

**PREPAREDNESS OF EMERGENCY CARE PROVIDERS FROM A
LOCAL AUTHORITY EMERGENCY MANAGEMENT SERVICE
FOR ONLINE CONTINUOUS PROFESSIONAL
DEVELOPMENT**

A dissertation submitted in fulfilment of the requirements for the degree of Master of Health Sciences in Emergency Medical Care in the Faculty of Health Sciences at the Durban University of Technology

Debbie Jane Winstanley
(Student No: 21447855)

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Department of Emergency Medical Care & Rescue
Durban University of Technology

Supervisor: Professor C. Stein
Co-Supervisor: Ms. D. Muhlbauer

DECLARATION OF ORIGINALITY

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

Name: Debbie Jane Winstanley

Signed: _____

Date: 10 December 2018

ETHICAL CLEARANCE

This is to certify that the studies contained in this dissertation have the approval of the Institutional Research Ethics Committee (IREC) of the Durban University of Technology (DUT) in KwaZulu-Natal.

The allocated Ethics Clearance number is: REC 157/15

Candidate:

Mrs Debbie Jane Winstanley _____

Supervisor:

Professor Chris Stein _____

Co-Supervisor:

Mrs Dagmar Muhlbauer _____

ABSTRACT

Introduction

Prehospital emergency care provides medical care to an injured or ill person out of the clinic or hospital environment. Due to the unique and demanding circumstances in which emergency care providers practice, a focussed foundation of knowledge is needed. To remain current with advances in the medical field, the Health Professions Council of South Africa (HPCSA) introduced the concept of Continuous Professional Development (CPD).

Purpose of the study

The purpose of this research was to determine if the emergency care providers from the City of Johannesburg Emergency Management Service (COJEMS) are prepared for online education as a means for compliance in CPD.

The three objectives of the study included:

1. An analysis of baseline information on demographics, educational level, qualifications of the emergency care providers, and access to electronic equipment by emergency care providers from COJEMS.
2. An assessment of the knowledge, current exposure to e-learning, and confidence when using electronic equipment to access online learning material, and
3. An analysis of preferences for traditional classroom learning or e-learning by emergency care providers from COJEMS.

Methodology

A questionnaire was distributed to a convenience sample of COJEMS operational emergency care providers during a two-month period. The statistical aspect of the research was completed using descriptive analysis. From these results, relevant information was extrapolated, and results were drawn.

Results

The following sub-questions were posed:

1. Are the COJEMS emergency care providers prepared for online learning using electronic technology?
2. Are the COJEMS emergency care providers confident in the use of computers and programs necessary for online and e-learning?
3. What recommendations can be made that would improve or contribute towards COJEMS emergency care providers' preparedness for online learning?

The results indicated the COJEMS emergency care providers were not prepared for online learning; they lacked the skills and knowledge necessary to use electronic equipment to access online learning. The majority of the sample preferred the traditional classroom environment to autonomous learning. Based on these findings, it is unlikely the COJEMS emergency care providers will achieve CPD compliance using electronic devices and online learning.

Conclusions and recommendations

The findings from this study indicate that the COJEMS emergency care providers are not prepared for online learning, and therefore will not achieve CPD compliancy using the Internet. Regular access to computers and in-service training is vital to up skill these emergency care providers, to meet the demands of modern-day learning.

DEDICATION

This dissertation is dedicated to:

My Mother and Father, who have always taught me that no one can take away your education.

Alan Winstanley, who has supported me throughout all my studies and just smiled at my wild ideas.

My son Bryce, whose smile lights up my heart and who makes me remember the simple things in life, named after the world-renowned novelist, Bryce Courtney. Courtney's writings have always inspired me – my favourite passage comes from his international bestseller - Power of One:

'The power of one is above all things the power to believe in yourself, often well beyond any latent ability you may have previously demonstrated. The mind is the athlete, the body is simply the means it uses to run faster or longer, jump higher, shoot straighter, kick better, swim harder, hit further or box better'

Bryce Courtney – Power of one

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To all the educators in the emergency medical care profession; together we can change, if only one student at a time.

TABLE OF CONTENTS

DECLARATION OF ORIGINALITY	ii
ETHICAL CLEARANCE	iii
ABSTRACT	iv
DEDICATION	vi
ACKNOWLEDGEMENTS	vii
TABLE OF CONTENTS	viii
ABBREVIATIONS AND GLOSSARY OF TERMS.....	xiii

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION.....	1
1.2 STUDY BACKGROUND.....	1
1.3 RATIONALE OF THE STUDY.....	3
1.4 PROBLEM STATEMENT	4
1.5 PURPOSE OF THE STUDY.....	4
1.6 OBJECTIVES OF THE STUDY	5
1.7 BRIEF METHODOLOGY.....	5
1.8 THE RESEARCHER'S INTEREST IN THE STUDY.....	5
1.9 DISSERTATION STRUCTURE	6
1.10 CONCLUSION	6

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION.....	7
2.2 LITERATURE SEARCH STRATEGY	7
2.3 THE PROGRESSION OF EDUCATION.....	8
2.4 ADULT LEARNING	9
2.5 E-READINESS	11
2.6 ONLINE AND E-LEARNING.....	13

2.7	LEARNING IN THE SOUTH AFRICAN ENVIRONMENT	144
2.8	CONTINUITY OF LEARNING AND CONTINUOUS PROFESSIONAL DEVELOPMENT	15
2.9	CONTINUOUS PROFESSIONAL DEVELOPMENT IN THE PREHOSPITAL ENVIRONMENT	16
2.10	PREHOSPITAL EMERGENCY MEDICINE EDUCATION IN SOUTH AFRICA	17
2.11	CONCLUSION	18

CHAPTER 3

RESEARCH METHODOLOGY

3.1	INTRODUCTION.....	19
3.2	RESEARCH DESIGN.....	19
3.3	RESEARCH SETTING.....	19
3.4	TARGET POPULATION AND SAMPLING METHOD	20
3.5	INCLUSION AND EXCLUSION CRITERIA.....	21
3.5.1	Inclusion criteria	21
3.5.2	Exclusion criteria	21
3.6	DATA COLLECTION TOOL	22
3.6.1	Demographical data	22
3.6.2	Access to/use of a computer.....	23
3.6.3	Frequency of use	23
3.6.4	Education and training	23
3.7	RELIABILITY AND VALIDITY OF DATA COLLECTION TOOL.....	23
3.7.1	Reliability.....	23
3.7.2	Validity	24
3.7.2.1	Face validity	24
3.7.2.2	Content validity.....	25
3.8	DATA COLLECTION PROCEDURE	25
3.9	DATA ANALYSIS	26
3.10	ETHICAL CONSIDERATIONS	26
3.10.1	Informed consent	26
3.10.2	Risks and benefits.....	27

3.10.3	Privacy and confidentiality	27
3.10.4	Permissions.....	28
3.11	CONCLUSION	28

CHAPTER 4
RESULTS

4.1	INTRODUCTION.....	29
4.2	THE SAMPLE.....	29
4.3	BIOGRAPHICAL DATA.....	30
4.3.1	Age and gender distribution	30
4.3.2	Educational levels and HPCSA registration categories of respondents	32
4.3.3	Length of service in the Emergency Medical Services	32
4.4	ACCESS TO/USE OF A COMPUTER.....	33
4.4.1	Electronic devices owned.....	33
4.4.2	Locations used to access a computer	34
4.5	FREQUENCY OF INTERNET USE.....	36
4.6	EDUCATION AND TRAINING.....	38
4.7	COMPLETION OF ONLINE COURSES.....	39
4.7.1	Completion of an online course.....	39
4.7.2	Non-completion of an online course.....	41
4.8	CONTINUOUS PROFESSIONAL DEVELOPMENT.....	42
4.9	PREPAREDNESS FOR ONLINE LEARNING FOR CPD DEVELOPMENT ...	42
4.9.1	Preference of delivery method	43
4.9.2	Preparedness for online learning	44
4.9.3	Ability to engage in autonomous learning	44
4.10	CONCLUSION	45

CHAPTER 5
DISCUSSION

5.1	INTRODUCTION.....	46
5.2	DELIVERY METHOD	47
5.2.1	Cellular phones	47

5.2.2	Computers.....	48
5.2.3	Tablets	48
5.2.4	Electronic reader	48
5.2.5	The Internet.....	48
5.3	CONFIDENCE AND COMPETENCE	50
5.4	ABILITY TO ENGAGE IN AUTONOMOUS LEARNING	52
5.5	CONCLUSIONS	52

CHAPTER 6

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

6.1	INTRODUCTION	54
6.2	LIMITATIONS.....	55
6.3	RECOMMENDATIONS	56
6.3.1	Delivery methods	56
6.3.2	Confidence and competence.....	56
6.3.3	Autonomous learning	57
6.4	FURTHER RESEARCH	57
6.5	CONCLUSION	57

REFERENCES.....	59
-----------------	----

FIGURES

Figure 2.1: The Seven Learning Styles	10
Figure 4.1: Racial distribution of sample	31
Figure 4.2: Educational qualifications of the sample	32
Figure 4.3: Length of service worked in the Emergency Medical Services.....	33
Figure 4.4: Use of computers and Internet at work and home.....	34
Figure 4.5: Additional locations used to access a computer.....	35
Figure 4.6: Frequency of use of electronic devices to access the Internet.....	36
Figure 4.7: Internet sites used by respondents at least once a day	37

TABLES

Table 2.1: Continuing Education Units needed per registration category per annum	16
Table 3.1: Stratified sampling according to registration categories	21
Table 4.1: Breakdown of responses according to HPCSA registration	30
Table 4.2: Ages categories with gender distribution	30
Table 4.3: Electronic devices owned	33
Table 4.4: Other locations for computer and Internet use	36
Table 4.5: Time in hours spent on the Internet per week	37
Table 4.6: Preferred learning styles.....	38
Table 4.7: Completion of online courses	40
Table 4.8: Non-completion of an online course	41
Table 4.9: Continuous Professional Development	42

ANNEXURES

Annexure 1: Ethical clearance for research from the Institution Research Ethics Committee at the Durban University of Technology	66
Annexure 2: Permission letter for research from the City of Johannesburg Emergency Management Service	67
Annexure 3: Information letter for responents	69
Annexure 4: Consent document for respondents	72
Annexure 5: Questonsaire	73

ABBREVIATIONS AND GLOSSARY OF TERMS

Ambulance Emergency Assistant (AEA):

A prehospital emergency care provider registered as such with the Health Professions Council of South Africa: Professional Board for Emergency Care that practices with an intermediate life support scope of practice (HPCSA, 1998a).

Basic Ambulance Assistants (BAA):

A prehospital emergency care provider registered as such with the Health Professions Council of South Africa: Professional Board for Emergency Care that practices with a basic life support scope of practice (HPCSA, 1998b).

Continuous Professional Development (CPD):

The Health Professions Council of South Africa defines CPD as 'a means for maintaining and updating professional competence, to ensure that the public interest will always be promoted and protected, as well as ensuring the best possible service to the community'. Each registered healthcare professional is required to engage in CPD activities recognised by the Health Professions Council of South Africa and accumulate *Continuing Education Units (CEU)* per 12 month period of which a portion determined by the HPCSA should be for ethics, human rights, and medical law (HPCSA, 2011).

Emergency Care Practitioner (ECP):

A prehospital emergency care practitioner with a degree in prehospital emergency care, registered as such with the Health Professions Council of South Africa: Professional Board for Emergency Care that practices with an advanced life support scope of practice. This is the highest level of qualification that leads to registration with the HPCSA (Emergency Care Society of South Africa, 2012).

Emergency Care Provider:

Any persons with the qualification of Basic Ambulance Assistant, Ambulance Emergency Assistant, Paramedic, Emergency Care Technician, or Emergency Care Practitioner working within the prehospital environment.

E-learning:

Learning conducted via electronic media, commonly by means of a computer and typically using the Internet (Oxford English Dictionary 2017).

Emergency Medical Services (EMS):

Any private or state organisation which is dedicated, staffed and equipped to offer: a) the prehospital medical treatment and the transport of the ill and/or injured, and where appropriate b) the inter-health establishment referral of patients requiring medical treatment en-route, c) prehospital emergency medical services for events, d) the medical rescue of patients from a medical rescue situation (Department of Health 2014).

Emergency Care Technician (ECT):

A prehospital emergency care provider with a two-year qualification in Emergency Medical Care, registered as an Emergency Care Technician with the Health Professions Council of South Africa: Professional Board for Emergency Care. The ECT has their own scope of practice, which differs from the ECP and Paramedic (Emergency Care Society of South Africa, 2012; HPCSA, 2009).

E-readiness:

The ability to make use of e-learning resources and multimedia technology to improve the quality of learning (Mafenya, 2013).

Health Professions Council of South Africa (HPCSA):

The Health Professions Council of South Africa is a statutory regulated body mandated to guide and regulate registered healthcare professions in the country in aspects pertaining to registration, education and training, professional conduct and ethical behaviour, ensuring continuing professional development, and fostering compliance with healthcare standards. All individuals who practise any of the healthcare professions incorporated in the scope of the HPCSA, are required by the Health Professions Act No. 56 of 1974 to register with the Council.

National Qualifications Framework (NQF):

The National Qualifications Framework Act No. 67 of 2008 provides for the National Qualifications Framework. This is a comprehensive system that is approved by the Minister of Higher Education and Training for the classification, registration, and publication of articulated and quality-assured national qualifications and part-qualifications. The South African NQF is a single integrated system comprising three co-ordinated qualifications: Sub-Frameworks for General and further Education and Training, Higher Education, and Trades and Occupations (Department of Health 1974).

Online:

This term is used to describe the use of a computer or electronic device to connect to either a network of computers or the Internet.

Paramedic:

A prehospital emergency care provider, registered as such with the Health Professions Council of South Africa: Professional Board for Emergency Care that practices with an advanced life support scope of practice. This qualification includes the National Diploma in Emergency Medical Care, the Diploma in Emergency Medical Care and Critical Care Assistants (CCA) (HPCSA, 1998c).

Prehospital:

The environment in which initial medical care is given to an ill or injured patient by an emergency care provider before the patient reaches the hospital (Oxford English Dictionary 2017).

Professional Board of Emergency Care (PBEC):

The Health Professions Council of South Africa has twelve professional boards each serving as co-ordinating bodies for all healthcare practitioners registered within South Africa. The Professional Board of Emergency Care is the professional board representing all emergency care providers registered with the Health Professions Board of South Africa.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter provides the background of the study, as well as an explanation of the rationale and objectives of the study. The researcher's personal interest is explored, and the chapter concludes with a brief overview of the structure of the research.

1.2 STUDY BACKGROUND

Emergency care is the provision of medical or other health treatment to an injured or ill person at the sudden onset of a medical condition. Failure to render immediate care would reasonably result in the deterioration of the injured person's medical condition (Segen, 2006). Prehospital emergency care is practiced out of the hospital or clinic environment by healthcare professionals; specifically, emergency care providers. Due to the unique and often demanding circumstances in which emergency care providers practice, a focussed body of knowledge is needed to perform an initial assessment, to determine diagnosis, treatment regimens and algorithms, as well as to coordinate multiple emergency care providers.

To qualify and practice as an emergency care provider in South Africa one needs to obtain a qualification in prehospital emergency medical care and register with the Health Professions Council of South Africa (Department of Health, 2003). Courses range from a four-week course to a four-year Bachelor's Degree in Health Sciences; each level of qualification providing a specific level of emergency care with prescribed capabilities and scopes.

Once qualified to treat patients, the emergency care provider registers with the Health Professions Council of South Africa (HPCSA) and once registered, they must prescribe to ethical practices and the principle of beneficence; actions for the benefit of the patient. Ethical practice requires accountability and commitment to update and develop the knowledge, skills and ethical attitudes that underpin competent practice.

