competent, knowledgeable RPNs.

5.4.2 Formal opportunity

The findings demonstrated that lack of opportunity related to either work circumstances, employer requirements and the absence of allocated time, meant that intranet-based CAL participants could not complete, or did not attempt CAL activities again.

A formal institutional policy is recommended which should stipulate the amount of time an employee is entitled to participate in informal training, such as CAL. Furthermore unit managers should support employees by ensuring that off duties are constructed in such a way, that employees will be able to complete activities without effecting the operational requirements of the unit.

5.4.3 Visual connection

The findings confirmed that WebEx-based CAL participants would have been more comfortable if they could see the facilitator and fellow learners. Modern technology supports the use of live video streaming (Abdous & He, 2011:40).

The recommendation is that synchronous learning via WebEx-based CAL should be adjusted to include an expanded blended approach. Introducing simultaneous video streaming and PowerPoint presentations could assist to put students at ease and more willing to ask questions if the facilitator and other learners are visible to them. Other options that should be explored by the employer include podcasting and pre-recorded lectures with voice overs.

5.4.4 Technical support structure

The findings indicated that participants experienced numerous technical difficulties during WebEx-based CAL sessions. Continued audio interferences distracted participants from the information presented by the facilitator.

Improved telecommunication systems are recommended. The amplification of peripheral sounds should be investigated by qualified persons and solutions should be pursued.

5.4.5 Separate learning from work environments

Intranet-based CAL participants experienced regular interruptions at the venue where they did the learning activity. As stated by Quinn and Hughes (2007:202) a training venue should be conducive to the learning process. Participants were also reluctant to attempt CAL again, once they were interrupted.

Therefore it is recommended that the organisation create and organise learner-centred learning environments that are conducive for learning.

5.4.6 Adjust the design of computer-assisted learning activities

The findings showed that participants were frustrated because intranet-based CAL could not be saved and continued at a later stage. Learning is not an isolated process; therefore learners must be able to reflect on the information presented to them (Quinn & Hughes, 2007:443).

The recommendation thus is to adjust the design of the intranet-based CAL activity to enable participants to save the activity at the point they wish and then be able to return to the activity at a later stage.

5.4.7 Future research

During the interviews it became clear to the researcher that although some similarities existed, WebEx-based CAL participants and intranet-based CAL participants experienced noticeable different challenges. For example, the major challenges for intranet-based CAL participants were access and opportunity, whereas WebEx-based CAL participants struggled with technical issues and the lack of human interaction.

It is recommended that future research is conducted on specific applications of CAL in nursing in more organisations, including the public health sector.

Also it could be useful to investigate the direct and indirect financial implications and advantages for both the employer and employee regarding granting user access from home for CAL activities.

5.5 CONCLUSION

The findings were discussed grounded on the objectives of the study in this chapter. The aim of the study was to explore RPNs experience in CAL. The aim and objectives of the study was achieved. RPNs experienced CAL mostly as a positive endeavour, considering the various challenges they face.

The findings of the study are supported by Knowles' theory of andragogy. Participants in CAL are eager to complete activities at home in their own time which correlates with self-regulation and motivation. They bring their unique life experiences to the virtual classroom, such as not enjoying technology and wanting more social interaction. Also they prefer a problem-based approach, for example participants felt that some of the content was too easy and others felt they did not learn much from their CAL activity. In addition participants' readiness to learn was greatly dependent on the support provided by their organisation. They often did not even attempt CAL activities due to lack of adequate support such as decreased access and opportunity.

REFERENCES

- Abdous, M & He, W. 2011. Using text mining to uncover students' technology-related problems in live video streaming. *British Journal of Educational Technology*, 42(1):40-49.
- Adams, A. & Timmins, F. 2006. Students views of integrating web-based learning technology into the nursing curriculum: A descriptive survey. *Nurse Education in Practice*, (6)1:12-21.
- Africa overview*. 2014. [Online]. Available: <http://www.worldbank.org/en/region/afr/overview#1.html> [2014, September 3].
- Ahedo, M. 2009. Comparing the principles of adult learning with traditional pedagogical teaching in relation to the use of technology. *International Journal of Web-Based Learning and Teaching Technologies*, (4)4:66-81.
- Akimanimpaye, F. 2012. Attitudes of undergraduate nursing students towards e-learning at the University of the Western Cape. Unpublished master's thesis. Cape Town: University of the Western Cape.
- Andersson, A. & Grönlund, A. 2009. A conceptual framework for e-learning in developing countries: A critical review of research challenges. *The Electronic Journal of Information Systems in Developing Countries*, 38(8): 1-16. [Online], Available: <http://www.ejisdc.org/ojs2/index.php/ejisdc/article/view/564/291> [2014, January 23].
- Axley, L. 2008. The integration of technology into nursing curricula: Supporting faculty via the technology fellowship program. *The Online Journal of Issues in Nursing*, 13(3):12.
- Azer, S.A. 2011. Introducing a problem-based learning program: 12 tips for success. *Medical Teacher*, 33:808-813.
- Babbie, E. 2007. *The practice of social research*. Belmont:Thomson Wadsworth.
- Becker, K., Newton, C. & Sawang, S. 2013. A learner perspective on barriers to e-learning. *Australian Journal of Adult Learning*, 53(2):211-233.
- Bembridge, E., Levett-Jones, T. & Jeong, S.Y. 2010. The preparation of technologically literate graduates for professional practice. *Contemporary Nurse*, 35(1):18-25.