This perspective protects the public interest and promotes the health of all members of South African society (Department of Health, 2003). Considering the dynamic and rapidly evolving nature of medicine, failure to update and develop knowledge and skills, and to maintain ethical practice in this field results in suboptimal patient care, possibly increasing the morbidity and mortality rates.

Historically no post graduate programmes existed ensuring currency in theoretical knowledge, procedural competencies or clinical review for the emergency care provider in South Africa. The need to update and develop knowledge, skills, and to maintain ethical practice was recognised by the HPCSA and the concept of mandatory Continuous Professional Development (CPD) was introduced. This was designed as a flexible system that would address the unique South African environment by providing a vast range of activities that would be 'readily accessible' and accommodate the diversity of the HPCSA.

To assist registered emergency care providers to meet the requirements of the CPD programme, education and training providers were mandated by the HPCSA to provide CPD activities at various levels of learning that would meet individual needs and demands specific to their practice environment (Health Professions Council of South Africa, 2014). Each learning activity is accredited with Continuing Education Units (CEUs) which indicate the value attached to a learning activity. To remain compliant, each emergency care provider must annually accumulate CEUs as prescribed by their registration category with the HPCSA. Random audits are conducted by the HPCSA and non-compliance results in various penalties determined by the Professional Board for Emergency Care in collaboration with the HPCSA CPD committee.

A challenge in fulfilling the CPD requirements is access to CPD activities. Cost of travel, family responsibilities, and shift work often result in the emergency care provider being unable to attend these activities. That, coupled with the lack of motivation to report to training providers during off duty time, results in poor CPD compliance and, ultimately, suboptimal patient care. The concept of online education allows for freedom of learning but encompasses new challenges such as access to a computer or electronic device, working knowledge of a computer or electronic device

to access educational material, and access to data to download this material or e-readiness.

Emergency Medical Services (EMS) within South African is provided by both the public and the private sector. For the purposes of the study, the researcher focussed on the City of Johannesburg Emergency Management Service (COJEMS), a public-sector service. The COJEMS provides emergency care and fire services to residents within the City of Johannesburg. The COJEMS Training Academy offers medical, fire, and rescue training to employees, and CPD training is offered through the Medical Training Academy. Currently, the CPD programmes are classroom based and at the time of this study, no online courses were available.

This research sought to determine if the emergency care providers from COJEMS are prepared for online education as a means for compliancy in CPD.

1.3 RATIONALE OF THE STUDY

Continuous Professional Development is designed to develop the individual within their chosen profession. Keeping up to date with knowledge, skills, and attitudes is highly instrumental in coping with change at whatever level it occurs (clinical, managerial, technological, professional) and is fundamental in delivering best practice medical care (HPCSA, 2014).

Emergency care providers often work shift rotations and cannot attend workshops in the traditional format. The cost of travel, educational material, and time required to attend teacher-based education sessions may alter the motivation for achieving CPD compliance, despite the desire to provide best practice medicine.

By bringing the classroom to the workplace through online and e-learning, emergency care providers can access CPD activities during 'on duty' time or in the home environment. Increasing the accessibility of CPD activities may solve compliancy issues, but new challenges arise, such as the cost of owning or accessing a suitable electronic device, data, and knowledge of computer programs to complete the learning activity.

Although research has provided many studies regarding the e-readiness of students towards e-learning, limited research is available that speaks directly to the prehospital emergency care provider and a paucity of literature exists when further specified to involve South Africa and CPD compliance. Research needs to be conducted in the local context to evaluate the preparedness of emergency care providers towards online learning for CPD compliance.

This research may outline voids within the educational domain relating to the use of electronic devices to access online educational material. It may also assist emergency care education and training providers to develop end user computer courses to enhance emergency care providers' skill set needed for online learning.

1.4 PROBLEM STATEMENT

At present, a lack of literature exists within the South African context describing the preparedness of emergency care providers in the prehospital environment towards electronic or online education. With current trends in education moving towards an electronic-based learning environment, this gap poses a challenge for the emergency care education and training providers as there is no knowledge of emergency care provider's abilities for computer use and online education. This has the potential to delay advancements in CPD in the prehospital environment, resulting in possible suboptimal patient management as the emergency care providers may not be up to date with the latest best practice prehospital medicine.

1.5 PURPOSE OF THE STUDY

The purpose of this research was to undertake a descriptive analysis using survey research methodology to evaluate the preparedness of emergency care providers towards using computers and electronic equipment for accessing online material for CPD compliancy.

1.6 OBJECTIVES OF THE STUDY

The objectives of the study were:

- To analyse the baseline information on demographics, educational level, qualifications of the emergency care providers, and access to electronic equipment by emergency care providers from COJEMS.
- To assess the knowledge, current exposure to e-learning, and confidence when using electronic equipment to access online learning material.
- To undertake an analysis of preferences for traditional classroom learning or e-learning by emergency care providers from COJEMS.

The sub-questions to be answered by this research were:

- Are the COJEMS emergency care providers prepared for online learning using electronic technology?
- Are the COJEMS emergency care providers confident in the use of computers and programs necessary for online and e-learning?
- What recommendations can be made that would improve or contribute towards COJEMS emergency care providers' preparedness for online learning?

1.7 BRIEF METHODOLOGY

The research was conducted using the positivist paradigm by means of a prospective quantitative survey using a paper-based questionnaire. The target population are all operational COJEMS emergency care providers.

1.8 THE RESEARCHER'S INTEREST IN THE STUDY

The researcher has been involved in prehospital education since 2007 and coordinates the CPD programme for the COJEMS Medical Training Academy. By interacting with students, the researcher became aware of the challenges faced by the employees of COJEMS in attending classroom-based CPD accredited activities.

By providing access to learning material for emergency care providers during on duty time or within the home environment, the means for maintaining and updating professional competence will be promoted. The integration of online education will enhance the learning experience, however, the researcher has realised the potential gap in computer abilities, and therefore, the challenge to navigate through online courses.

By providing feedback to COJEMS from the collected and analysed data, the researcher hopes to promote and enhance the preparedness and learning experiences of emergency care providers for CPD compliance.

1.9 DISSERTATION STRUCTURE

The structure of the remaining chapters of this dissertation is as follows:

- **Chapter 2** presents the literature review in a manner that addresses the objectives of the study.
- **Chapter 3** presents a discussion of the research design and methodology of the research. This includes the study design, the population, the data collection process, reliability and validity, inclusion and exclusion criteria, and the ethical considerations.
- **Chapter 4** presents the results of the research in the form of discussions on the statistical output, as well as illustrations necessary to present the data visually.
- **Chapter 5** presents a discussion of the findings relating to the objectives.
- **Chapter 6** provides the conclusions, limitations, and recommendations of the study.

1.10 CONCLUSION

This chapter provided insight into the background of the study and the researcher's personal interest. The rationale and objectives of the study were stated with a brief overview of the structure of the research. The following chapter explores education through the last century in a comprehensive literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review will begin by following the progression of education in the last century. Various educational theories, learning styles and motivation of learning in adults will be reviewed. The concept of online and e-learning within South Africa will be explored with consideration of continuity of learning relating to preparedness for online CPD in the prehospital environment. As the research is conducted within the COJEMS, full details and insight into this service will be provided. International literature relevant to this research will also be incorporated into the literature review.

2.2 LITERATURE SEARCH STRATEGY

The literature review was an ongoing and continuous process to ensure that new and relevant developments were included in the study. The initial search for relevant material was undertaken online through the Pubmed search engine, through the National Centre for Biotechnology Information using the US National Library of Medicine, and the National Institutes of Health website which allowed the researcher access to a broad variety of related journal articles. Additional literature and articles with limited access through the Pubmed search engine were accessed via the Elsevier Science Direct website, which allows full access to journal articles subscribed to by the Durban University of Technology. The Google Scholar search engine was also used.

In the initial literature search, keywords used in all search engines included “continuous professional development” AND “emergency medicine” OR “prehospital” AND “online” OR “e-readiness”. No limitations of journal types or dates were placed on any of the search engines used.

Originally, abstracts from the searches were accessed and read for relevance. Relevant articles were downloaded and saved to a hard drive. Recommendations

made by the Google Scholar and Pubmed search engines were taken into consideration, as were the reference list and citations in relevant journal articles. Once the full article had been read by the researcher and deemed relevant, it was printed and filed for referencing.

While progressing through the literature review, the researcher realised that additional searches were needed and additional keywords of “learning styles”, “adult learning”, “andragogy” and “lifelong learning” were used in the mentioned search engines. This need arose to gain insight into the adult learner.

2.3 THE PROGRESSION OF EDUCATION

The educational domain has evolved in the last century; changes in lifestyle and the emergence of adult learning and self-improvement has placed the working adult back in educational systems (Findsen & Formosa, 2011). The need for a means of accessing learning material out of the traditional classroom environment has been recognised, hence the evolution from the traditional teacher-led, textbook medium environment, to the use of electronic devices to either fulfil or supplement learning needs (Hung, Chou, Chen & Own, 2010).

Teaching philosophies around the world have changed since the introduction and advancement of the andragogical approach. From the transfer of skills from parent to child in the Stone Age, training became more structured during the Greek and Roman eras (480 B.C. – 300 A.D.) (Chan, 2010). The first organised form of teaching, and the origin of pedagogy, or ‘child led’ learning was seen across Europe between the seventh and twelfth century (Knowles, 1980). This type of teaching was practiced by monks in the cathedral schools across Europe and spread to universities towards the end of the twelfth century. According to Chan (2010), this form of training froze the educational system with the emphasis being on the importance of the role of the teacher in education; fundamentally, the teacher taking responsibility for every learning decision. Pedagogy was recognised as a teacher orientated approach and defined as ‘the art of and science of teaching children’ (Knowles, 1980).

This approach challenged teachers in the adult learning environment. Knowles (1980) states that although the concept of pedagogy, namely transmission of knowledge and skills, had stood the test of time, adult learners were resistant to the boundaries set by the pedagogical paradigm (Knowles, 1980). The realisation was then made that the principles of pedagogy did not fit the adult learner. It was this resiliency that resulted in teachers of pedagogy extending the boundaries of teaching to cater for the needs of the adult learner. It was in the 1950s that books started analysing these teaching strategies and the principle of andragogy was developed.

2.4 ADULT LEARNING

Andragogy was first coined in 1833 by a German school teacher, Alexander Kapp (Henschke, 2010), who used this term as a description of the education paradigm for adult learning. Andragogy was a loosely used term until 1926 when Eduard C Lindeman covered the topic – specifying adult learning (Chan, 2010). This was further extended by Malcolm Knowles in 1959 when Knowles, together with other prominent educators, officiated adult learning (Margolis, 1970; Chan, 2010).

Knowles' (1980) concept of andragogy, or the art of helping adults learn, is based on six main assumptions:

- Self-concept – adult learners are self-dependant and have a deep psychological need to be self-directing.
- Role of experience – the adult learner draws on previous experience which is a wealthy resource for learning.
- Readiness to learn – adults become ready to learn when they experience a need to learn to fulfil a real-life task or problem.
- Orientation to learn – adults learn for today's needs; the need for learning is based on completing tasks in the immediate future. The learning orientation is problem centred, task orientated, and life focussed.
- Internal motivation – motivation for learning is based on satisfying the internal needs of the adult learner rather than the environment or person around them.
- Need to know – adults need to understand the value of the lesson to be learnt and why learning needs to occur. Should this satisfy their personal needs, the learning process should be successful.

Knowles' theories have met with criticism, including the lack of social and political concept consideration in andragogy (Chan, 2010). Chan further cited authors who identified criticism within the andragogical sphere relating to cultural perspectives and diversities.

Adults use a variety of styles and techniques to learn and acquire knowledge. The way the adult learns impacts their learning process; and Knowles' principle of andragogy placed emphasis on the teacher recognising the learning style of the student and applying delivery methods in the classroom to meet the learning needs of the student (Warner, Christie & Choy, 1998). Students may use various styles when they learn, with a high probability of one dominant style – these changing to adapt to various circumstances within the learning environment (Chan, 2010).

Kapp (Henschke, 2010) identified seven learning styles as portrayed in Figure 2.1:

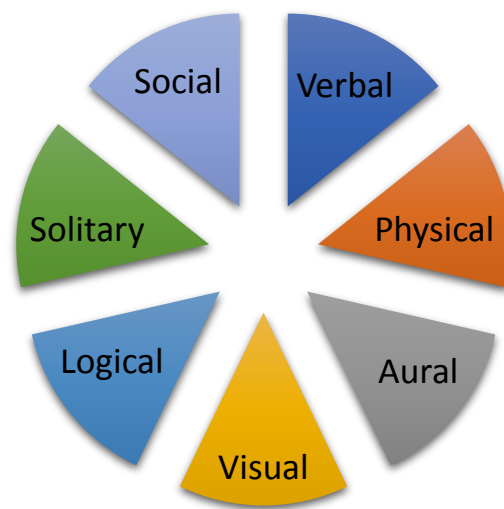


Figure 2.1: The Seven Learning Styles

- Verbal learners: The verbal learner uses words, both in speech and writing.
- Physical learners: These learners need to do (hands-on learners).
- Aural learners: These learners prefer using sound; rhythms, music, recordings, clever rhymes.
- Visual learners: These learners use pictures, images, colours, and mind maps to aid in learning.

- Logical learners: These learners use logic or reasoning to understand concepts.
- Solitary learners: The solitary learner prefers to learn alone and through self-study.
- Social learners: These learners are the ones who enjoy learning in groups or with other people, and aim to work with others as much as possible.

Although adults tend to mix styles in their learning, each adult learner will have one dominant learning style and study behaviour (Chan, 2010; Williams, Boyle, Molloy, Brightwell, Munro, Service & Brown, 2011; Asci, Kulac, Sezik, Cankara & Cicek, 2016). E-learning material tends to reach the visual and solitary learner, with some verbal and aural learners' needs met if the information is presented using videos or sound. Unfortunately, there is a high possibility that e-learning will not meet the needs of the social and physical learner.

2.5 E-READINESS

The domain for learning has shifted in the last century as educational facilities incorporate the use of electronic and online learning in the syllabus. E-learning has become a standard delivery medium for education and training. It is seen as a means to enhance the accessibility and quality of the teaching-learning process (Mafenya, 2013). Online readiness was researched by Warner, *et al.* (1998), and they described e-readiness, or a state of preparedness, in terms of three aspects:

- the student's preference of delivery method;
- the student's confidence in using electronic equipment for learning, specifically competence and confidence in Internet use; and
- the student's ability to engage in autonomous learning.

Many who participated in international studies commented on the flexibility of online courses (Beard, Harper & Riley, 2004). This was noted in the older learners who worked full time and who could not attend classes. A comment was also made about the lack of instructor and student interaction (Beard, *et al.* 2004). The separation of the teacher-student relationship played a role in personal motivation towards completion of the course. Before commencing an online course, respondents were

asked to propose a timeline for completion and it was noted that online courses took longer to complete than predicted (Beard, *et al.* 2004).

Computer literacy plays an integral role in the success of online and e-learning. This course is offered in high schools across South Africa, but many obstacles have been identified in an assessment by the South African Institute for Distance Learning (Gauteng Department of Education, 2010). One of these obstacles was insufficient teachers with adequate knowledge to present the course. A lack of equipment and Internet connectivity also prevented students from accessing educational material online and restrictions, therefore, limited the students to e-learning using DVD or CD-loaded material (Xhakaza, 2011). Many school leavers enter the technological world with limited exposure to using a computer and knowledge of accessing information from the Internet. This is supported by international research where participants identified inadequate computer knowledge as one of the significant disadvantages in e-learning (Smart & Cappel, 2006; Kavaliauskiene & Valunas, 2012).

The lack of instructor-led teaching introduces the concept of autonomous learning. Henry Holec described the concept of autonomy in 1979 in his works “*Autonomy and Foreign Language Learning*”, and Little (2009) broadened Holec’s initial definition and highlighted the concept that autonomous learners learn freely beyond the confines of the context of learning, with the outcome of the learning experience dependant on personal motivational advantage (Little, 2009). Shannon (2000) furthered the subject by recognising that the concept of self-directed learning is effective as it builds on the learner’s experiences. This then integrates the learnt material gained via active involvement into practice.

Multiple assessment tools have been designed and validated that assess attitudes towards computers, and online or e-learning across a variety of disciplines. International authors found that the majority of the participants involved in research had positive attitudes towards online and e-learning, especially when completion of the course resulted in gain; students were not motivated to complete courses unless there was some form of reward in the form of certificates or CPD points (Williams, *et al.* 2011).

It is recognised that there is a cost to setting up online courses and programs for e-learning, but the cost of access to these courses is usually covered by the student (Smart & Cappel, 2006). However, access to affordable education is vital in motivating a student to up skill.

2.6 ONLINE AND E-LEARNING

There is much debate among authors regarding the definitions of these two terms. Some authors use precise terminology, others use somewhat vague descriptions that are often interchangeable and related to the learning environment according to Moore, Dickson-Deane and Galyen (2011). They further state that despite the definition or characteristics of these terms, the result will still be learning opportunities. The use of electronic devices for learning has been thought of as e-learning (Smart & Cappel, 2006), and as this often incorporates the use of the Internet or online learning, these concepts form an integrated part of 'blended learning' (Glogowska, Young, Lockyer & Moule, 2011). Research has also revealed m-learning, an upgrade of the e-learning concept to include any form of handheld mobile electronic device on which educational information can be accessed (Clyde, 2004; Fahad, 2009). For the purposes of this research, the term e-learning will include any form of electronic device used for educational purposes, inclusive of online learning.

The need for a flexible, blended form of learning applies particularly to adult students whose work constraints prevent them from attending lengthy classroom-based classes. Adult learning has identified a need for accessing learning material out of the traditional classroom environment. This has resulted in the evolution from the traditional teacher-led, textbook medium environment, to the use of online learning (Hung, *et al.* 2010; Findsen & Formosa, 2011). Online and e-learning can potentially allow the adult learner to learn at their own convenience. Studies done at Jackson State University in the United States of America found online courses both augmented the student's learning experience and allowed those who could not attend classes the flexibility to continue with their studies (Beard, *et al.* 2004). The concept of using electronic equipment to access learning material is currently a norm in higher educational institutions, and is filtering into high schools within South Africa (Baloyi, 2014).

2.7 LEARNING IN THE SOUTH AFRICAN ENVIRONMENT

Historically, the South African educational system was shaped by the colonial, segregationist, and apartheid past (Walters, 1999; Stevens, n.d.). The 1994 National Elections marked the end of apartheid in South Africa. The movement from a racially defined teaching regime to one of racial inclusion resulted in the need for an integrated educational system for lifelong learning. National curriculum reform initiatives were introduced by the Minister of Education in 1995; the first was Curriculum 2005 (C2005) released in March 1997 – the first post-apartheid curriculum intended to ‘purge the apartheid curriculum (school syllabuses) of racially offensive and outdated content’ (Jansen, 1997; Jansen, 1998). This initiative was the first step in departing from the pedagogical approach in the South African classroom using a subject dominated syllabus to a learner centred integrated education and training system (Jansen, 1998; Stevens, n.d.).

The second initiative introduced a single qualification structure and the South African Qualifications Authority (SAQA) was established in 1995 to manage and coordinate the National Qualifications Framework (NQF). The aim of the NQF was to link segregated and separated education and training fields (Stevens, n.d.). Continuous assessments were introduced into schools with outcome based education (Jansen & Taylor, 2003). These new concepts in legislature, and the resultant dramatic changes of political and economic equity within the South African society, rendered it imperative for the South Africa educational system to produce lifelong learners, and to provide for continued learning throughout life (Walters, 1999).

The White Paper on e-education “*Transforming Learning and Teaching through Information and Communication Technologies (ICTs)*” published in 2004, identified worldwide changes in educational systems and recognised information and communication technologies (ICT) as the way forward in the South African educational system in overcoming the digital divide (Department of Education, 2004). This was the first policy in South Africa detailing a rollout of ICT in South Africa since the introduction of computers to the school environment in the 1980’s, although these were initially restricted to administrative staff.

The technology 2005 (T2005) rollout of ICT into South African schools was planned for 1994 – 1997, with full integration by 2005 (Stevens, n.d.). Unfortunately, significant challenges were faced; many schools had no access to basic commodities such as electricity, and the project was recommissioned after only three of the nine provinces in South Africa were completed. Together with the White Paper, the Curriculum 2005 promoted the concept of lifelong learning and efforts were directed towards improving the abysmal educational system for impoverished South Africans prior to the 20th Century (Department of Education, 2004).

According to the 2011 Census of South Africa, the population was 51 770 560, of which 12 272 263 resided in Gauteng. Of Gauteng residents aged 20 and over, 8.4% have received no schooling, 11.2% have had some primary schooling (below Grade 7), 5.5% have completed only primary school (Grade 7), 34.3% have had some high school education (Grade 7 to Grade 12), 28% have finished only high school (Grade 12), and 12.6% have an education higher than the high school level. Overall, 40.6% of residents have completed high school (Grade 12) (Statistics, 2011). It is also noted that there is a dramatic decrease in the percentage of individuals who are functionally illiterate, or lacking the necessary skills needed in most jobs and everyday situations (Oxford English Dictionary, 2017). National results indicated that 35% of the population had access to the Internet, with over 16% accessing the Internet from their cell-phones.

2.8 CONTINUITY OF LEARNING AND CONTINUOUS PROFESSIONAL DEVELOPMENT

Continuous professional development allows for lifelong learning within a profession and occurs after qualification. The HPCSA (2014) defines CPD as ‘a means for maintaining and updating professional competence, to ensure that the public interest will always be promoted and protected, as well as ensuring the best possible service to the community’. Continuous professional development is recognised as a self-orientated progression within the specific profession.

2.9 CONTINUOUS PROFESSIONAL DEVELOPMENT IN THE PREHOSPITAL ENVIRONMENT

Each emergency care provider registered with the HPCSA prescribes to The Health Professions Act No. 56 of 1974. This Act endorses CPD as a means for ‘maintaining and updating professional competence and for ensuring the public interest will always be promoted and protected’ (HPCSA, 2009). The HPCSA has therefore made CPD a requirement for every registered professional, thus increasing the need for access to regular, up to date educational activities.

Each emergency care provider must accumulate CEUs through CPD activities. Continuing education units are the value (points) attached to a learning activity for continuing professional development through CPD activities. These CEUs are accumulated over a 12-month period, are valid for 24 months from the date of issue, and must include ethics, human law, or health law CEUs as per Table 2.1.

Table 2.1: Continuing Education Units needed per registration category per annum

Registration category	Minimum CEUs per twelve-month period	Ethics, Human Rights or Health Law CEUs
Basic Ambulance Assistant	15	2
Ambulance Emergency Assistant	30	5
Paramedic	30	5
Emergency Care Technician	30	5
Emergency Care Practitioner	30	5

Currently, there are both private and public sector educational and learning centres offering CPD activities. To assist their employees in remaining CPD compliant, COJEMS Medical Training Academy offers workshops for staff to attend. These

workshops range in topics and are based in the classroom, so both theoretical knowledge and practical skills are covered.

2.10 PREHOSPITAL EMERGENCY MEDICINE EDUCATION IN SOUTH AFRICA

In 1985 three standardised short courses in Emergency Medical Care were introduced. Course content was based on a national curriculum and was skill and protocol based (Emergency Care Society of South Africa, 2012; HPCSA, 1998). Time has seen many changes to these short course qualifications, with the most significant being increased hours in clinical learning.

These three courses included:

1. A basic course in prehospital emergency medicine allowing a successful candidate to qualify as a Basic Ambulance Assistant (BAA) and register with the HPCSA. A BAA is qualified to use standard ambulance equipment, but is unable to perform invasive procedures on the patient (HPCSA, 1998).
2. An intermediate course in prehospital emergency medicine allowing registration as an Ambulance Emergency Assistant (AEA) with the HPCSA. Over and above BAA capabilities, the AEA can also defibrillate, initiate intravenous infusions in the adult patient, and conduct other basic invasive procedures such as needle thoracentesis and needle cricothyrotomy. To participate in this course, a qualification of BAA and 1000 operational ambulance hours are required (HPCSA, 1998).
3. An advanced course in prehospital emergency medicine allowing a successful candidate to qualify as a Critical Care Assistant (CCA) and register with the HPCSA as a Paramedic. The paramedic's scope of practice includes that of the AEA and although restricted to protocols, the paramedic can treat to an advanced life support level. To participate in this course, a qualification of AEA and 1000 operational ambulance hours are required (HPCSA, 1998).

These three short courses were never registered through the NQF, although certification is achieved. These courses are non-credit bearing and thus articulation to an NQF qualification is difficult.

In 2009 the HPCSA issued a report indicating that to comply with the National Department of Health, the requirements of the South African Qualifications (SAQA) Bill and the National Qualifications Framework Bill, the Professional Board for Emergency Care had reviewed the structure of the courses in Emergency Medical Care. The existing AEA and CCA short courses were restructured into a two-year formal qualification and registered with SAQA, thus allowing the opportunity for progression and lifelong learning (Emergency Care Society of South Africa, 2012). Currently, to graduate with an NQF qualification, three qualifications are offered:

1. A one-year Higher Certificate in Emergency Medical Care allowing the successful participant registration with the HPCSA as an Emergency Care Assistant (ECA).
2. A two-year Diploma in Emergency Medical Care allowing the successful participant registration with the HPCSA as a Paramedic (ANT). This course has been realigned in the last five years from an NQF level 5 to level 6.
3. A four-year Professional Degree in Emergency Medical Care allowing the successful graduate registration with the HPCSA as an Emergency Care Practitioner (ECP).

Most of the emergency care providers in South Africa hold short course qualifications. Due to the time frame allocated to achieve a diverse curriculum, short course graduates are often forced to study for assessments rather than build the foundations for lifelong learning. In addition, the constraints within the South African educational system have resulted in adults who need to learn how to learn (Walters, 1999).

2.11 CONCLUSION

Research has provided insight into the adult learner, the growth in education in South Africa, and e-readiness of students towards e-learning. Advances in emergency education and training have been considered through literature reviews, but limited research is available that speaks directly to the prehospital emergency care provider, and paucity exists when further specified to involve South Africa and CPD compliance with the HPCSA. The next chapter focusses on the methodology used in this research.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research design and methodology used to guide the study. It focuses on the setting and population used and explores the data collection procedure, data analysis, and ethical considerations.

3.2 RESEARCH DESIGN

This research was conducted using a paper-based cross-sectional survey. Cross-sectional surveys are research tools used to collect data to a conclusion based on evidence about a population at a specific point in time (Creswell, 2007). Attitudes, knowledge and beliefs can be assessed describing the magnitude of a problem within a population at the specific time. Assumptions can be replaced with chosen variables specific for that study. This research is descriptive in nature and can be used as a point of departure for future research (Creswell, 2007; Schostak, 2007).

3.3 RESEARCH SETTING

Gauteng is the most populous province in the Republic of South Africa (RSA) with an estimated 12.3 million people as of 2011 (Statistics SA, 2011). As the smallest province, it accounts for only 18178km² or 1.4% of the land within RSA. Gauteng contains the largest city in RSA, Johannesburg, with about 4.5 million residents (Statistics SA, 2011). Emergency Services within the City of Johannesburg are provided at governmental and municipal levels, as well as by the private sector. For the purposes of this research, the municipal services within the City of Johannesburg were used.

City of Johannesburg Emergency Management Services provide emergency medical care and fire services to residents within the City of Johannesburg area. With 28 base

stations and covering an area of 1620km², COJEMS is one of the largest emergency service units in Africa (City of Johannesburg, 2018).

At the time of the research, COJEMS had a compliment of 1137 operational employees, most of whom held a short course qualification with HPCSA registration. Table 3.1 in Section 3.4 details the breakdown of registration categories within COJ.

3.4 TARGET POPULATION AND SAMPLING METHOD

The target population included all operational COJEMS emergency care providers. A convenience sampling method was used resulting in a sample that included operational COJEMS emergency care providers registered with the HPCSA and present at the time of survey distribution. This method was selected to ensure access and availability of the target population; due to the random nature of emergency calls the researcher needed to ensure access to the COJEMS emergency care providers at their convenience and availability.

Due to a lack of literature researching the prehospital operational environment, the Raosoft Sample Size calculator was used to indicate a sample size for this research. Based on the target population of 1137 operational crews, a sample size of 288 was calculated. This was stratified according to the HPCSA registration categories at the time of distributing the questionnaires (Refer to Table 3.1).

Table 3.1: Stratified sampling according to registration categories

HPCSA registration	COJEMS operational employees	Percentage representation	Stratified sample
Basic Ambulance Assistant	883	78%	226
Ambulance Emergency Assistant	234	20.5 %	58
Paramedic	14	1.2%	4
Emergency Care Technician	3	0.26%	1
Emergency Care Practitioner	3	0.26%	1

The sampling was carried out over a period of six weeks to gain access to crews, taking annual and sick leave periods into account. The final study sample included 320 distributed questionnaires of which 276 were included for data analysis. The deviation between the sample size obtained from the Raosoft Sample Calculation and the result was due to incorrectly completed or incomplete questionnaires found during the data capturing phase. This is further detailed in Chapter 4 Section 4.2.

3.5 INCLUSION AND EXCLUSION CRITERIA

3.5.1 Inclusion criteria

The study included all operational staff of COJEMS with the qualifications of BAA, AEA, Paramedic, ECT, and ECP registered with the HPCSA who were present when the researcher visited the base station, and who consented to participate.

3.5.2 Exclusion criteria

Operational staff in the position of 'station commander and above' were excluded from the study as persons in this position are allocated a computer with Internet access for their day-to-day administrative duties.

3.6 DATA COLLECTION TOOL

A questionnaire (Refer to Annexure 5) was designed by the researcher incorporating questions that targeted the aims and objectives of this study. The researcher designed closed-ended questions to evaluate preparedness and knowledge towards online education. This facilitated comparability of responses and analysis of data. Two questionnaires used in similar international studies were assessed. These included the Online Learning Environment Survey (OLES) (Pearson & Trinidad, 2005), and Mc Vay's readiness for online learning questionnaire (OLRS) (Dray, Lowenthalb, Miszkiewicz, Ruiz-Primoa & Marczynskid, 2011). Mc Vay's OLRs survey did not include an assessment of basic technology skills, access to or the use of electronic equipment, and this was later included in programme specific surveys. The OLES survey was found to be easy to administer and comments included 'an effective way of obtaining feedback on modules'. Further research indicated that surveys assessing online readiness focussed on learner characteristics such as communication skills, general writing skills, and language (Dray, *et al.* 2011). Using this information, the researcher designed a questionnaire making use of binary questions and Likert scales.

The research instrument consisted of 47 questions, and was divided into four sections which measured various themes:

- Demographical data
- Access to/use of a computer
- Frequency of use
- Education and training

3.6.1 Demographical data

This section deals with generic demographic data such as gender, age, and race. Further questioning regarding educational level allowed for the researcher to evaluate trends and correlations relating to access and the use of electronic devices and Internet. Considering the movement from the older, more traditional classroom environments to newer online learning, age could play a key role in the preparedness towards online learning as computers were not traditionally used in the classroom.

3.6.2 Access to/use of a computer

These questions explored the ownership of and access to electronic devices with the intention of correlating the frequency of use, motivation for learning, and access to electronic devices.

3.6.3 Frequency of use

Understanding how often an electronic device is used and what programs or websites are accessed can assist in designing learning material best suited for professional development.