- Bischoff, T. & Govender, C.M. 2004. A management framework for training providers to improve skills development in the workplace. *South African Journal of Education*, 24(1):70-79.
- Booyens, S.W. 2008. *Introduction to health service management*. Cape Town: Juta & Co Ltd.
- Brink, H. 2008. *Fundamentals of research methodology for the health care professional*. Cape Town: Juta.
- Burns, N. & Grove, S.K. 2009. *The practice of nursing research: Appraisal, synthesis and generation of evidence*. St. Louis: Elsevier Saunders.
- Burns, N. & Grove, S.K. 2011. *Understanding nursing research: Building an evidenced-based practice*. Maryland: Elsevier Saunders.
- Canadian Nurses Association. 2006. E-nursing strategy for Canada. [Online] Available: <http://cna-aiic.ca/sitecore%20modules/web/-/media/cna/page-content/pdf-en/e-nursing-strategy-2006-e.pdf#search=%22information%20technology%22>. [2014, October 3].
- Carroll, C., Booth, A., Papaioannou, D., Sutton, A. & Wong, R. 2009. UK health care professionals' experience of on-line learning techniques: A systematic review of qualitative data. *Journal of Continuing Education in the Health Professions*, 26(4):235 – 241.
- Cheeseman, S.E. 2011. Are you prepared for the digital era? *Neonatal Network*, 30(4):263-266.
- Chen, S., Stocker, J., Wang, R., Chung, Y. & Chen, M. 2009. Evaluation of self-regulatory on-line learning in a blended course for post-registration nursing students in Taiwan. *Nurse Education Today*, 29(7):704-709.
- Chinyamurindi, W.T. 2007. An investigation into e-learning acceptance in selected South African companies. Unpublished master's thesis. Port Elizabeth: Nelson Mandela Metropolitan University.
- Clark, R.C. & Mayer, R.E. 2011. *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Fransisco: Pfeiffer.
- Cobb, S.C. 2011. Social presence, stratification and perceived learning of RN to BSN students in web-based nursing courses. *Nursing Education Perspectives*, 32(2):115-119.

- Coetzee, M. 2007. *Practising education, training and development in South African organisations*. Cape Town: Juta & co.
- Cottrell, S. & Donaldson, J.H. 2013. Exploring the opinions of registered nurses working in a clinical transfusion environment on the contribution of e-learning to personal learning and clinical practice: Results of a small scale educational research study. *Nurse Education in Practice*, 13(3):221-227.
- Crafford, I. 2013. Utilisation of e-learning in Netcare, e-mail to C. Louw [Online], 2 December. Available e-mail: celeste.louw@westerncape.gov.za.
- De Vos, A.S., Strydom, H., Fouche, C.B. & Delport, C.S.L. 2011. *Research at grass roots: For the social sciences and human service professions*. Pretoria: Van Schaik.
- Dennison, H.A. 2011. Creating a computer-assisted learning module for the non-expert nephrology nurse. *Nephrology Nursing Journal*, 38(1):41-52.
- Denton, D.W. 2012. Enhancing instruction through constructivism, cooperative learning and cloud computing. *TechTrends*, 56(4):34-41.
- Donald, D., Lazarus, S. & Lolwana, P. 2011. *Educational psychology in social context: Ecosystemic applications in Southern Africa*. Cape Town: Oxford University Press.
- Elletson, H. & MacKinnon, A. (eds). 2014. *The e-learning Africa report 2014. ICWE: Germany*. [Online] Available: www.elearning-africa.com/report2014 [2014, June 9].
- Ericksen, C. 2011. *What is WebEx? A cool way to have an online meeting* [Online]. Available: <http://blogs.cisco.com/home/what-is-webex-a-cool-way-to-have-an-online-meeting/> [2014, October 3].
- Frans, C. 2013. Personal interview. 21 November, George.
- Friesen, N. 2009. *Re-thinking e-learning research: Foundations, methods and practices*. New York: Peter Lang Publishing.
- Gillies, J. & Cailliau, R. 2000. *How the web was born*. New York: Oxford University Press.
- Gribbin, A. 2011. A brief history of the internet. *The New Statesman*, 140(5066):30.
- Hassim, A., Heywood, M & Berger, J. 2007. *Health and democracy. A guide to human rights, health law and policy in post-apartheid South Africa*. Cape Town: Cred Communications (Pty) Ltd.
- Hannah, K.J., Ball, M.J. & Edwards, M.J.A. 2006. *Introduction to nursing informatics: Health informatics series*. New York: Springer science & business media.

- Hegney, D., Buikstra, E., Eley, R., Fallon, T., Gilmore, V. & Soar, J. 2007. Nurses and information technology: Final report [Online]. Available: http://anmf.org.au/3E370BB5-A253-4CE7-854F-CB87F6D4667E/FinalDownload/DownloadId-519DE300DF50902E174DE36D2A074923/3E370BB5-A253-4CE7-854F-CB87F6D4667E/documents/reports/IT_Project.pdf [2012, November 30].
- Henderson, H. 2003. *A to Z of computer scientists*. New York: Facts on File.
- Holmes, B. & Gardener, J. 2006. *E-learning: concepts and practice*. London: Sage.
- Hrastinski, S. 2008. Asynchronous and synchronous e-learning. *Educause Quarterly*, 31(4):51-55.
- Hubbard, R. 2013. *The really useful e-learning instruction manual*. Cornwall: Wiley & Sons.
- Johnson, R.D., Hornik, S.R. & Salas, E. 2008. An empirical examination of factors contributing to the creation of successful e-learning environments. *International Journal of Human-Computer Studies*, 66:356-69.
- Johnson, R.D., Gueutal, H. & Falbe, C.M. 2009. Technology, trainees, metacognitive activity and e-learning effectiveness. *Journal of Managerial Psychology*, 24(6):545-566.
- Jones, R., Skirton, H. & McMullen, M. 2006. Feasibility of combining e-health for patients with e-learning for students using synchronous technologies. *Journal of Advanced Nursing*, 56(1):99–109.
- Khogali, S.E.O., Davies, D.A., Donnan, P.T., Gray, A., Harden, R.M., McDonald, J., Pippard, M.J., Pringle, S.D. & Yu, N. 2011. Integration of e-learning resources into a medical school curriculum. *Medical Teacher*, 33:311-318.
- Knowles, M. 1976. *The modern practice of adult education: from pedagogy to andragogy*. New Jersey: Cambridge Adult Education.
- Knowles, M. 1990. *The adult learner. A neglected species*. Houston: Gulf Publishing.
- Knowles, M., Holton, E.F. & Swanson, R.A. 2011. *The adult learner: the definitive classic in adult education and human resource development*. Oxford: Butterworth-Heinemann.
- Koch, J., Andrew, S. & Salamonson, Y. 2010. Nursing students on of a web-based intervention to support learning. *Nurse Education today*, 30(6): 584 – 590.
- Lain, D. & Aston, J. 2004. *Literature Review of evidence on e-learning in the workplace* [Online]. Available: <http://www.employment-studies.co.uk/pdflibrary/01580.pdf> [2013, October 25].