3.6.4 Education and training

Further, analysing participation in online courses may indicate preparedness for online learning. Insight into learning styles could assist in the future preparation of learning material to meet the emergency care providers' needs to achieve CPD compliancy.

3.7 RELIABILITY AND VALIDITY OF DATA COLLECTION TOOL

The two most important aspects of precision are reliability and validity. Therefore, the development of a reliable and valid data collection tool was critical in the outcome of this research.

3.7.1 Reliability

Reliability refers to the consistency of the assessment tool and can be assessed through a trial run or pilot study prior to a major study (Polit & Beck, 2014). The pilot study ensures that instructions are logical and comprehensible, that wording is understood, and it can indicate weaknesses within the questionnaire.

3.7.2 Validity

According to Sullivan (2011), validity refers to accuracy, determining how well a tool measures what it is supposed to measure. Validity is not a property of the tool itself, but rather of the specific purpose of the assessment tool within the research setting. The questionnaire used was based on the objectives of the research and designed by the researcher after extensive literature review. Face validity was applied as per the following section.

3.7.2.1 Face validity

Although considered the weakest form of validity, face validity is a subjective judgement indicating whether the data collection tool appears to measure the assessment objectives (Brink, Van der Walt & Van Rensburg, 2012).

To ensure face validity, a pilot study was conducted prior to the actual data collection to detect possible flaws. An expert panel within the prehospital medical field, not including operational employees within COJ, was used for the pilot study. This included prehospital emergency care academic staff from the University of Johannesburg's Emergency Medical Care Department and the COJEMS Medical Training Academy. They were requested to appraise and comment on the design and appropriateness of the questionnaire. The time required to complete the questionnaire was also determined and used as an average for completion for the sample group. Data collected from the pilot study were not included in the final results.

Eight questionnaires were distributed for the pilot study and eight were returned. Comments from the pilot study resulted in three changes being made:

1. One grammatical amendment was made to the questionnaire.
2. One grammatical amendment was made to the letter of information.
3. Instructions for answering questions were clarified on the questionnaire.

It was determined that the average time to complete the questionnaire would be 12 minutes.

3.7.2.2 Content validity

Content validity displays the degree to which the data collection tool represents the aims and objectives of the research. According to Bolarinwa (2015), the development of a content valid instrument can be achieved through rational analysis of the questionnaire by experts within the subject field. He further mentions that reviewing readability, clarity, and comprehensiveness may be subjective. This research used the panel of experts as mentioned under face validity to complete the questionnaire, and feedback was given during this pilot study regarding the flow, clarity of questions, and grammatical changes.

3.8 DATA COLLECTION PROCEDURE

Once permission was granted by the relevant persons within COJEMS (Refer to Annexure 2) and ethical clearance (Refer to Annexure 1) was received to conduct the study, the researcher printed and numbered the questionnaires.

During the data collection phase, the researcher worked various eight hour shifts on a response vehicle over a two-month period within the regions of COJ. The regularity of these shifts depended on the need for additional vehicles and the availability of the researcher. The area covered for that shift was dependant on the need for medical resources and was determined by the dispatch centre. Base stations were conveniently selected depending on the location the response vehicle was dispatched to. Between calls, the researcher targeted base stations within that area. On arrival at a base station permission was obtained from the Station Commander to access the operational staff. The aim of the research was explained to the staff and information letters (Refer to Annexure 3) were distributed. Consent forms (Refer to Annexure 4) were distributed with questionnaires and staff were afforded an opportunity to complete these. The respondents placed their questionnaires in a box and left the consent form next to the box.

A total of 320 questionnaires were distributed and 276 questionnaires were completed during the data capturing. Each respondent placed their own questionnaire in the box, thus the researcher was not involved in ascertaining if the questionnaire was correctly and fully completed. It was during the data capturing phase that the researcher found

incomplete questionnaires; details of this can be found in Chapter 4, Section 4.2. As there was no identifying data on the questionnaire, these incomplete questionnaires were removed from the study.

The raw data from the questionnaires were manually entered into a password-protected spreadsheet by the researcher. The numbered questionnaire related to the sequential number on the electronic spreadsheet. This was done for future reference in the event it was noted that data were incorrectly captured.

3.9 DATA ANALYSIS

Raw data from each completed questionnaire were captured on an electronic spreadsheet (Refer to Annexure 6) on the researcher's personal computer, which was password protected. A professional statistician was used to analyse the raw data. Statistical software used included SPSS Statistics version 21.0 (Released August 2013) and Statgraphics Centurion 15.1 (2006). The statistical aspect of the research was completed using descriptive analysis; results and correlations were drawn from these statistical results.

3.10 ETHICAL CONSIDERATIONS

Respondents for this research comprised of a convenience sample of COJEMS operational emergency care providers on duty and present at the time the questionnaires were distributed. Ethical guidelines as per the Durban University of Technology's Faculty of Health Sciences policy were adhered to throughout this research.

3.10.1 Informed consent

On arrival at the various stations and with the permission of the senior ranked officer on duty, operational staff were approached by the researcher and the contents of the research were explained. Information sheets were distributed detailing the research and any person who consented to participate was given a consent sheet to complete, and then the questionnaire. Completion of the questionnaire was on a voluntary basis

and no incentives were offered. It was explained to each respondent that once the questionnaire was placed in the box it was considered a component of the research; as there was no identifying data on the questionnaire respondents would be unable to retrieve their questionnaire from the box.

3.10.2 Risks and benefits

The researcher is a ranked officer within the institute. Therefore, to mitigate the risk of coercion, emphasis was placed on voluntary participation with no incentives (included in the information letter), and the opportunity to withdraw from the research at any stage prior to placing the questionnaire in the box. Respondents were given the questionnaire to complete while the researcher waited outside the room and the respondent placed the completed questionnaire in the box. Thus, the researcher was unable to note if the respondent had completed the questionnaire. Although the potential risk of coercion was present, respondents were eager to participate once they realised the potential of improved access to educational material within the workplace.

3.10.3 Privacy and confidentiality

During the data collection process, respondent-specific information was not recorded on the questionnaires for this research. All questionnaires were completed anonymously, and the consent form was collected and filed separately ensuring no identifying data was captured on the questionnaire at any stage. All data was captured into an electronic spreadsheet – Microsoft Office Excel © 2007 – on a password-protected personal computer. The computer is owned by the researcher who is the sole administrator. Therefore only the researcher, supervisor, co-supervisor, and statistician had access to the information obtained from the questionnaires. This electronic data will be stored in a password-protected file for a period of five years after completion of the research. Thereafter, the data will be destroyed. All hard copies will be shredded once the research is complete.

3.10.4 Permissions

Consent was obtained from the COJEMS directive allowing access to staffing information, staff, and collection of data (Refer to Annexure 2). This was submitted to the Durban University of Technology's Institutional Research Ethics Committee for approval to conduct the proposed research.

3.11 CONCLUSION

This chapter explored the research design and methodology of the study. Although challenges were faced with the distribution and collection of the questionnaires and access to operational COJEMS staff, information relevant to the research aims and objectives was still obtained. The following chapter explores the results obtained from a comprehensive analysis of the feedback, making use of visual aids such as graphs and tables.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter presents detailed results obtained from the data collected and will be structured according to the sections of the questionnaire, thus meeting the objectives of the study. The results will be presented using pie charts, graphs, and tables, together with a brief descriptive analysis.

Initially, baseline information on demographics, educational levels, EMS qualification, and access to electronic equipment by emergency care providers will be analysed. This will be followed by an assessment of access to and use of electronic equipment by respondents. After determining the respondents' learning styles and preferences, the researcher will comment on knowledge, current exposure to e-learning, and confidence when using electronic equipment to access online learning material.

4.2 THE SAMPLE

A total of 320 questionnaires were distributed. On inspection of each questionnaire, 44 questionnaires were excluded. Thirty-nine of those were incomplete, and the following trends were noted:

- The majority of the questionnaires that were considered incomplete were due to omitted data in the education and training section, mainly questions 23 to 40.
- Five questionnaires omitted educational levels in the demographic details section.
- Eleven were incorrectly completed; open responses were provided where closed responses were required.

A response rate of 276/320 (86%) was achieved. Table 4.1 indicates the breakdown of completed questionnaires per registration category used in the data collection process. The majority of the sample is registered as BAA with the HPCSA, which constitutes the COJEMS workforce.

Table 4.1: Breakdown of responses according to HPCSA registration

HPCSA Registration Category	Responses
Basic Ambulance Assistant	206 (74.6 %)
Ambulance Emergency Assistant	59 (21.4%)
Paramedic	6 (2.2%)
Emergency Care Technician	1 (0.4%)
Emergency Care Practitioner	4 (1.4%)
TOTAL	276

A deviation between Table 3.2: Stratified sampling according to registration categories and Table 4.1: Breakdown of responses according to HPCSA registration is noted: an additional Emergency Care Practitioner was employed by COJEMS after the stratified sample was completed. As there were so few participants in this registration employed at time of data collection it was decided to include this questionnaire in the research.

4.3 BIOGRAPHICAL DATA

This section summarises the biographical characteristics of the respondents.

4.3.1 Age and gender distribution

Overall, the ratio of males to females was approximately 3:2 (60.5%: 39.5%). Table 4.2 depicts the age categories within the gender distribution.

Table 4.3: Ages categories with gender distribution

Age category	Male	Female	Total
<20	3 (1.0%)	4 (1.4%)	7 (2.4%)
20-29	47 (17.1%)	42 (15.2%)	89 (32.3%)
30 - 39	79 (28.6%)	48 (17.4%)	127 (46%)
40 - 49	30 (10.9%)	14 (5.1%)	44 (16%)
50 - 59	7 (2.5%)	1 (0.4%)	8 (2.9%)
60 - 69	1 (0.4%)	0 (0.0%)	1 (0.4%)
TOTAL	167	109	276

The majority of males and females who completed the questionnaire fell into the age category of 30 to 39 years; this accounted for 46% of the total sample. More than 75% of the sample were below 39 years of age, indicating that many in this group would have completed matric or Grade 12 post 1995. In 1995 national curriculum reform initiatives were introduced to schools within South Africa, marking dynamic changes within the classroom environment from a subject dominated syllabus to a learner centred integrated curriculum (discussed in Chapter 2, Section 2.7).

Of the females who responded, 94 (86%) were under 40 years of age, compared to 129 (77%) males. Less than 20% of the sample fell into the age group above 40 years; these respondents would have matriculated prior to 1995.

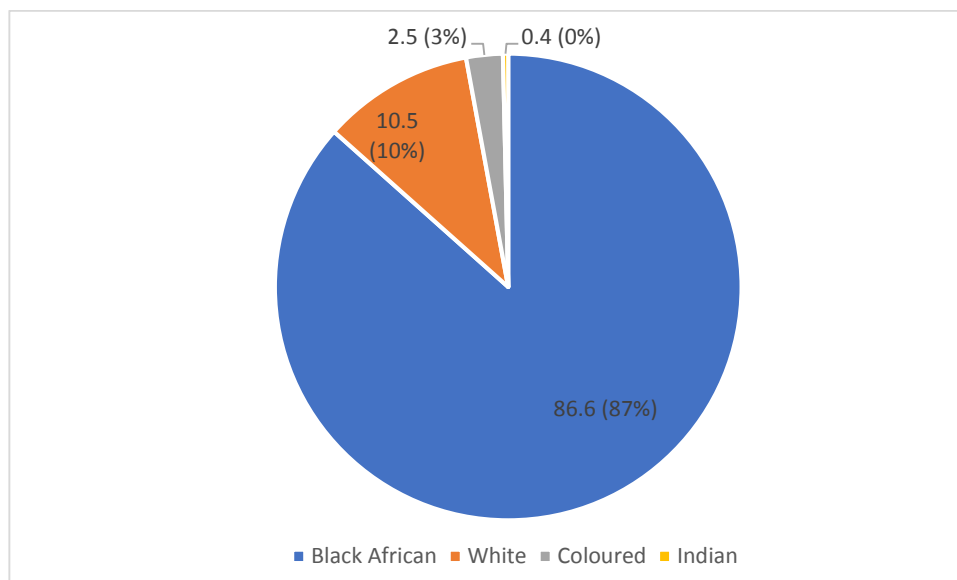


Figure 4.1: Racial distribution of sample

Statistics South Africa (2012) uses five racial population categories to describe the population, namely Black African, White, Coloured, Indian, and other (unspecified) (Statistics SA 2012). These categories were provided in the questionnaire so as to compare the sample distribution to the Statistics South Africa census data.

The racial distribution of the sample was found to be similar to that of the South African population according to the 2011 census; Black Africans constitute 87% or the majority, Whites at 10%, and Indians the least at 2.5%. There were no responses for the option of 'other'.

4.3.2 Educational levels and HPCSA registration categories of respondents

Prior to 2012 one was able to gain entry to a BAA course without a Grade 12 or matric certificate (Senior Certificate (prior to 2009) or National Senior Certificate). In January 2012 the HPCSA amended this ruling requiring all future applicants to produce a Grade 12 or matric certificate to gain entry to the BAA courses. Figure 4.2 displays the various educational qualifications of the sample.

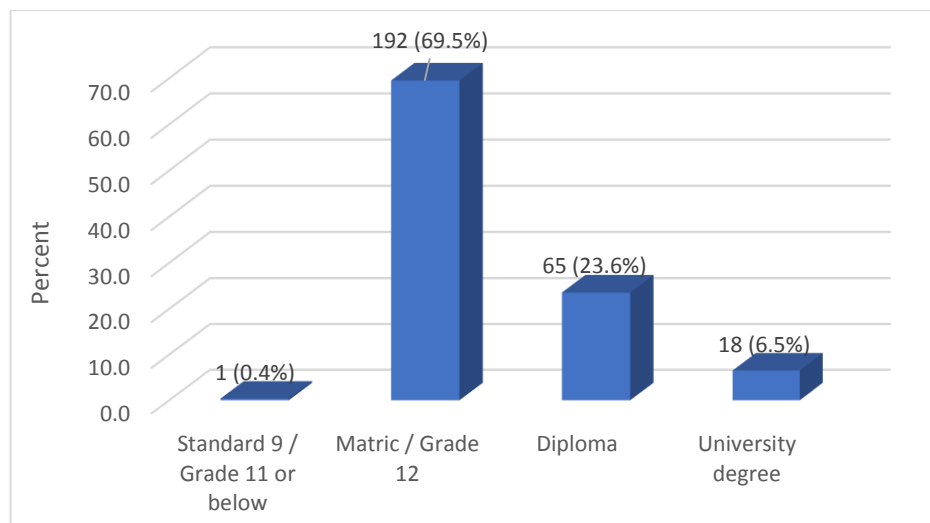


Figure 4.2: Educational qualifications of the sample

The majority of the sample have a Grade 12 or matric, with 30% of the sample holding a diploma or university degree. Of the EMS qualifications, only the Emergency Care Practitioners hold a University Qualification. This indicates that 5% of the sample have achieved a university qualification that is not related to the EMS.

4.3.3 Length of service in the Emergency Medical Services

Figure 4.3 portrays the number of years worked by respondents within the EMS. This was not restricted to employment within COJEMS and could include other services.