- Lewis, M.J., Davies, R., Jenkins, D. & Tait, M.I. 2005. A review of evaluative studies of computer-based learning in nursing education. *Nurse Education Today*, 25(8):586-597.
- Lincoln, Y.S. & Guba, E.G. 1985. *Naturalistic inquiry*. London: Sage.
- LoBiondo-Wood, G. & Haber, J. 2010. *Nursing research. Methods and critical appraisal for evidence-based practice*. St Louis: Mosby Elsevier.
- Maboe, K.A. & De Villiers, L. 2011. Computer-assisted instruction in nursing education in South Africa. *Africa Journal of Nursing and Midwifery*, 13(1):93–104.
- Mathis, R.L. & Jackson, J.H. 2009. *Human resource management: Essential perspectives*. Mason: South-Western Cengage learning.
- McVeigh, H. 2009. Factors influencing the utilisation of e-learning in post-registration nursing students. *Nurse Education Today*, 29(1):91-99.
- Mbuli, F. 2013. An evaluation of the influence of e-learning in adult education with special reference to the employees of Parliament RSA. Unpublished master's thesis. Pretoria: University of South Africa.
- Mediclinic: Local WebEx implementation leads to global adoption*. 2011. [Online]. Available: <http://www.is.co.za/Resources/CaseStudies/Documents/Webex.pdf> [2012, July 21].
- Merriam, S.B., Caffarella, R.S. & Baumgartner, L.M. 2007. *Learning in adulthood: A comprehensive guide*. San Francisco: Jossey-Bass.
- Meyer, M., Probart, R. & Bushney, M. 2010. *South African learning and development managers exceed global standards despite skills crisis: Release of 8th annual ASTD/SABPP state of the South African learning and development industry report* [Online]. Available: <http://astd.co.za/south-african-ld-managers-exceed-global-standards-despite-skills-crisis> [2012, September 15].
- Meyer, S., Naudé, M., Shangase, N.C. & Van Niekerk, S.E. 2010. *The nursing unit manager*. Sandton: Heinemann.
- Meyer, S. & Van Niekerk, S. 2008. *Nurse educator in practice*. Cape Town: Juta.
- Mgutshini, T. 2013. Online or not? A comparison of students' experiences of an online and an on-campus class. *Curationis*, 36(1):1-7.
- Moule, P., Ward, R. & Lockyer, L. 2010. Nursing and healthcare students' experiences and use of e-learning in higher education. *Journal of Advanced Nursing*, 66(12):2785-2795.

- Muller, M. 2010. *Nursing dynamics*. Sandton: Heinemann.
- National Bureau of Statistics of China. 2013. *China statistical yearbook 2013* [Online]. Available: <http://www.stats.gov.cn/tjsj/ndsj/2013/indexeh.htm> [2014, January 21].
- Nelson, R., Joos, I. & Wolf, D. 2013. *Social media for nurses: Educating practitioners and patients in a networked world*. New York: Springer.
- Newton, D. & Ellis, A. 2005. Effective implementation of e-learning: A case study of the Australian army. *The Journal of Workplace Learning*, 17(5):385-397.
- O'Regan, G. 2012. *A brief history of computing*. New York: Springer.
- Oultram, K. 2010. Time to train: your rights. *Community practitioner*, 83(9):43-44.
- Pass, S. 2004. *Parallel paths to constructivism: Jean Piaget and Lev Vygotsky*. United States of America: Information age publishing.
- Pawlyn, J. 2012. The use of e-learning in continuing professional development. *Learning Disability Practice*, 15(1):33-37.
- Quinn, F.M. & Hughes, S.J. 2007. *Quinn's principles and practice of nurse education*. Cheltenham: Nelson Thornes.
- Republic of South Africa. 1998. *Skills Development Act 97 of 1998*. Pretoria: Government Printer.
- Republic of South Africa. 2005. *Nursing Act 33 of 2005*. Pretoria: Government Printer.
- Republic of South Africa. Department of Health. 2013. *The National Strategic Plan for Nurse Education, Training and Practice 2012/13 - 2016/17* [Online]. Available: <http://www.health.gov.za/straticdocs.php> [2014, January 18].
- Rohleder, P., Bozalek, V., Carolissen, R. & Leibowitz, B. (2008). Students' evaluations of the use of e-learning in a collaborative project between two South African universities. *Higher Education*, 56:95-107.
- Saskatchewan registered nurses' association. 2013. *Continuing competency manual* [Online]. Available: http://www.srna.org/images/stories/Nursing_Practice/Resources/Continuing_Competence_Program_Manuel_2013_07_29.pdf [2013, November 25].
- Searle, C. 2005. *Professional practice: A Southern African nursing perspective*. Sandton: Heinemann.
- Sector specialist guide*. 2010. [Online]. Available: http://www.hwseta.org.za/upload/sector_guide_update_february_2010_final_version.pdf [2013, November 10].