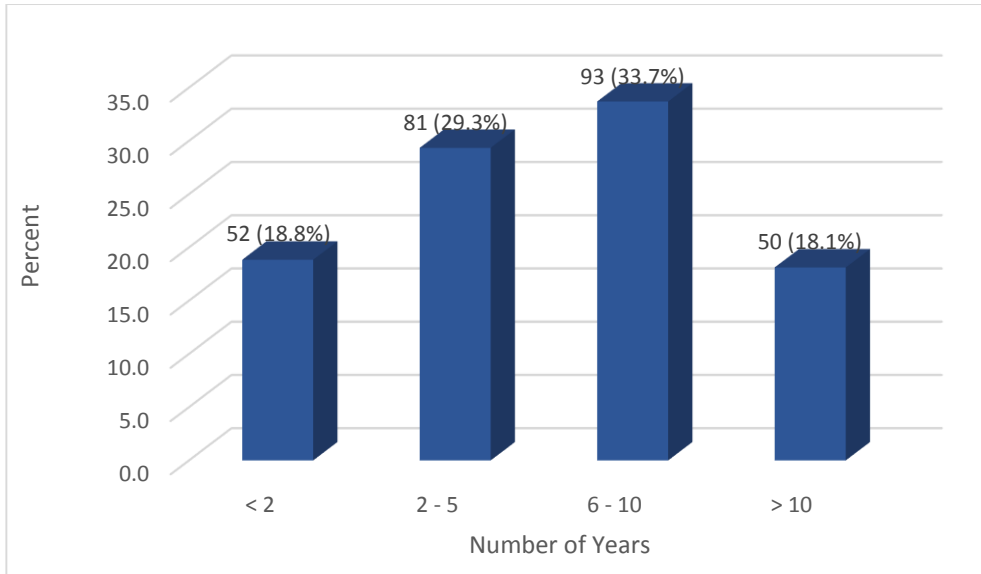


Figure 4.3: Length of service worked in the Emergency Medical Services

More than half of the respondents (52%) have been employed by an emergency service for at least six years. Less than 20% have been employed in the EMS for less than two years.

4.4 ACCESS TO/USE OF A COMPUTER

This section explores access to various electronic equipment and the use thereof.

4.4.1 Electronic devices owned

This section in the questionnaire assessed the types of electronic devices owned by respondents including computers, cellular phones, electronic tablets or readers as indicated in Table 4.3.

Table 4.4: Electronic devices owned

Electronic device options	Yes	No
Computer (laptop or desktop)	114 (41.3%)	162 (58.7%)
Cellular phone	263 (95.3%)	13 (4.7%)
Tablet	85 (30.8%)	191 (69.2%)
Electronic reading device	21 (7.6%)	255 (92.4%)

All respondents indicated owning an electronic device; more than 95% mentioned owning a cellular phone, while less than half of the sample owned a computer. The electronic reader was the least owned device.

4.4.2 Locations used to access a computer

These questions explored locations where computers and the Internet via a computer were used by respondents; options included at work, at home, a local library, a friend's house, and an Internet café. Figure 4.4 reflects the use of computers and the Internet at work and home.

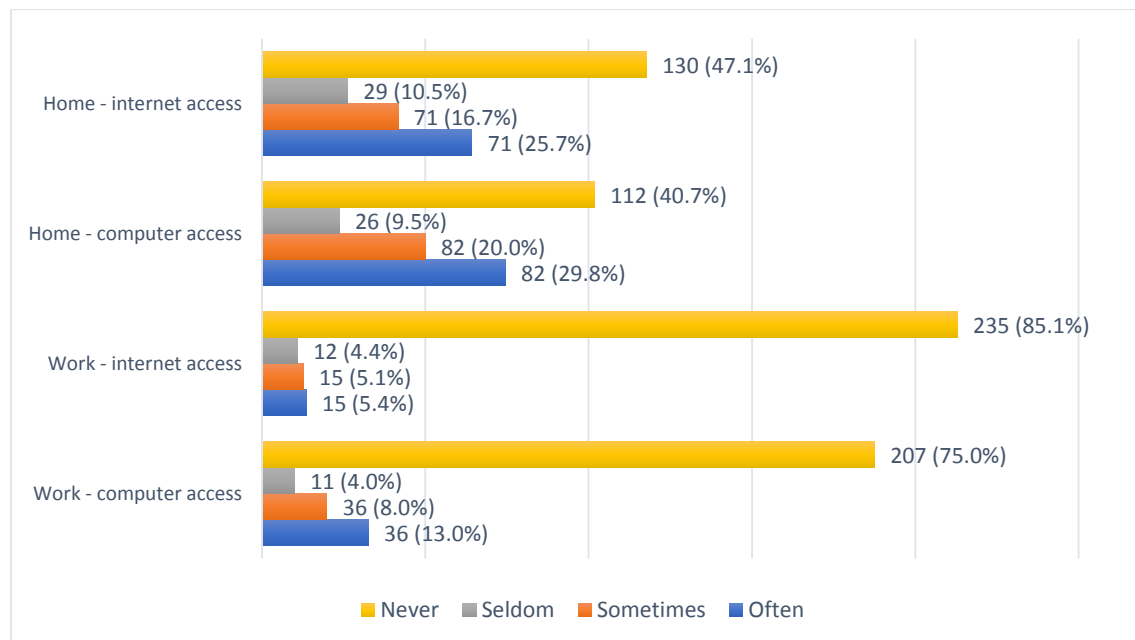


Figure 4.4: Use of computers and Internet at work and home

Of the sample, over 40% indicated that they never had access to a computer at home, with over 47% unable to access the Internet using a computer. Less than 10% seldom had access to a computer or the Internet at home, indicating limited access. Within the work environment, less than 15% often had access to a computer, with only 5% able to access the Internet. These results indicate poor accessibility to computers and the Internet within both the home and the workplace, limiting possible access to educational programmes.

Three other options of access to computers were explored including:

1. The local library
2. A friend's house
3. An Internet café

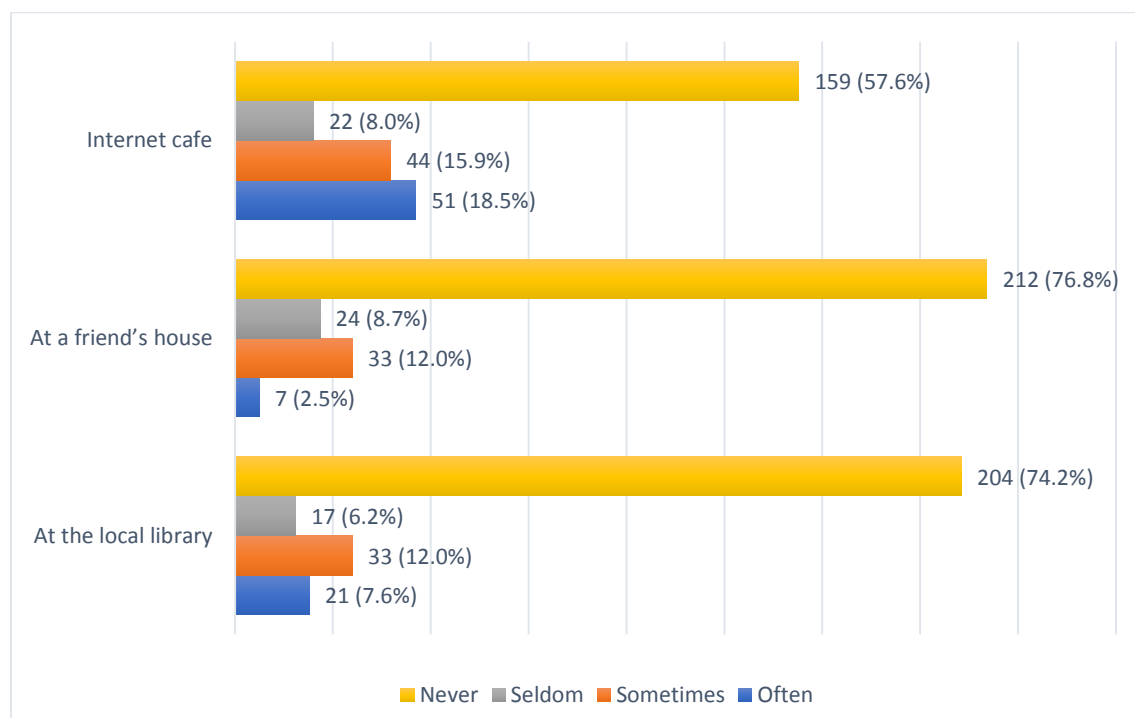


Figure 4.5: Additional locations used to access a computer

Of the three choices to access a computer, less than 20% of the sample indicated that an Internet café was often used. Although the City of Johannesburg has made free Wi-Fi accessible at over 50 public libraries, 74% of the sample revealed they never used this option (Jozi Digital Ambassadors, 2016).

The questionnaire allowed for the respondents to document any additional locations they used for Internet access. Twenty-eight (28) respondents specified their preferences as summarised in Table 4.4.

Table 4.5: Other locations for computer and Internet use

Place	Number of responses
Family member's home	1 (3.6%)
Gym	9 (32.2%)
Restaurants	10 (35.7%)
Local mall with free Wi-Fi spots	6 (21.4%)
Municipal swimming pool (free Jozi Wi-Fi)	2 (7.1%)

(Table 4.4 is based on the responses of the 28 respondents who specified their preference)

Considering the responses noted in Table 4.4 it appears that the Internet is used mainly where free Wi-Fi is available.

4.5 FREQUENCY OF INTERNET USE

The following section of the questionnaire explored the frequency of Internet access using electronic devices. Figure 4.6 indicates how often respondents use computers, cellular phone, tablets, or electronic readers to access the Internet.

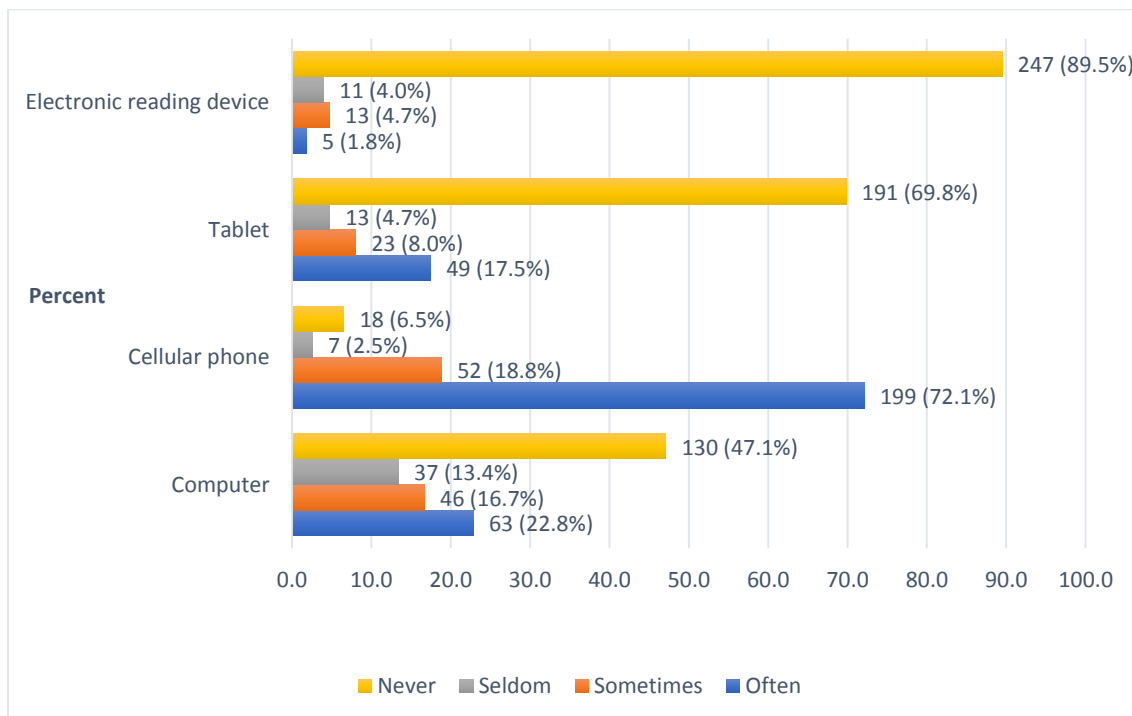


Figure 4.6: Frequency of use of electronic devices to access the Internet

The majority of respondents accessed the Internet using a cellular phone. Almost 70% of the sample indicated they had never used a tablet to access the Internet. Electronic readers were the least used, directly relating to ownership of these devices.

Respondents were asked to indicate the approximate amount of time spent on the Internet per week. The results are depicted in Table 4.5.

Table 4.6: Time in hours spent on the Internet per week

Time in hours	Response
Less than 7	97 (35%)
7 – 14	71 (25%)
14 – 21	61 (22%)
More than 21	47 (17%)

One third of the sample spent at least one hour per day on the Internet, with 17% spending up to three hours per day on the Internet. Figure 4.7 presents Internet sites used by respondents at least once a day on the days they access the Internet.

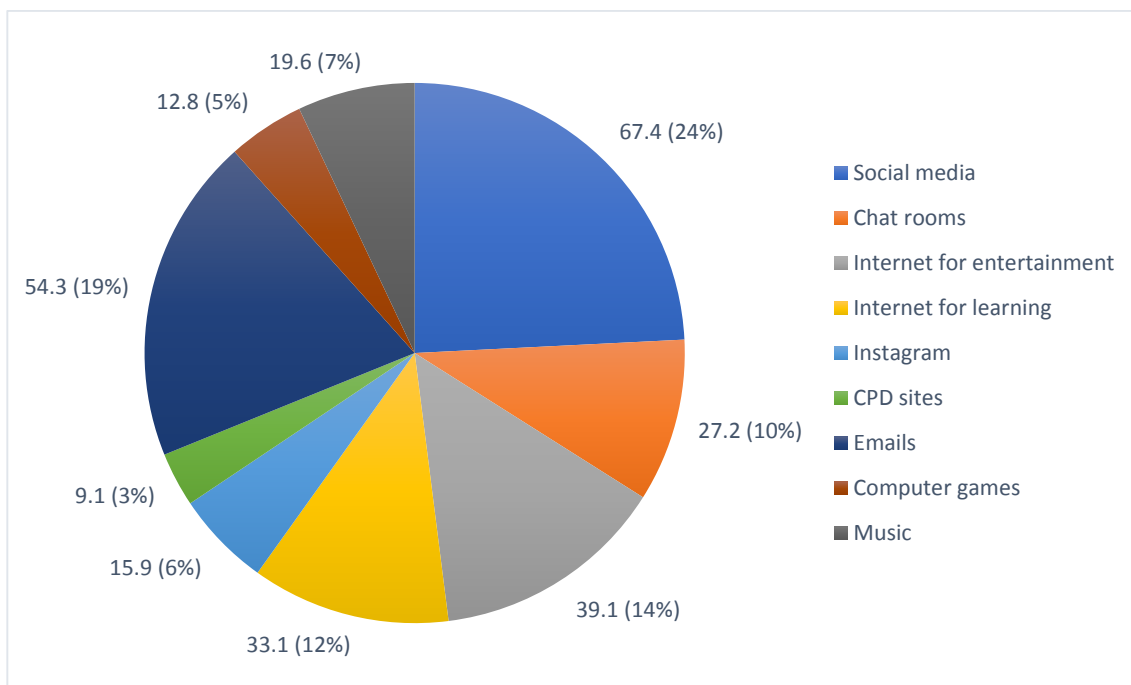


Figure 4.7: Internet sites used by respondents at least once a day

Questions exploring the frequency of Internet websites indicated that most of the respondents access social media sites such as Facebook. Other sites accessed included chat rooms and instagram.

More than 40% of the respondents indicated that they have never accessed sites for CPD instruction, with less than 50% using the Internet for educational purposes.

4.6 EDUCATION AND TRAINING

The various learning styles were explored through questions 16 to 22; seven possibilities were offered in this section, each relating to one of Knowles' learning styles as discussed in Section 2.3 of the literature review (Chapter 2) and depicted in Figure 2.1. Respondents were asked to select the statements that were relevant to them; a total of 740 responses were received. Table 4.6 displays the seven learning styles according to Knowles, with the relevant question from the questionnaire.