- Sheen, S., Chang, W., Chen, H., Chao, H. & Tseng, C. 2008. E-learning education program for registered nurses: The experience of a teaching medical centre. *Journal of Nursing Research*, 16(3):195-200.
- Smythe, L. 2012. Research methodology: Discerning which qualitative approach fits best. *New Zealand College of Midwives*, 46:5-12.
- South African Nursing Council. 2004. *Charter of nursing practice* [Online]. Available: <http://www.sanc.co.za/pdf/Charter%20Draft.pdf> [2014, February 4].
- South African Nursing Council. 2013. *Provincial distribution of nursing manpower versus the population in South Africa* [Online]. Available: <http://www.sanc.co.za/stats/stat2013/Distribution%202013.htm> [2014, February 4].
- Speziale, H.J.S. & Carpenter, D.R. 2007. *Qualitative research in nursing: Advancing the humanistic imperative*. Philadelphia: Lippincott Williams & Wilkins.
- Statistics South Africa. 2013. *Statistical release: General household survey* [Online]. Available: <http://beta2.statssa.gov.za/publications/P0318/P0318August2012.pdf> [2013, November 30].
- Takalani, T. 2008. Barriers to e-learning amongst postgraduate black students in higher education in South Africa. Unpublished master's thesis. Stellenbosch: Stellenbosch University.
- Terre Blanche, M., Durrheim, K. & Painter, D. 2006. *Research in practice. Applied methods for the social sciences*. Cape Town: University Press.
- Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L.P., Robson, R., Thabane, M., Giangregorio, L. & Goldsmith, C.H. 2010. A tutorial on pilot studies: the what, why and how. *BMC Medical Research Methodology*, 10(1):1-10. [Online], Available: <http://www.biomedcentral.com/content/pdf/1471-2288-10-1.pdf> [2015, February 4].
- Townsend, I. & Norman, S. 1985. About computers: The Calgary report. *Nurse Education Today*, 5:167-170.
- Van der Merwe, N. 2014. Personal interview, 18 February, George.
- Vlietstra, M. 2014. Personal interview. 20 June, Cape Town.
- Wilkinson, A., While, A. & Roberts, J. 2009. Measurement of information and communication technology experience and attitudes to e-learning of students in the healthcare professions: integrative review. *Journal of Advanced Nursing*, 65(4):755-772.
- Young, L.E. & Paterson, B.L. 2007. *Teaching nursing: Developing a student-centered learning environment*. Philadelphia: Lippincott Williams & Wilkins.

Yu, S. & Yang, K. 2006. Attitudes toward web-based distance learning among public health nurses in Taiwan: A questionnaire survey. *International Journal of Nursing Studies*, 43(6):767-774.

ANNEXURES

Annexure A: Demographic questionnaire

Please complete the following questions by indicating the appropriate answer:

Statistic	Answer				
Age group	22 – 29	30 – 49	50 - 65	66+	
Gender	Male	Female			
Computer literacy level	Very low	Low	Average	High	Very high

Annexure B: Semi-structured interview guide (English)

1. You have recently completed a learning activity that involved computer usage. Tell me more about that.
2. How did your computer literacy level affect your learning experience?
3. Describe the support you received from your employer to partake in the computer learning experience (prompt words: venue, time, facility, technology).
4. Tell me about your ideas regarding a human instructor versus a computerised instructor.
5. Tell me about the design of the computer learning program you completed.

Annexure C: Semi-structured interview guide (Afrikaans)

1. Jy het onlangs 'n leer aktiwiteit voltooi wat rekenaar gebruik behels het. Vertel my meer daarvan.
2. Hoe het jou rekenaar geletterdheid jou leer ervaring beïnvloed?
3. Beskryf die ondersteuning wat jy van jou werkgewer ontvang het om deel te neem aan die rekenaar-ondersteunde leerervaring. (aansporingswoorde: plek, tyd, fasiliteit, tegnologie).
4. Vertel my oor jou idees aangaande 'n menslike instrukteur teenoor 'n rekenaar instrukteur.
5. Vertel my oor die ontwerp van die rekenaar leerprogram wat jy voltooi het.

Annexure D: Information leaflet and consent form

Principle investigator

Celesté Louw

Address

Faculty of Medicine and Health Sciences

Stellenbosch University

PO Box 19063

Tygerberg

7505

South Africa

Contact number

084 634 4924

You are invited to participate in a research project. Please take time to read the information provided in this leaflet. Your participation in the research is completely voluntary and you may at any stage withdraw, even if you initially agreed to participate. Your withdrawal or refusal to participate will bear you no consequences.

This study has been approved by the Health Research Ethics Committee of the University of Stellenbosch (telephone: +27 21 938 9677). Diligent ethical principle adherence will be maintained as stipulated in the South African guidelines for Good Clinical Practice and the Declaration of Helsinki.

Research title

Registered professional nurses' experiences in computer-assisted learning at a private hospital organisation.

Aim of the study

The aim of this study is to investigate the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation in the Cape Metropole.

Participation

Participation is strictly voluntary and consists of taking part in a once off individual interview (8 participants) or a focus group discussion (5 participants) of 30 minutes each. Participants may withdraw from the study at any time without being prejudiced.

Protecting the participants

All interviews will be recorded for analysis, however each participant will only be distinguished by means of a number and thus anonymity will be maintained. Participants' identity will further be protected by sealing all recordings in a lockable box.

The information collected in the study will only be available to the researcher, field worker and research supervisor. Confidentiality will be ensured by placing all data in sealed boxes and storing it in a locked cupboard.

Benefits

Participants will not benefit directly or immediately from research participation, however within the broader concept participants will contribute to the understanding of nurses' experiences of computer-assisted learning.

Risks

The study does not hold any risk for participants; however some participants may feel anxious to reveal information to the field worker. Should this occur, the researcher may be contacted and will be available to offer support.

Will you be paid to take part in this study and are there any costs involved?

You will not be paid to take part in the study but your transport costs will be covered for each study visit. There will be no costs involved for you, if you do take part.

Participant declaration

I hereby agree to participate in the research study: "Registered professional nurses' experiences in computer-assisted learning at a private healthcare organisation."