Table 4.7: Preferred learning styles

Knowles' learning style	Related question in the questionnaire	Total responses
Verbal	I like role playing and speeches	141 (51%)
Physical	I learn best when I can do the actual skill - 'hands-on' learning	192 (69%)
Aural	I learn best by listening to the teacher/instructor explaining concepts	164 (59%)
Visual	I like using pictures or images and colour when I learn	130 (47%)
Logical	I enjoy logic and reasoning	166 (60%)
Solitary	I learn best when I learn on my own	69 (25%)
Social	I enjoy group work and learning activities	160 (58%)
	Total Responses	740

Of Knowles' seven learning styles, the physical style was the most selected, indicating that almost 70% of the respondents preferred a hands-on approach to learning. Logical and social learning styles were second highest, receiving 60% and 58% of selections by respondents respectively. The lowest percentage of selections was the solitary learners; only 25% of respondents felt this statement was relevant to them. Considering the vast difference between the aural learners (59%) or those who chose 'I learn best by listening to the teacher/instructor explaining concepts' and the solitary learners (25%), or those who felt 'I learn best when I learn on my own' there is a high probability that online learning may not suit the learning style of the target population.

4.7 COMPLETION OF ONLINE COURSES

Questions 23 to 39 were designed to explore participation and completion of an online course. Of the 276 completed questionnaires, only 96 (34%) of the respondents indicated that they had taken an online course. The following two sections (4.7.1 and 4.7.2) are based on those who have completed an online course and those who have never participated in one.

4.7.1 Completion of an online course

Table 4.7 displays questions 23 to 32; these were aimed at respondents who had completed a course via the Internet. These questions were answered by 96 respondents.

Table 4.8: Completion of online courses

Question as per questionnaire	Yes	No
Have you ever received computer training?	68 (71%)	28 (29%)
Was the online course relevant to the EMS?	53 (55%)	43 (45%)
I felt the course content was relevant to the topic I was studying	78 (81%)	18 (19%)
I felt uncomfortable without an instructor to guide me through the course	46 (48%)	50 (52%)
I felt less pressure completing the online course than I feel in a class with an instructor	47 (48%)	49 (52%)
I felt the online course assisted in improving myself in my professional capacity	75 (78%)	21 (22%)
The online activity was good value for money	69 (72%)	27 (28%)
I successfully completed the course I started	70 (73%)	26 (27%)
I am eager to complete more online courses	74 (78%)	21 (22%)
My motivation for the online course was to remain current with the HPCSA CPD requirements	67 (70%)	29 (30%)

(Table 4.7 is based on the responses of the 96 respondents who had participated in an online course)

Of the 96 respondents who indicated that they had taken a course via the Internet, 68 (71%) had received some form of computer training. More than 70% of the respondents were successful in completing the online course. These respondents indicated that they completed the online course to remain current with CPD requirements. Less than half of the respondents felt uncomfortable without an instructor leading the course they completed. A high percentage (70%) indicated that they completed the online course to meet the HPCSA CPD requirements.

4.7.2 Non-completion of an online course

Table 4.8 displays the results from 180 respondents who indicated they had never done an online course.

Table 4.9: Non-completion of an online course

Question as per questionnaire	Agree	Disagree
I have never done an online course as I do not have access to the Internet via a computer	139 (77%)	41 (23%)
I have not done an online course as it does not interest me	49 (27%)	131 (72%)
I prefer the traditional classroom environment and therefore chose not to do online courses	118 (66%)	62 (34%)
I am keen to do online courses but do not know how to use a computer or the programs necessary for taking an online course	126 (70%)	54 (30%)
I feel online courses cost too much	81 (45%)	99 (55%)
I do not study well on my own and therefore prefer the classroom environment	123 (68%)	57 (32%)
I am considering online course as this will enable me to remain current with HPCSA CPD requirements	162 (90%)	18 (10%)
I am currently CPD compliant with the HPCSA	107 (59%)	73 (41%)

Although the responses from this section of the questionnaire show that the respondents prefer the classroom and teacher-led instruction, more than 70% indicated that they had not completed an online course as they do not know how to use a computer or the programs necessary for this, which may indicate the preference for classroom education. More than 90% of the respondents would consider online courses to remain current with CPD requirements.

4.8 CONTINUOUS PROFESSIONAL DEVELOPMENT

The last section of the questionnaire explored CPD, the knowledge thereof, as well as personal compliance. Table 4.9 displays the results of answers from these questions probing personal compliance and a general understanding of CPD.

Table 4.10: Continuous Professional Development

Question as per questionnaire	Agree	Disagree
I am CPD compliant	180 (65%)	96 (35%)
I get more CPD points than required each year	107 (39%)	169 (61%)
I know what is expected of me to remain CPD compliant	252 (91%)	24 (9%)
I understand HPCSA motivation for CPD compliance	244 (88%)	32 (12%)
Online courses assist me with CPD compliancy	234 (85%)	42 (15%)
I prefer instructor-led CPD courses to online courses	236 (86%)	40 (14%)
I only do CPD activities if audited by HPCSA	76 (28%)	199 (72%)

When asked to comment on personal compliance, 65% of respondents indicated that they are compliant with the HPCSA CPD requirements. More than 85% of the respondents are aware of, and understand the HPCSA motivation for CPD compliance, and know what is expected of them to meet these requirements. Although more than 85% prefer instructor-led CPD activities, it was acknowledged that online courses could assist with compliance. It is interesting to note that more than 70% of respondents complete CPD activities irrespective of HPCSA audits, which may suggest personal or intrinsic motivation.

4.9 PREPAREDNESS FOR ONLINE LEARNING FOR CPD DEVELOPMENT

Preparedness is defined as 'a state of readiness' (Oxford English Dictionary, 2017). Specific learning styles and study behaviour is required for individual learning; Warner, *et al.* (1998) use the preference of delivery method, confidence and competence in using electronic equipment and the Internet, and the ability to engage in autonomous learning to determine preparedness. To ascertain the preparedness of COJEMS

emergency care providers for online learning to facilitate CPD compliancy, these three components were further assessed.

4.9.1 Preference of delivery method

Traditionally the delivery method of learning included the teacher-led classroom-based system. Significant educational changes in the last century encouraged alternative delivery methods; from a traditional classroom with social learning, to work-based learning and online delivery (Warner, *et al.* 1998). This allows the learner greater options in their preferred delivery method.

Previous research (Warner, *et al.* 1998) established that alternative delivery methods are constrained by lifestyle, such as the availability of resources and standard of living. Course content also dictates the delivery method, and may require a blended learning experience (Glogowska, *et al.* 2011; Smart & Cappel, 2006).

When assessing the preferred delivery method of learning from the questionnaire completed by the sample, it was evident that the majority of respondents preferred the physical, aural, logical, and social categories of Knowles' learning styles (Refer to Table 4.5). This portrayed a preference for 'hands-on' work, listening to the teacher explaining concepts, and group work. Online learning does not allow for physical or 'hands-on' learning and limits social interaction. Of the sample, 66% indicated they preferred the traditional teacher-led classroom to online learning (Refer to Table 4.8).

Warner, *et al.* (1998) identified that lifestyle constraints played an essential role in the choice of delivery method. The results of this research echoed this concept, indicating the respondents had limited access to computers and the Internet for learning (Refer to Tables 4.3, 4.4 and 4.8). Although 28 respondents mentioned alternative locations for Internet access, such as the mall, gym, or swimming pool, these locations are not conducive to learning (Chan, 2010, Knowles, 1980) . Considering the respondents' preference of delivery method or learning styles and access to electronic devices and Internet for learning, they have poor levels of preparedness for online learning.

4.9.2 Preparedness for online learning

Warner, *et al.* (1998) characterised a state of readiness in terms of disposition and skills required for self-directed learning. Hung, *et al.* (2010) assessed multiple tools designed to assess readiness, or preparedness to online learning. The results were similar to Warner, *et al.*'s. and yielded a two-factor structure: comfort with e-learning, and self-management of learning, thus indicating a need for technical computer skills, Internet navigation skills, and learner control over the sequence and selection of materials (Hung, *et al.* 2010).

Of the 180 respondents who completed the section of the questionnaire for those who had never participated in an online course, 126 (70%) indicated they did not know how to use a computer or the programs necessary for taking an online course (Refer to Table 4.8). Considering that the South African curriculum only changed to include computer education after 1995, the majority of the respondents in this research were not exposed to computers during their school years. Furthermore, the lack of access to computers in both the work and home environment has hindered the respondents from gaining confidence and competence to use electronic devices to access learning material. This again portrays a poor level of preparedness for online learning.

4.9.3 Ability to engage in autonomous learning

Autonomous learning places the responsibility of learning on the learner according to Warner, *et al.* (1998). This includes self-directed learning following a self-paced learning package, own decision making, researching, organising and managing study time, and motivating themselves to study. Autonomous learning thus places the learner out of the traditional classroom and into a self led solitary learning environment.

The results of this research clearly indicate that the majority of respondents prefer the classroom environment and teacher-led learning, physical or hands-on involvement (Refer to Table 4.8). Although 69 (25%) of the sample are solitary learners, the majority prefer physical, aural, and social learning styles (Refer to Table 4.5). The concept of autonomous learning is not met by the respondents in this research, indicating poor levels of readiness for self-directed learning.

When applying Warner, *et al's.* (1998) three concepts to determine preparedness for online learning to the results of this research, the following can be summarised:

1. The preferred delivery method of learning indicates a lack of readiness for online learning.
2. The sample does not express confidence and competence with regards to online learning.
3. The majority of the sample prefers the traditional classroom environment to autonomous learning.

These observations suggest that the sample does not display preparedness for online learning and CPD development due to the preference for hands-on work and an instructor-led learning environment.

4.10 CONCLUSION

Detailed results of the data collected, structured according to the sections of the questionnaire, has been presented in this chapter. Brief descriptive analysis relating to the objectives of the study provides insight to the preparedness for online learning. Important points have been highlighted suggesting the sample does not display the preparedness that is needed for autonomous learning. This will form components of the following chapter, where in-depth interpretation and discussions will be provided.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

The purpose of this research was to undertake a descriptive analysis using survey research methodology to evaluate the preparedness of emergency care providers towards using computers and electronic equipment for accessing online material for CPD compliancy. Continuous professional development in the prehospital environment is designed to up skill the emergency care provider, allowing them to keep up to date with knowledge, skills and attitudes. This is highly instrumental in coping with change at whatever level that occurs and is key in delivering best practice medical care (HPCSA, 2014).

As the researcher works for the COJEMS and has a personal interest in the growth of this institute, this municipal service was selected as the target population. At the time of data collection COJEMS had a compliment of 1 137 operational emergency service providers. Inclusions and exclusions were discussed in Chapter 3, Section 3.5. A questionnaire was designed to determine if the COJEMS emergency care providers are prepared for online learning to maintain CPD compliance. A random stratified sample was used including COJEMS operational staff during the two-month period of data collection. Of the 320 questionnaires distributed, 276 were found to be complete and were used in data collection.

Many international studies have been published exploring preparedness of online learning in the prehospital environment. To date there has been no research focusing on the South African emergency care provider and preparedness for online learning. This gap poses a challenge for the emergency care education and training providers as there is no knowledge of the abilities of these students for computer use and online education. Online learning is a flexible delivery method and lack of preparedness has the potential to delay advancements in CPD in the prehospital environment. This may result in possible suboptimal patient management as the emergency care providers may not be up to date with the latest best practice prehospital medicine.

To evaluate preparedness, three concepts were explored: the preference of delivery method, confidence and competence in using electronic equipment and the Internet, and the ability to engage in autonomous learning (Warner, *et al.* 1998). This chapter provides insight into the results of the research and further discusses the challenges of online learning for CPD development faced by the emergency care providers in the prehospital environment.

5.2 DELIVERY METHOD

Warner, *et al.* (1998) identified that varied delivery methods of educational material would benefit the learner although many students have little choice in selecting their preferred mode of delivery in learning. Lifestyle constraints for many students mean that certain modes of study are unavailable, even if it is offered by course providers. This is because of access issues, particularly for students with employment responsibilities and financial restraints.

Four delivery methods for learning, including cellular phones, computers, tablets, and electronic reading devices will be discussed. The availability of Internet access will also be considered as an integral component for obtaining learning material.

5.2.1 Cellular phones

Advances in mobile technology have created additional opportunities for mobile learning (Mokoena, 2012). Although the specific types of cellular phones were not specified in this research, 263 (95.3%) of the sample own a cellular phone (Refer to Table 4.2). These may not be the new generation cellular phones, but all of them have generic functions to operate the device effectively, such as typing and accessing components of the phones for various functions – these are usually self-taught, indicating the ability of users to learn to navigate electronic equipment if only at a basic level. Despite a portable and easily operated device, Link and Marz (2006) and Haag (2011) identified that most students use smart phones for making notes, booking appointments, or schedules rather than as a primary study medium.

5.2.2 Computers

Computers are owned by 114 (41.3%) of the respondents (Refer to Table 4.3). Considering the technological capacity, size, and program for assignment or assessment purposes, this is currently the easier electronic tool to use for online learning (Haag, 2011). Of the sample, 75% indicated they never have access to a computer at work, and 85% unable to access to the Internet (Refer to Figure 4.4). Considering the sample a direct representation of the target population, majority of COJEMS operational emergency care providers cannot study via online means at work. One purpose of online learning is flexibility in learning, if computers were available during on duty time, there would be accessibility and possibly motivation to partake in online learning.

5.2.3 Tablets

Over the last five years, electronic tablets have become more popular. The idea of owning a device smaller than a computer that is user friendly and cost effective was the perfect solution to mobile technology. The data from this study shows the reverse of this. Only 85 (30.8%) respondents of the sample own this type of device (Refer to Table 4.3), which is a small percentage based on the industry hype of the 'perfect solution' for day-to-day work.

5.2.4 Electronic reader

Only 21 (7.6%) of the sample own an electronic reader (Refer to Table 4.3), and none indicated using it to access the Internet or to complete online learning. Reading material can be easily accessed on this device, however, it is not designed to type or complete documents, a requirement for many courses.

5.2.5 The Internet

The Internet is not a physical delivery method of learning material, but this research assessed preparedness for online learning and, therefore, the responses from respondents are relevant in this section.

Results from the questionnaire revealed that all respondents had access to the Internet, with one third spending at least one hour per day on the Internet (on days they access the Internet). Some respondents indicated more than 21 hours per week are spent on the Internet, equating to more than three hours per day if evenly distributed over a week. This reflects the ubiquity of the Internet today. Results revealed that there is often no access to the Internet at home and only 15 (5%) respondents obtained access to the Internet in the workplace (Refer to Figure 4.4) (Chan, 2010, Knowles 1980). Although it was indicated that the Internet was accessed at other locations such as the mall, the gym, or the local swimming pool, these are not conducive learning environments and often restrict the amount of time or data one can use (Refer to Table 4.5). It was interesting to note that local libraries were not popular locations to access the Internet, despite it being free to all – it appears the preferred venue for Internet use is a social setting.

More than 70% of the sample used a cellular phone to access the Internet compared to 23% of the sample using a computer for Internet access (Refer to Figure 4.6). The financial viability and ease of use of cellular phones have made these devices accessible to everyone. Although a less costly and more accessible device, the cellular phone can provide a learner access to learning material but is not an ideal device for completion of requirements in day-to-day studies due to size and program limitations (Haag, 2011).

Social media and entertainment websites were the most popular sites with the sample. Data from the questionnaire revealed that 57% of the sample had never accessed an Internet site for CPD activities (Refer to Figure 4.7). Many cellular phone and data suppliers now include free Facebook access in their packages. Considering the popularity of social media sites and the option for free access to these sites, serious consideration should be given to increasing learning material availability on social media. Although it remains the user's discretion to access and read these, options such as short videos or journal reviews may entice the learner to explore other learning options.