I declare that:

- I have read and understood the information presented to me.
- I have had the opportunity to ask questions which have been sufficiently dealt with.
- Participation in the study is voluntary and that I am taking part out of my own free will.
- I have the option to withdraw from the study at any time and I will not be punished or unfairly treated should I choose to do so.

Declaration by investigator

I, Celesté Louw, declare that I have:

- explained the information in this document to the participant
- Provided the participant with opportunity to ask questions and responded adequately.
- Ensured that the participant understands all aspects of the study.
- Used a translator if indicated

Signed at.....on this.....

.....

Participant name and surname

.....

Participant signature

.....

Signature of investigator

.....

Signature of witness

Annexure E: Request for organisational consent

Faculty of Medicine and Health Sciences
Stellenbosch University
PO Box 19063
Tygerberg
7505
15April 2014

+++++

P O Box +++

+++++

7599

For Attention: Nursing Executive

Dear Ms. +++++,

**REGISTERED PROFESSIONAL NURSES' EXPERIENCES IN COMPUTER-ASSISTED
LEARNING AT A PRIVATE HEALTHCARE ORGANISATION**

I am a Master's student under the direction of Mrs. L. Terblanche and Dr. E. Stellenberg at the Division of Nursing, Faculty of Health Science at Stellenbosch University. I plan to conduct a study to explore the experiences of registered professional nurses in computer-assisted learning at your institution. I am requesting your permission for the participation of registered professional nurses in this research study. The study will involve the completing of a demographic questionnaire with 3 questions followed by a focus group and individual interviews of 30 minutes each. I have included the proposal for the study (and the proposal synopsis), questionnaire, interview guide and Health Research Ethics Committee approval letter for your consideration.

Participation in the research study is voluntary and complete anonymity and confidentiality will be maintained and guaranteed. The results of the study may be published but the name of the health care institution and the identity of the participants will not be disclosed in any publication, report, or presentation resulting from this research.

If you need more information or have any questions concerning the study please contact me at 084 634 4924.

Yours sincerely,

Celesté Louw

(Diploma in Nursing: General, Psychiatric, Community Nursing and Midwifery. Post Graduate Diploma in Nursing Education)

Annexure F: Permission obtained from private healthcare organisation

STRAND ROAD
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ETHICS LINE 0800 005 316

12 June 2014

Ms C Louw
PO Box 922
GEORGE
6530

Dear Celesté

PERMISSION TO CONDUCT RESEARCH AT [REDACTED] AND [REDACTED]

Your research proposal entitled "*Registered professional nurses' experiences in computer assisted learning at a private healthcare organisation*" refers.

It is in order for you to conduct your research at [REDACTED] and [REDACTED] and I wish you success with this project.

Yours sincerely


ESTELLE JORDAAN
Nursing Executive

Annexure G: Health research ethics approval



UNIVERSITEIT-STELLENBOSCH-UNIVERSITY
jou kennisvennoot • your knowledge partner

Approval Notice New Application

15-Apr-2014
LOUW, Celeste

Ethics Reference #: S14/02/048

Title: Registered professional nurses' experiences in computer assisted learning at a private healthcare organisation.

Dear Ms Celeste LOUW,

The New Application received on , was reviewed by members of Health Research Ethics Committee 1 via Minimal Risk Review procedures on 15-Apr-2014 and was approved.

Please note the following information about your approved research protocol:

Protocol Approval Period: 15-Apr-2014 - 15-Apr-2015

Please remember to use your protocol number (S14/02/048) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 0219389657.

Included Documents:

Protocol
Information leaflet
Organisational consent
Investigator declaration Louw

Annexure H: Certificate of translation and confidentiality



CERTIFICATE OF VERACITY AND CONFIDENTIALITY

Name of study: Registered professional nurses' experiences in computer-assisted learning at a private healthcare organisation.

We, TOP transcriptions, hereby certify that in as far as it is possible translation of the transcripts from Afrikaans to English for Celesté Louw is a true and correct translation of the transcript provided by you (Celesté Louw) and have been done by a qualified language practitioner.

We further state that we shall:

- Hold in strictest confidence the identification of any individual that may be inadvertently revealed during the transcription of audio-taped interviews, or in any associated documents;
- Not make copies of any computerised files of the transcribed interview texts, unless specifically requested to do so by Celesté Louw;
- To store all study-related materials in a safe, secure location as long as they are in our possession;
- To delete all electronic files containing study-related documents from our computer hard drives and any backup devices.

We are aware that we may be held legally liable for any breach of this confidentiality agreement, and for any harm incurred by individuals if we disclose identifiable information contained in the files to which we had access.

Nalini Singh: Transcription manager

8 October 2014

Date

Annexure J: Transcriptionist confidentiality agreement

CONFIDENTIALITY AGREEMENT

Transcription Services

The experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation

I, Alma vd. Meerwe, transcriptionist, agree to maintain full confidentiality in regards to any and all audiotapes and documentation received from Celesté Louw related to the study on the experiences of registered professional nurses in computer-assisted learning at a private healthcare organisation. Furthermore, I agree:

1. To hold in strictest confidence the identification of any individual that may be inadvertently revealed during the transcription of audio-taped interviews, or in any associated documents;
2. To not make copies of any audiotapes or computerised files of the transcribed interview texts, unless specifically requested to do so by Celesté Louw;
3. To store all study-related audiotapes and materials in a safe, secure location as long as they are in my possession;
4. To return all audiotapes and study-related documents to Celesté Louw.
5. To delete all electronic files containing study-related documents from my computer hard drive and any backup devices.

I am aware that I can be held legally liable for any breach of this confidentiality agreement, and for any harm incurred by individuals if I disclose identifiable information contained in the audiotapes and/or files to which I will have access.

Transcriber's name (printed) Alma van der Meerwe

Transcriber's signature Alma vd. Meerwe

Date 15 September 2014

Annexure K: Interview transcript

Line number	Transcription	Coding
1 2 3 4 5 6	I: I wanted to ask you, you've completed a computer-assisted learning activity, any e-learning or whatever you have done, or whether it was Webex, or just the e-learning online. Can you tell me what have you done and so on?	
7 8	P: I completed the one on the ECG workshop.	
9 10	I: Yes, the ECG workshop.	
11 12 13 14 15	P: Yes that is correct. Recently I started on another one for oral medication but because I had to work I only completed half of it so I haven't got back to it yet.	
16 17 18	I: All right. And have you attended any Webex sessions?	
19 20	P: No.	
21 22 23	I: No problem. In particular those one and half activities you did, how did you experience them?	
24 25 26	P: By experiencing, you mean in terms of the course itself or?	
27 28 29	I: Ja, well did you enjoy it? Did you learn something from it? Was there any difficulties for you?	

30		
31	P: With the first one, the one that I completed, it	
32	was quite a learning experience. There is quite a	
33	few things, because it doesn't give you feedback if	
34	you've made mistakes. So I can say that I learnt	
35	from that. Obviously with the second one that I	
36	haven't completed, it is just a bit stressful with	
37	work and being called out, to go and do things and	
38	not completing it so I am not even sure if the stuff	
39	that I have filled in was correct or incorrect.	
40		
41	I: Ja. So I am hearing two things from you, is that	
42	your work circumstances often don't maybe allow	
43	you to complete the activity and the second is	
44	that, I am assuming, you can correct me if I am	
45	wrong, is that when you now stop that activity, do	
46	you have to go back and start over, because you	
47	said you didn't get feedback? Or can you	
48	continue from where you left off?	
49		
50	P: It doesn't allow you to continue where you left,	
51	you have to start right from the beginning again.	
52		
53	I: All right.	
54		
55	P: There is always that chance that you might be	
56	interrupted again.	
57		
58	I: Do you do these activities, obviously now you	
59	do it at work, do you do it like in your office where	
60	the phone then rings and you have to answer?	
61		
62	P: That is correct, ja. So it is not a formal thing	

63	where you get time off and sit down. It is in your	
64	own time basically where it's scheduled. There is	
65	one that I completed.	
66		
67	I: So how does that make you feel if you are	
68	continuously like interrupted to, you know.	
69		
70	P: It is a bit frustrating, because I haven't gone	
71	back to the one that I have only finished halfway	
72	because you know that when you start with it	
73	again, it is either the phone or someone makes an	
74	appointment with you or something comes in by	
75	the door to come and ask something regarding	
76	training or so. It is a bit frustrating.	
77		
78	I: Continue, sorry.	
79		
80	P: It is not like you're allowed to take time off	
81	because that would have been ideal, if you were	
82	given some formal time. But because it is not a	
83	formal course, you can't say I want some time off	
84	to do this.	
85		
86	I: Yes, I understand. Do you think also that, what	
87	about the venue where you did it? You know if it	
88	was maybe a venue in another place, would the	
89	situation be different?	
90		
91	P: I think if it is a venue that is not shut off, but	
92	where others won't, there won't be interruptions, it	
93	would be much easier, but getting a venue like	
94	that isn't always possible.	
95		

96	I: Ok, so that is also a challenge. So I understand	
97	from what you are saying, that it's sometimes	
98	frustrating that you cannot complete an activity	
99	due to interruptions, whether duties from your	
100	work circumstances or maybe just somebody	
101	entering the venue or your phone ringing or	
102	whatever the reason may be?	
103		
104	P: Yes that is a problem.	
105		
106	I: I have noticed in your demographic	
107	questionnaire, thank you for completing that, that	
108	you noted your computer literacy level is average	
109	and I wanted to ask you if, if you are doing those	
110	computer assisted learning activities, does your	
111	computer literacy level play a role?	
112		
113	P: For me it is not a problem filling it in. I haven't	
114	done a formal course in for example Microsoft	
115	Word or something, Microsoft Office. I have done	
116	a course in Excel but that course doesn't require	
117	Excel, but then again looking at myself without a	
118	doing course, but I have been working with	
119	computers regularly, on my own laptop as well. It	
120	makes it easier, but I know of people that I assist	
121	with basic computer skills who are unaware of	
122	where to go, but the courses itself that I have	
123	done, it is quite straightforward. It basically gives	
124	you an option where to click, to choose and to	
125	continue with the next question. So the online	
126	courses that I have done, the two, I wouldn't	
127	consider difficulty in maneuvering in the course	
128	itself. That it doesn't require that much computer	

129	skill, or being very computer literate. So I put	
130	myself down as an average, only because I	
131	haven't done any courses. But on a daily basis I	
132	am busy with the computer, with Excel or Word	
134	documents as well.	
135		
136	I: So, I hear what you're saying, the level of the	
137	activity, wasn't difficult, or let me not say the level,	
138	the computer literacy level required to do the	
139	course wasn't very high. So for you who use a	
140	computer every day, you find it quite easy to use.	
141	But maybe for somebody who's got a very, very	
142	low computer literacy level, they might not be so	
143	sure of a few things like where to click, or you	
144	know.	
145		
146	P: Ja, even getting to the course itself.	
147		
148	I: O, all right, I see. And you obviously do have	
149	access to the Intranet and the Internet and so on?	
150		
151	P: Mostly Intranet. All of the new staff get access.	
152	We assist them with getting on to the Intranet,	
153	checking emails. All the new staff, we assist them	
154	with that.	
155		
156	I: Ok, but you don't have access to the Internet	
157	though, you personally?	
158		
159	P: It is limited. It is basically, you have to be	
160	either unit manager or someone has to load you	
161	onto on to say that you are allowed Internet	
162	access. Because xxx (organisation) puts up a	