Technological development through the last century has seen the transition of electronic devices and the use of the Internet as a core component of learning

(Jansen, 1997; Jansen, 1998). Many South African schools face financial constraints and therefore some students may not benefit from exposure to a range of electronic devices as learning tools. Results indicated that minimal respondents have tablets or electronic readers, yet the majority of respondents have cellular phones with Internet access. Furthermore, many of them access social media sites multiple times a day. Considering that social media can be considered a norm in daily lives, introducing learning material that can be easily accessed through these sites may overcome the need for computers and expose learners to learning opportunities. Although the majority of learning material from educational institutes is designed for learning via a computer, the way forward may be to prepare this material for access via a cellular phone (Mokoena, 2012). This way material can be accessed at any time by the learner using devices and sites that they are familiar with.

5.3 CONFIDENCE AND COMPETENCE

Competence is defined as the 'ability to do something successfully' and confidence is the 'belief that one can succeed' (Oxford English Dictionary, 2017). Warner, *et al.* (1998) assessed competence and confidence in their sample and identified that half their participants had little to no confidence when using the Internet, and less than a quarter felt confident in navigating self-learning packages.

Considering the age distribution of the sample, with the majority completing Grade 12 or matric prior to the introduction of electronic technology in schools, it is expected that there would be a lack of confidence and competence in using computers. Of the sample, 83 (30%) respondents have completed a diploma or degree, which often require computer skills as a component of the course work (Refer to Figure 4.2). Of the 96 respondents who had participated in an online course, 68 (71%) indicated that they had received computer training; this is only 25% of the sample, a small proportion that has formal computer skills (Refer to Table 4.6).

When asked about participation in online courses, 180 (65%) respondents indicated that they have never participated in an online course (Refer to Table 4.7). Seventy percent (70%) of these said the reason for this is that they do not know how to use a computer or the necessary programs for online learning. This means that at least 30%

of the sample are not prepared for online learning based on competence and confidence in using electronic equipment, one of Warner, *et al.*'s. (1998) requirements for preparedness (Refer to Table 4.8).

In an international study that focussed on online learning, generically a quarter of the sample displayed low levels of confidence in themselves as autonomous learners due to a lack of knowledge and experience when using online programs (Warner, *et al.* 1998). The data from the current study echoed the findings of Warner, *et al.* (1998), with 126 (70%) respondents who had never done an online course stating that they do not know how to use a computer or the programs necessary for taking an online course.

Considering that only 25% of the respondents have received formal computer training, it can be said that there is a lack of confidence and competence in operating this particular device. When emphasis is placed on the use of electronic equipment during a course, a learner who does not feel comfortable in operating an electronic device will probably not succeed in their studies.

As noted in Section 5.2, the majority of respondents have a cellular phone. By engaging learning material through a device that is familiar and accessible, there is a high probability more adults will be prepared to learn with higher success rates. The results from this study indicate that respondents prefer the classroom approach to learning; possibly due to the lack of experience in using electronic equipment, since a traditional approach has been their norm. Their perception of learning, what constitutes learning, and the learning environment is didactic in nature. It appears as though exposure to electronic learning has been restricted to date, possibly due to school funding or lack of instructor knowledge. This has placed limitations on the adult learner preparing for the andragogy-based learning environment. By expecting a student to use devices that they are not confident or competent in using, they are being set up for failure before they even start learning.

5.4 ABILITY TO ENGAGE IN AUTONOMOUS LEARNING

The concept of autonomous learning is well described by Knowles (Margolis, 1970) as 'self-directed learning' where the learner takes the initiative for their learning opportunities, creates and formulates goals, and can evaluate the outcome of the learning opportunity. Warner, *et al.* (1998) added researching, organising, and motivation to Knowles' description. This section assesses the various learning styles of the sample and the ability to engage in autonomous learning as preparedness to online learning.

Knowles identified seven learning styles that were used to categorise learners in this study (Margolis, 1970). Each learner has their own preferred learning style and although many can adapt and integrate these styles, correlations do exist between outcomes and the use of preferred learning styles (Pearson & Trinidad, 2005). The results of this study revealed that the majority of respondents preferred to study in an instructor-led, physical and social environment (Refer to Table 4.8). Of the 96 (34%) respondents who had completed an online course, 46 (48%) felt uncomfortable without an instructor to guide them (Question 26).

The results from this study show that the respondents are not autonomous learners; learning styles indicating a preference for the teacher-led learning opportunity with a hands-on approach is repeatedly noted. There is a high possibility that this could be due to insufficient technological training specifically pertaining to computers. Although online learning can cater to the aural learner with videos and concept explanations, it may hinder the social, verbal, and physical learner. A concept of blended learning may fill these gaps. Unfortunately, this requires multiple learning sessions; preparation online followed by physical sessions in class could extend the time to complete necessary requirements (Glogowska, *et al.* 2011; Smart & Cappel, 2006).

5.5 CONCLUSIONS

This chapter provided interpretations and a comprehensive discussion of the results for each of the objectives of the study. Once Warner, *et al.*'s. (1998) three concepts for preparedness for online learning were applied to the sample, it was realised that the

sample lacks the dispositional and skill readiness for online learning. The next chapter contains conclusions, limitations, as well as the recommendations gained from the insights of this study.

CHAPTER 6

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

6.1 INTRODUCTION

The aim of this research was to determine if the emergency care providers from COJEMS are prepared for the movement from the traditional classroom environment to online learning in order to facilitate and enhance CPD.

Paramedical training and education in South Africa has undergone significant changes within the past five years. To provide best practice, evidence-based medicine to patients in the unique and demanding prehospital environment, a focussed body of knowledge is needed with regular updates and learning opportunities. With the dynamic and rapidly evolving nature of emergency medicine, failure to update and develop knowledge, skills and to maintain ethical practice in this field results in suboptimal patient care, possibly increasing morbidity and mortality rates.

The need for opportunities where emergency care providers could update their skills with theoretical opportunities was recognised by the HPCSA and the concept of mandatory CPD was introduced. This flexible system would address the unique South African environment by providing a vast range of activities that would be 'readily accessible' and accommodate the diversity of HPCSA.

Educational evolution in South Africa has seen learning opportunities migrate from the traditional teacher-led class to flexible blended learning opportunities with an emphasis on electronic and online learning (Glogowska, *et al.* 2011; Smart & Cappel, 2006). This is invaluable to the adult learner who wishes to learn yet needs to remain financially stable.

Online readiness was researched by Warner, *et al.* (1998), and they described e-readiness, or a state of preparedness, in terms of three aspects:

- the student's preference of delivery method;
- the student's confidence in using electronic equipment for learning, specifically competence and confidence in Internet use; and
- the student's ability to engage in autonomous learning.

The results of this study were compared to Warner, *et al.*'s. (1998) description of e-readiness, with consideration of Knowles' definition of autonomous learning and seven learning styles.

The results obtained from the questionnaire revealed:

1. The preferred delivery method of learning indicated a lack of readiness for online learning.
2. The sample does not express confidence and competence with regards to online learning.
3. The majority of the sample prefers the traditional classroom environment to autonomous learning.

These observations suggest that the sample does not display preparedness for online learning and CPD development due to the preference for hands-on work and an instructor-led learning environment. Considering the sample is a representation of the target population, one can induce from this that COJEMS Emergency Care Providers are not prepared for this delivery method of learning.

6.2 LIMITATIONS

The limitations of this study included:

1. This study was limited to a municipal emergency service within Gauteng. Although many other South African provincial or local authorities have similar demographics to COJEMS, demographic-related results such as age, gender, learning styles, and

ability to use devices may be similar. However, other results such as access to electronic equipment or Internet may be quite different due to infrastructure, resources, and policies.

2. Only 28 (10%) respondents opted to complete the questions which allowed the participant to indicate 'other' in the questionnaire. Although the aims and objectives were met, these answers may have added insight to aspects on the delivery method.

6.3 RECOMMENDATIONS

6.3.1 Delivery methods

This study has shown that 180 (65%) respondents have never completed an online course, and of these, 126 (70%) indicated that they had never completed an online course because they did not know how to use a computer or the programs necessary for online learning. To facilitate success in online learning, COJEMS needs to provide electronic equipment with Internet access at locations accessible and conducive to learning for operational crews. On duty crews should have access to this facility at each station, providing opportunities for those who wish to develop their skills and gain CPD compliance.

As the whole sample owns a cellular phone, this delivery method should be further explored. Although this device is probably not the most suited to formal learning material, a large component of the sample indicated they use social media. Social media is perceived as 'fun' and promoting learning material through this mode may inadvertently create learning opportunities; videos and pictures capture the social media market and using this, together with a follow-up printed worksheet made available at the workplace, can expose the learner to a blended learning opportunity removing the expense of personal equipment yet promoting adult learning.

6.3.2 Confidence and competence

The respondents' lack of confidence and competence was clearly displayed in the results of this study. Basic courses in computer literacy for COJEMS operational

emergency providers is vital. This should include orientation to computers, the use of programs necessary for online learning, and Internet navigation. These courses must be held regularly to ensure all operational staff can attend. The researcher further recommends that these basic courses should be led by an experienced teacher in computer literacy. As the students gain the confidence and competence in using electronic devices, the shift towards autonomous learning will naturally occur.

6.3.3 Autonomous learning

According to Knowles, each adult learner has a unique learning style (Henschke, 2010). Although each learner uses a combination of styles during various learning opportunities, one cannot change their dominant learning style. By designing course material that incorporates the various learning styles to meet course outcomes, all students will be catered for in some form. The concept of blended learning can allow all seven of Knowles' learning styles into the learning opportunity created for the student.

6.4 FURTHER RESEARCH

There is little research assessing preparedness for online learning in the South African prehospital environment and many opportunities are available for further studies. South Africa is a unique, diverse country that has suffered from a historical lack of learning opportunities. Further research ascertaining the effectiveness of computer literacy in the school environment as preparation for adult learning would provide insight into the preparedness of the adult for electronic and online learning.

Similar studies should be expanded to the private sector within the prehospital emergency sector.

6.5 CONCLUSION

To provide best practice, evidence-based medicine to patients in the unique and demanding prehospital environment, the emergency care provider needs to remain current with the dynamic and rapidly evolving nature of emergency medicine. To

achieve this, access to learning material is vital and the aim of this research was to determine if the emergency care providers from COJEMS are prepared for online learning to facilitate and enhance CPD. The results from this study revealed that COJEMS emergency care providers are not currently prepared for online learning for CPD compliance. Despite this, information was obtained from the study for recommendations to enhance accessibility and increase exposure to learning material.

With further exploration of these recommendations, preparedness for CPD compliance through online learning by COJEMS emergency care providers is achievable, allowing for updates, development of skills, and maintenance of ethical practice; ultimately improving patient care and possibly reducing morbidity and mortality rates.

REFERENCES

- Asci, H., Kulac, E., Sezik, M., Cankara, F.N. & Cicek, E. 2016. The effect of learning styles and study behavior on success of preclinical students in pharmacology. *Indian Journal of Pharmacology*, 48(1):15-20. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778199/>.
- Baloyi, G.P. 2014. The role of University of South Africa in contributing to open distance and e-learning and to social justice in South Africa. *Mediterranean journal of social sciences*, 5(3):376-380.
- Beard, L.A., Harper, C. & Riley, G. 2004. Online versus on-campus instruction. *Student attitudes & perceptions*, 48 (Generic):29-31.
- Bolarinwa, O. 2015. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Nigerian Postgraduate Medical Journal*, 22(4):195. Available at: <http://www.npmj.org/text.asp?2015/22/4/195/173959>.
- Brink, H., Van der Walt, C. & Van Rensburg, G. 2012. *Fundamentals of research methodology for health care professionals*. Cape Town, South Africa: Juta.
- Chan, S. 2010. Applications of andragogy in multi-disciplined teaching and learning. *Journal of adult education*, 39(2):25-35.
- Clyde, L.A. 2004. m-learning. *Teacher Librarian*, 32(1):45-46.
- City of Johannesburg (City of Joburg). 2018. *City of Joburg*. Available at: [www.joburg.org.za/departments_/Pages/City directorates including departmental sub-directorates/Emergency/Overview-.aspx](http://www.joburg.org.za/departments_/Pages/City%20directorates%20including%20departmental%20sub-directorates/Emergency/Overview-.aspx). 5 April 2016.

Creswell, J.W. 2007. Research Design: Qualitative, Quantitative and Mixed Method Approaches. *SAGE Publications*, pp. 203–223. Available at: <http://libproxy.unm.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=51827937&site=eds-live&scope=site%5Cnhttp://content.ebscohost.com.libproxy.unm.edu/ContentServer.asp?T=P&P=AN&K=51827937&S=R&D=a9h&EbscoContent=dGJyMNLr40Sep14>.

Department of Education, 2004. White Paper on e-Education: Transforming learning and teaching through information and communication technologies (ICTs). *Government Gazette*, 26762(26734):3-46. Available at: <http://www.education.gov.za/dynamic/dynamic.aspx?pageid=329&catid=12&category=Whitepapers&legtype=7White Paper on e-Education>.

Department of Health. 2003. *Emergency Services Regulations*. South Africa.

Department of Health, 2014. *Emergency Medical Services Regulations*. South Africa.

Dray, B.J., Lowenthal, P.R., Miskiewicz, M.J., Ruiz-Primo, M.A. & Marczyński, K. 2011. Developing an instrument to assess student readiness for online learning: a validation study. *Distance Education*, 32(1):29-47.

Emergency Care Society of South Africa, 2012. Position Statement on The Health Professions Council of South Africa's Intention to Close the Short Course-Related Professional Registers., pp. 2-7. Available at: http://www.ecssa.org.za/images/pdf/pos_statements/pos_statement_01-12.pdf.

Fahad, N. 2009. Student's attitudes and perceptions towards the effectiveness of mobile learning in King Saud University, Saudi Arabi. *The turkish online journal of educational technology*, 8(2):9.

Findsen, B. & Formosa, M. 2011. *Lifelong learning in later life, a andbook on older adult learning*. Boston: Sense Publisher.

Gauteng Department of Education. 2010. *e-Maturity and e-Readiness Assessment Report*. Gauteng: 27 April 2014.

Glogowska, M., Young, P.G., Lockyer, L. & Moule, P. 2011. How 'blended' is blended learning?: students' perceptions of issues around the integration of online and face-to-face learning in a Continuing Professional Development (CPD) health care context. *Nurse education today*, 31(8):887.

Haag, J. 2011. From eLearning to mLearning: The Effectiveness of Mobile Course Delivery. *Industry Training, Simulation, and Education Conference*, (11053):1-13.

Health Professions Council of South Africa (HPCSA), 1998a. *Personnel Curriculum for the Ambulance Emergency Course*. Professional Board for Emergency Care Personnel. South Africa.

Health Professions Council of South Africa (HPCSA), 1998b. *Personnel Curriculum for the Basic Ambulance Course*. Professional Board for Emergency Care Personnel. South Africa.

Health Professions Council of South Africa (HPCSA), 1998c. *Personnel Curriculum for the Critical Care Course*. Professional Board for Emergency Care Personnel. South Africa.

Health Professions Council of South Africa (HPCSA), 2014. *Continuing Professional Development Guidelines for the Health Practitioners*. (June), pp. 1-30. Available at: [http://www.hpcsa.co.za/uploads/editor/UserFiles/CPD Guidelines 2014.pdf](http://www.hpcsa.co.za/uploads/editor/UserFiles/CPD%20Guidelines%202014.pdf).

Health Professions Council of South Africa (HPCSA), 2009. *Emergency Care Technician scope of Practice*. Professional Board for Emergency Care Personnel. South Africa.

Henschke, J.A. 2010. Beginnings of the history and philosophy of andragogy, 1833-2000. *Integrating adult learning and technologies for effective education: Strategic approaches*. Lindenwood University, USA.

Hung, M.-L., Chou, C., Chen, C.-H. & Own, Z.-Y. 2010. Learner readiness for online learning: Scale development and student perceptions. *Computers & education*, 55(3): 1080-1090.

Jansen, J. 1997. "Essential Alterations"? A Critical Analysis of the State's Syllabus Revision Process. *Perspectives in education*, 17(2):1-11.

Jansen, J. 1998. Curriculum Reform in South Africa : a Critical Analysis of Outcomes-Based. *Cambridge Journal of Education*, 28(3):321-331.

Jansen, J. & Taylor, N. 2003. Educational change in South Africa 1994-2003: case studies in large-scale education reform (English). *Education reform and management publication series*, 2(1). Washington, DC. World Bank. Available at: <http://documents.worldbank.org/curated/en/129941468778149162/Educational-change-in-South-Africa-1994-2003-case-studies-in-large-scale-education-reform>

Jozi Digital Ambassadors, 2016. Free WiFi in over 50 Libraries across Johannesburg. Available at: <http://digitalambassadors.org.za/free-wifi-in-over-50-libraries-across-johannesburg/>.

Kavaliauskiene, G. & Valunas, D. 2012. Learners' perceptions of e- learning. *Socialiniu Mokslu Studijos*, 4(1).

Knowles, M. 1980. *The modern practice of adult education: From pedagogy to andragogy (revised and updated)*. Englewood Cliffs, NJ: Cambridge Adult Education.

Link, M.T. & Marz, R. 2006. Computer literacy and attitudes towards e-learning among first year medical students. *BMC Medical Education*, 6(1):1-8. Available at: <http://dx.doi.org/10.1186/1472-6920-6-34>.

Little, D. 2009. Language learner autonomy and the European language portfolio: Two L2 english examples. *Language teaching*, 42(2):222-233.

Mafenya, P.N. 2013. An investigation of first-year students' pedagogical readiness to e-learning and assessment in open and distance learning: an University of South Africa context. *Mediterranean journal of social sciences*, 4(13):353-360.

Margolis, J. 1970. The modern practice of adult education. *Training & Development Journal*, 24:47. Available at: <http://jiuproxy.egloballibrary.com/login?user=true&url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=7455262&site=ehost-live>.

Mokoena, S. 2012. Smartphones and Regular Cellular Phones: Assessing their Impact on Students' Education at the University of Zululand. Main Campus (Master's Thesis). Available at: <http://hdl.handle.net/10530/1049>.

Moore, J., Dickson-Deane, C. & Galyen, K. 2011. e-Learning, online learning, and distance learning environments: Are the the same? *The Internet and higher education*, 14:6.

Oxford English Dictionary, 2017. Oxford English Dictionary Online. *Oxford English Dictionary*. Available at: <http://dictionary.oed.com>.

Pearson, J. & Trinidad, S. 2005. OLES: an instrument for refining the design of e-learning environments. *Journal of computer assisted learning*, p.8.

Republic of South Africa, 2009. Health Professions Act 56 of 1974, Government Gazette 31859. Sabinet.

Schostak, J. 2007. *Interviewing and representation in qualitative research*, Available at: <http://proquest.umi.com/dbgw.lis.curtin.edu.au/pqdweb?did=1366157701&Fmt=7&clientId=22212&RQT=309&VName=PQD>.

Polit, D.F. & Beck, C.T. 2014. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. 8th ed. Philadelphia: Wolters Kluwer Health /Lippincott Williams & Wilkins.

Segen, J. 2006. *Concise Dictionary of Modern Medicine*. McGraw-Hill.

Shannon, S. 2000. Self-directed learning and continuing professional development. *Canadian association of radiologists journal*, 51(6):326-327.

Smart, K. & Cappel, J. 2006. Students' perceptions of online learning: a comparative study. *Journal of information technology education*, p. 5.

Statistics, South Africa (Stats SA). 2011. *Statistics South Africa*. Available at: <https://Internet.statssa.gov.za/Census2011/default.asp>.

Statistics South Africa (Stats SA). 2012. *Census 2011 - Census in brief*. Available at: www.statssa.gov.za.

Stevens, A. n.d. Technology Teacher Education in South Africa. , pp. 1-10. Available at: <ftp://ftp.uwc.ac.za/users/DMS/CITI/New PHd folder/PHd PDF's/Technology teacher education in SA.pdf>.

Sullivan, G.M. 2011. A Primer on the Validity of Assessment Instruments. *Journal of Graduate Medical Education*, 3(2):119-120. Available at: <http://www.jgme.org/doi/abs/10.4300/JGME-D-11-00075.1>.

Walters, S. 1999. New Challenges and Opportunities for Lifelong Learning in South Africa. *Comparative Education*, 35(2):217-224.

Warner, D., Christie, G. & Choy, S. 1998. The Readiness of VET: Clients for Flexible Delivery Including On-line Learning. pp. 1-64. Available at: <http://www.voced.edu.au/content/ngv:35337>.

Williams, B., Boyle, M., Molloy, A., Brightwell, R., Munro, G., Service, M. & Brown, T. 2011. Undergraduate paramedic students' attitudes to e-learning: findings from five university programs. *Research in learning technology*, 19(2):89-100.

Khakaza, N. 2011. Computer Literacy in Grade 9. Masters in Education, University of Kwazulu Natal.

ANNEXURE 1: ETHICAL CLEARANCE RESEARCH FROM THE INSTITUTIONAL RESEARCH ETHICS COMMITTEE AT THE DURBAN UNIVERSITY OF TECHNOLOGY



Institutional Research Ethics Committee
Faculty of Health Sciences
Room MS 49, Mansfield School Site
Gate 8, Ritson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900

Fax: 031 373 2407

Email: lavishad@dut.ac.za

http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

18 April 2016

IREC Reference Number: **REC 157/15**

Mrs D J Winstanley
Suite 551
P/BAG X09
Weltevreden Park
1715

Dear Mrs Winstanley

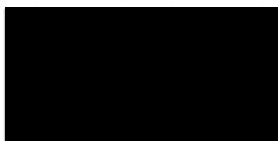
Preparedness of emergency care providers from a local authority emergency management service for online continuous professional development

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the questionnaire has been APPROVED; you may now proceed with data collection on the proposed project.

Kindly ensure that participants used for the pilot study are not part of the main study.

Yours Sincerely



Professor J K Adam
Chairperson: IREC



ANNEXURE 2: PERMISSION LETTER FOR RESEARCH FROM THE CITY OF JOHANNESBURG EMERGENCY MANAGEMENT SERVICES

Attention Mr L. Makola
EMS: Executive Head

Re: Permission to conduct research with City of Johannesburg EMS

I am currently enrolled at the Durban University of Technology (DUT) to complete the Master of Technology in Emergency Medical Care. Completion of the degree requires a full research project.

The research I would like to conduct is entitled E-readiness for Online Continuous Professional Development Compliance; Are the Emergency Medical Service Providers from the City of Johannesburg Emergency Management Services ready?

The proposed research will be conducted using the positivist paradigm by means of descriptive analysis. A paper-based questionnaire will be used aimed at all operational pre hospital EMS providers within the City of Johannesburg EMS.

I feel this research will ultimately benefit the City of Johannesburg EMS operational staff as it will provide valuable information regarding access to and availability of online learning; this the way forward in education. The research may also assist with intended online learning programs within the City of Johannesburg empowering our employees within the learning environment.

In order for my research proposal to be accepted by the Department of Emergency Medical Care and Rescue, I need pre approval or full approval to conduct this research.

I have attached the concept document I presented to Durban University for research approval.

My proposal will be made available to you once I have DUT approval.

I would appreciate your permission in this regard.

Kind regards



Debbi Winstanley



Mr T. L. Makola

Executive Head

Emergency Management Services

ANNEXURE 3: INFORMATION LETTER FOR RESPONDENTS



LETTER OF INFORMATION

Title of the Research Study:

Preparedness of emergency care providers from a local authority emergency management service for online continuous professional development.

Principal Investigator/s/researcher:

Debbie Jane Winstanley (B Tech: EMC)

Co-Investigator/s/supervisor/s:

Mr Raveen Naidoo (MSc Cardiology; MSc Medicine) and Dr Christopher Stein (PhD)

Brief Introduction and Purpose of the Study:

Outline of the Procedures:

Paramedical training and education in South Africa has undergone major changes within the past five years. The need for continued education within the field of emergency care has been recognised by the Health Professional Council of South Africa and therefore made Continuous Professional Development (CPD) a requirement for every registered professional.

The aim of this research is to determine if the emergency care providers from COJEMS are prepared for the movement from traditional classroom environment to online learning in order to facilitate and enhance Continuous Professional Development.

Outline for completion of the questionnaire:

- A consent form will be distributed for completion by each respondent prior to distribution of the questionnaire.

- The questionnaire will be distributed and completed by each respondent.
- Once completed the questionnaire will be placed in a sealed box.
- Completion of the questionnaire should take no longer than 15 minutes.

If during completion of the questionnaire you are uncomfortable and do not wish to continue you are welcome to withdraw from the research. There will be no repercussions should you decide to withdraw. Please note that once the questionnaire has been placed in the sealed box it cannot be withdrawn - as the questionnaire has no identifying details the researcher will be unable to ascertain which questionnaire belongs to you.

Benefits:

When this research is complete the information provided may highlight potential problems regarding e-learning and online completion of Continuous Professional Development online.

Reason/s why the Respondent May Be Withdrawn from the Study:

If at any stage during the completion of the questionnaire you are uncomfortable, you may withdraw from the study prior to placing the questionnaire in the sealed box. There will be no repercussions should you chose to do this.

Remuneration:

You will not be paid any money to participate in this research and no incentives will be given for completion of the questionnaire.

Costs of the Study:

There will be no costs involved in completion of the questionnaire.

Confidentiality:

Any information in the questionnaire cannot be linked to you as no specific identifying data will be collected.

Research-related Injury:

You will not be exposed to anything that could cause injury or harm to you while completing the questionnaire. There will be no remuneration or compensation should injury occur.

Persons to Contact in the Event of Any Problems or Queries:

Should you require further information please contact the researcher;

Debbie Jane Winstanley (debbi@storage.co.za) on 082 498 1867, my supervisors are:

Mr Raveen Naidoo (raveenn@dut.ac.za) on 031 373 5201 or Dr Christopher Stein (cstein@uj.ac.za) on 011559 6564 or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.

ANNEXURE 4: CONSENT DOCUMENT FOR RESPONDENTS



CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Debbie Winstanley, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: REC 157/15.
- I have also received, read and understood the above written information (Respondent Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Respondent Date Time Signature/Right Thumbprint

I, Debbie Winstanley herewith confirm that the above respondent has been fully informed about the nature, conduct and risks of the above study.

Debbie Winstanley

Full Name of Researcher Date Signature

Full Name of Witness (If applicable) Date Signature

ANNEXURE 5: QUESTIONNAIRE

Title of Research Study: Preparedness of emergency care providers from a local authority emergency management service for online continuous professional development.

Dear Colleague,

Thank you for taking the time to fill out this questionnaire.

The aim of this research is to determine if the emergency care providers from COJEMS are prepared for the movement from traditional classroom environment to online learning in order to facilitate and enhance Continuous Professional Development

Please answer each question to the best of your ability to ensure an accurate reflection of current online and e-learning trends.

Demographic details

1. What is your gender?

MALE	FEMALE
------	--------

2. What is your age in years?

3. Which of the following describes your highest educational level?

(Please tick the relevant box)

Standard 9 / Grade 11 or below	
Matric / Grade12	
Diploma	
University degree	

4. What is your highest qualification that is registered with the Health Professional Council of South Africa (HPCSA)?

(Please tick the relevant box)

Basic Ambulance Assistant (BAA)	
Ambulance Emergency Assistant (AEA)	
Critical Care Assistant (CCA)	
National Diploma in EMC (N Dip EMC)	
Emergency Care Technician (ECT)	
Emergency Care Practitioner (ECP)	

5. What is your race?

(Please tick the relevant box)

African	
White	
Coloured	
Indian	
Other: <i>(Please specify)</i> _____	

6. How long have you worked in the EMS?

(Please tick the relevant box)

Less than 2 years	
2-5 years	
6-10 years	
More than 10 years	

Access to/Use of a computer

7. Do you own the following?

		Yes	No
7.1	Computer (laptop or desktop)		
7.2	Cellular phone		
7.3	Tablet		
7.4	Electronic reading device		

		Often	Sometimes	Seldom	Never
8	At work, do you have access to a computer?				
9	Do you use a work computer to access the Internet?				
10	At home, do you have access to a computer				
11	Do you use your computer at home to access the Internet?				

12. Which of the following locations do you use to access a computer?

		Often	Sometimes	Seldom	Never
12.1	At the local library				
12.2	At a friend's house				
12.3	Internet cafe				
12.4	Other: (Please specify)				

Frequency of use

13. Indicate how often you access the Internet with the following:

		Often	Sometimes	Seldom	Never
13.1	A computer				
13.2	A cell phone				
13.3	A tablet				
13.4	An Electronic reading device				

14. Approximately how much time do you spend on the Internet per week? (incl social media, search engines)

Less than 7 hours	
More than 7 hours but less than 14 hours	
More than 14 hours but less than 21 hours	
More than 21 hours	

15. Tick the appropriate block to indicate your frequency of use of the following:

1 = Not at all

2 = at least once a day

3 = at least once a week

4 = at least once a month

15.1	Social media sites such as Facebook™ and Twitter™	1	2	3	4
15.2	Chat rooms or blogs	1	2	3	4
15.3	World Wide Web for entertainment	1	2	3	4
15.4	World Wide Web for learning	1	2	3	4
15.5	Instagram	1	2	3	4
15.6	CPD sites – for example myCPD or CPDonline	1	2	3	4
15.7	Send or receive emails	1	2	3	4
15.8	Play computer games	1	2	3	4
15.9	Download music	1	2	3	4

Education and Training

Please answer the following by ticking the statement/s that are relevant to you:

		Often	Sometimes	Seldom	Never
16	I learn best by listening to the teacher/instructor explaining concepts				
17	I enjoy group work and learning activities				
18	I learn best when I learn on my own				
19	I enjoy logic and reasoning;				
20	I like role playing and speeches; I make lots of notes when I learn				
21	I like using pictures or images and colour when I learn				
22	I learn best when I can do the actual skill - 'hands on' learning				

If you have taken a course via the Internet (online) please answer the following:

(If you have never done this please leave questions 23-32 blank)

		Yes	No
23	Have you ever received computer training?		
24	Was the online course relevant to the EMS?		
25	I felt the course content was relevant to the topic I was studying		
26	I felt uncomfortable without an instructor to guide me through the course		
27	I felt less pressure completing the online course than I feel in a class with an instructor		
28	I felt the online course assisted in improving myself in my professional capacity		
29	The online activity was good value for money		
30	I successfully completed the course I started		
31	I am eager to complete more online courses		
32	My motivation for the online course was to remain current with the HPCSA CPD requirements		

Continued on following page...

If you have never done an online course, please answer the following questions:

		Agree	Disagree
33	I have never done an online course as I do not have access to the Internet via a computer		
34	I have not done an online course as it does not interest me		
35	I prefer the traditional classroom environment and therefore chose not to do online courses		
36	I am keen to do online courses but do not know how to use a computer or the programs necessary for taking an online course		
37	I feel online courses cost too much		
38	I do not study well on my own and therefore prefer the classroom environment		
39	I am considering online course as this will enable me to remain current with HPCSA CPD requirements		
40	I am currently CPD compliant with the HPCSA		

Please answer the following regarding CPD (Continuous Professional Development):

		Agree	Disagree
41	I ensure that I am CPD complaint each year		
42	I usually have more CPD points than required by the HPCSA each year		
43	I know what is required of me to remain CPD compliant by the HPCSA		
44	I understand the HPSCA's motivation for CPD compliancy		
45	I feel that online courses assist me with CPD compliancy		
46	I prefer doing courses led by an instructor for CPD compliance		
47	I am not motivated to do courses unless I am being audited by the HPCSA		

Thank you for taking the time to complete this questionnaire