163	pop-up that says this is a restricted site.	
164		
165	I: Yes.	
166		
167	P: So in terms of me, I can get on and some of	
168	the things are restricted, but for the rest of the	
169	staff, registered nurses, staff nurses, ENAs who	
170	are working in the wards, their access is restricted	
171	for Internet, for Intranet they have full access.	
172		
173	I: O, I see, I understand. And then in relation to	
174	actual computers? I assume you've got your own	
175	computer where you work on, if you say you work	
176	on it every day?	
177		
178	P: That is correct.	
179		
180	I: And the rest of the hospital?	
181		
182	P: Each of the nursing stations have one	
183	computer, obviously it is mostly for the UAA, the	
184	unit admin assistant, who does the stock. That is	
185	for the ward. And then each of the tearooms has	
186	a computer as well.	
187		
188	I: O, all right.	
189		
190	P: One computer. So staff are allowed to	
191	access that and to go in on it, but I mean if you're	
192	in there, reading your email, other people are in	
193	there as well, so it is not always a personal area	
194	where you can sit and maybe do a course	
195	because there will be constant in and outflow of	

196	people and that.	
197		
198	I: So actually the access to computers, there is	
199	not really enough computers, say for instance a	
200	staff member want to do an activity, they will either	
201	have to go to the training department or to the	
202	tearoom, which neither of them are maybe, or the	
203	tearoom especially not private really? Do I	
204	understand you correctly?	
205		
206	P: Yes, it is quite open. Everyone sits in the	
207	same room and it is normally not a big room, so	
208	the computer is there for everyone to access.	
209		
210	I: I understand. And then the next thing I wanted	
211	to ask you is, we spoke about earlier now, you	
212	mentioned that it would be good if you can maybe	
213	have a specific time that is allocated to you to	
214	actually do the computer-assisted learning	
215	activities. Would you be willing for example to do	
216	these activities at home, if you had the access?	
217		
218	P: Yes, I would work at home. My email at home	
219	unfortunately, at the moment, is not working.	
220		
221	I: Ja.	
222		
223	P: But then from home, we aren't allowed to	
224	access the Intranet.	
225		
226	I: Ja. But if you had it, then you might have done	
227	some activities at home and some at work, if you	
228	were allocated specific time for it.	

229		
230	P: Ja, definitely. I did the ACLS online. I know	
231	this doesn't count for MAP points from xxx	
232	(organisation). The ACLS and I did the self-study	
233	and self-test online as well, more than a year ago.	
234	My computer was still working.	
235		
236	I: O, all right. And which is also part of our	
237	professional development as nurses, hey?	
238		
239	P: Ja.	
240		
241	I: Ok. Did you experience any like technically	
242	difficulty, for example did the program, while you	
243	were doing the activity, throw you out and then	
244	you had to start over or anything like that?	
245		
246	P: Not the ones that I used, no.	
247		
248		
249	I: So, can you tell me, how did you feel about	
250	sitting in front of the computer, instead of like	
251	having an instructor? You know traditionally we	
252	have maybe a lecturer in front of us and you	
253	wouldn't have that, with that computer-assisted	
254	learning activity, so did you prefer it, or was it	
255	better or worse, or?	
256		
257	P: There are some benefits. On the one hand it	
258	is also nice to have someone, because you can	
259	ask a question that the computer is not going to	
260	give an answer. So it gives you an answer on the	
261	specific question you have, but you might have a	

262	different question. So if you had interaction with	
263	someone, it would have been much easier to get a	
264	different perspective on something, whereas with	
265	the computer, I think an upside, you don't have to	
266	wait for a specific person for example, a lecturer.	
267	You can do it in your own time, if it is available	
268	obviously.	
269		
270	I: Ja. So obviously with the e-learning, there are	
271	advantages and disadvantages. The biggest	
272	advantage, is that it is quite convenient and the	
273	disadvantage is that there is not really much	
274	human interaction, so if you want to ask a	
275	question or?	
276		
277	P: You're limited, the information that is on the	
278	system.	
279		
280	I: And now next, tell me a little bit about the actual	
281	content of the course you did. Not what was in it,	
282	but do you feel that, well the ECG thing you did	
283	and then the medication, the little bit that you did	
284	on the medication. How did you feel about the	
285	actual content of the course, of the activity? Was	
286	it sufficient, was there enough, or could you apply	
287	it and use it?	
288		
289	P: The ECG content was very, I could apply it.	
290	There was a lot of useful information. I can say	
291	that I have learned from that. Because things that	
292	I wasn't aware of, I was made aware of, after	
293	doing that.	
294		

295	I: Ok.	
296		
297	P: On the medication, I can't say because I only	
298	answered a few questions, so I don't have	
299	feedback whether I was right or I was wrong, so	
300	that makes it a bit difficult.	
301		
302	I: I hear what you say.	
303		
304	P: It is a problem to say it was useful information.	
305	I can say the first questions were quite basic.	
306		
307	I: Yes. But you don't know how the rest would	
308	be, but the ones that you did answer, were quite	
309	basic.	
310		
311	P: Yes. I can't say if it would become more	
312	difficult or challenging, but the first was quite	
313	straight-forward.	
314		
315	I: And do you feel that the activities that are	
316	available, that is possible that they can make	
317	maybe a positive change in the units, should the	
318	staff do them?	
319		
320	P: Definitely. If I think of my experience working	
321	with the guys where I have to ask certain	
322	questions relating to the things I have picked up	
323	after doing that course. It was actually quite	
324	useful because many of them, placed the leads in	
325	the incorrect place. And in doing the course it	
326	actually guides you where to place the leads, what	
327	to look out for. So I would say that it is actually	

328	quite useful because I learned from it.	
329		
330	I: Ja, that is good to hear. So you can easily	
331	apply the content of the course to your practical	
332	work environment and it might even improve your	
333	clinical skills, do I understand you correctly?	
334		
335	P: That is correct.	
336		
337	I: And the amount of information in the activity?	
338	Did you feel it was adequate or was it information	
339	overload or?	
340		
341	P: It was a lot of information to take in at one	
342	time. I suppose, for example it doesn't	
343	differentiate between this one is for staff nurse	
344	and this one is for registered nurse. So it gives the	
345	one more meaning. Both of you were asked	
346	about the ECG rhythm, whereas the staff nurse	
347	won't always get training on the ECG rhythm	
348	unless something had been organised especially	
349	in the unit. So it doesn't differentiate between	
350	categories or rank if I can do it that way. So that is	
351	maybe one thing, because within the training one	
352	person will be trained this thing and then the	
353	person with a higher category or rank would know	
354	a little bit more in terms of what they will be	
355	trained or what is within their curriculum.	
356		
357	I: O, I understand what you are saying.	
358		
359	P: I don't know if I am putting it nicely.	
360		

361	I: I understand exactly what you're saying.	
362		
363	P: The course is like straightforward, it doesn't	
364	differentiate between those categories.	
365		
366	I: Yes.	
367		
368	P: Maybe if it did, it would have been more	
369	applicable or might have benefited more.	
370		
371	I: Yes, I understand. So what you're actually	
372	saying is, or you're actually making a suggestion	
373	that to improve the course would be to have	
374	different categories...	
375		
376	P: Yes, to make it category specific because an	
377	ENA who might attempt to look at something like	
378	that to gain a bit more knowledge will not have	
379	any idea of the medication and a registered nurse	
380	would obviously know more because they have	
381	been trained to look at medications and the effect.	
382		
383	I: I hear what you're saying, thank you. The last	
384	thing, I just want to get back to something quickly,	
385	because you said that you felt a little bit frustrated	
386	when you were sort of interrupted and called out.	
387	What is the expectation from your employer? So	
388	for example would you feel comfortable to say to	
389	the person coming in, look I cannot help you now,	
390	I am first finishing my e-learning and you can	
391	come back later. I am just asking what is your	
392	employer's expectations? Would they expect you	
393	to, you know, what would be priority? Or do you	

394	feel guilty maybe sitting there, when you have to	
395	work or, you know.	
396		
397	P: It obviously depend on what the problem is	
398	that the person need some assistance with,	
399	because you get people that just walk in. So it is	
400	not like they always come here and they have an	
401	appointment. And you can't tell them, look I can't	
402	see you now, because they were referred from the	
403	front desk to our department.	
404		
405	I: I hear what you say.	
406		
407	P: I don't have a choice but to assist the people.	
408		
409	I: Are you supposed to complete activities at	
410	work, I mean from your employers side?	
411		
412	P: Those specific ones are not a must. You do	
413	get MAP points, you know those xxx	
414	(organisation) points system, the CPDs. So you	
415	get those points worth, but it is not compulsory to	
416	do that specific things because it is not anything	
417	formal or something that you applied for.	
418		
419	I: But you can get a point for it?	
420		
421	P: You do get points for completing it because	
422	those are xxx (organisation) approved.	
423		
424	I: So it is not necessary that you have to do those	
425	specific activities but you do get points if you do	
426	do them, but there are a number of other activities	

427	that you can do?	
428		
429	P: Yes, you enroll for a formal fundamental	
430	course and you get WebEx, then it is compulsory.	
431	Then you can actually get one of the offices and	
432	the phone is switched off and you put a sign on	
433	the door, then you cut off all the external, people	
434	from coming in.	
435		
436	I: So how do you feel that if participants, the	
437	Webex participants get specified time, privacy and	
438	so on but participants who do the online or	
439	Intranet activities, don't?	
440		
441	P: This is a headache. But it is a problem	
442	because at the end of the day it is going to benefit	
443	you as well as the hospital because your skills will	
444	be upgraded, your knowledge, you will be a better	
445	equipped person to work in a department, you're	
446	actually more informed. Make informed decisions.	
447		
448	I: I have now heard during this interview that you	
449	said to me quite a few positive and one, two	
450	maybe suggestions for improvement regarding e-	
451	learning so a positive thing is that you do actually	
452	have access to the Intranet and that you can	
453	access the activities. But a negative point maybe	
454	is the interruptions and the frustration that it	
455	causes and that you suggested maybe that there	
456	should be a specified time allocation. I also heard	
457	you said that you know, you feel that it quite	
458	convenient and maybe the learning environment	
459	can also be improved a little bit and with relation	

460	to human contact, that there is benefits to e-	
461	learning and drawbacks. And also then of course	
462	regarding the program and the content of the	
463	program, the ECG you found very useful.	
464	Unfortunately you couldn't complete the	
465	medication one yet and you find it quite applicable	
466	to the unit, but that the level at which it speeches,	
467	should be category-specific. And then the other	
468	thing I heard from you was with computer literacy,	
469	is that you rated yourself as average, but you use	
470	a computer every day and you didn't find really	
471	any difficulty for using the activities, but that you	
472	think that somebody with quite a low level of	
473	computer literacy might struggle with that.	
474		
475	P: Yes, that is correct.	
476		
477	I: Ok. So I think we can conclude the interview.	
478	Is there any other suggestions that you would like	
479	to make regarding the e-learning that is offered in	
480	your hospital?	
481		
482	P: I think if more, better variety or more options.	
483	Because there are now, I know of a third one that	
484	was loaded now. But that is still limited. It doesn't	
485	speak to everyone who might have a need for	
486	knowledge, some different. Because they might	
487	want to do something related to the medical or	
488	nursing but there aren't a lot of options to choose	
489	from. There are limited options	
490		
491	I: O, I understand. So your suggestion would be	
492	for a bigger variety of different types of programs	

493	in different disciplines of nursing maybe. All right,	
494	do I understand?	
495		
496	P: That is correct.	
497		
498	I: I want to say to you, thank you so much for your	
499	time. I really, really appreciate it.	
500		
501	P: Not a problem.	