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**A FRAMEWORK FOR ARTICULATION BETWEEN THE EMERGENCY CARE
TECHNICIAN CERTIFICATE AND THE EMERGENCY MEDICAL CARE
PROFESSIONAL DEGREE**

By

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DECLARATION

I hereby declare that the work submitted here is the result of my own independent investigation. Where help was sought, it was acknowledged. I further declare that this work is submitted for the first time at this university/faculty towards a Philosophiae Doctor degree in Higher Education studies and that it has never been submitted to any other university / faculty for the purpose of obtaining a degree.

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DEDICATION

I dedicate this thesis to all our emergency care educators and operational personnel in South Africa; despite the fact that your efforts are not always adequately acknowledged, it is you who are the ones people turn to in their hour of need.

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LIST OF COMMONLY USED ACRONYMS:

AEA:	Ambulance Emergency Assistant
BAA:	Basic Ambulance Assistant
*B EMC:	Bachelor Degree in Emergency Medical Care
*BHS EMC:	Bachelor of Health Sciences Degree in Emergency Medical Care
CCA:	Critical Care Assistant
CHE:	Council for Higher Education
DoE:	Department of Education
ECT:	Emergency Care Technician
ETQA	Education and Training Quality Assuror
HE:	Higher Education
HEI:	Higher Education Institution
HEQF:	Higher Education Qualifications Framework
HPCSA:	Health Professions Council of South Africa
MLW:	Mid-Level Worker
NDoH:	National Department of Health
NQF:	National Qualifications Framework
RPL:	Recognition of Prior Learning
SAQA:	South African Qualifications Authority
SGB:	Standard Generating Body
UoT:	University of Technology

** B EMC and BHS EMC both refer to the same four-year qualification, and at the time of writing the two Abbreviations were synonymous and could be used interchangeably.*

SUMMARY

Keyterms: Recognition of Prior Learning; articulation, Mid-Level-Worker, Career-pathing; Academic- Architecture

The need to comply with the requirements of the SAQA Act necessitated a review of emergency care education and training in South Africa. The review and restructuring led to the creation of a formal two-year, 240-credit NQF level 5 Emergency Medical Care Technician (ECT) Qualification. The NDoH views the ECT programme as the "Mid-Level Worker" equivalent for the Emergency Care Profession. At the Higher Education level, the existing three-year National Diploma and one-year B Tech Programmes were collapsed to form a single four-year, 480-credit, NQF level 8 Professional Bachelor of Health Sciences Degree in Emergency Medical Care (B EMC).

After the establishment of the two-year ECT and four-year B EMC programmes, the next challenge faced by the HPCSA, educators and educational providers within the emergency care field became that of facilitating articulation between the two qualifications. This study aimed to critically analyse and compare the two-year ECT qualification with the four-year professional B EMC degree in order to design a framework and bridging programme that may support and guide articulation between the two qualifications.

An expository, retrospective analysis of existing documentation was followed by a focus group discussion with educators in the field in order to identify and explore potential obstacles and challenges with regard to articulation between the ECT and the B EMC qualifications. Finally, a detailed Delphi Questionnaire was sent to selected expert panel members.

The study highlights a strong desire for articulation and academic progression within the emergency care profession. Similarities and substantial differences were identified in the scope, level and depth of knowledge of the ECT and B

EMC qualifications. A framework was designed that includes a bridging programme to provide ECT graduates with the necessary knowledge, skills and insights required to enter directly into the third year of the Emergency Medical Care Degree.

OPSOMMING

Sleuteltermes: Erkenning van vooraf leer; artikulasie; Middelvlak werkers; Beroepsrigting; Akademiese Argitektuur

Die noodsaak om aan die vereistes van SAKO-wetgewing te voldoen, het 'n hersiening van nooddiensoonderrig en -opleiding in Suid-Afrika teweeggebring. Die hersiening en herstrukturering het tot die daarstelling van 'n formele twee jaar, 240-krediet, NKR vlak 5 Noodgeneeskunde Tegnikus (Emergency Medical Care Technician (ECT)) kwalifikasie gelei. Die NDvG beskou die ECT-program as die "Middelvlakwerker" ekwivalent vir die Noodgeneeskunde-professie. Op Hoër Onderwysvlak is die bestaande drie jaar Nasionale Diploma en die een jaar B Tech-programme saamgevoeg om die enkele vier jaar 480-krediet, NKR vlak 8, Professionele Baccalaureus in Gesondheidswetenskappe Graad in Noodgeneeskunde (Professional Bachelor of Health Sciences Degree in Emergency Medical Care) (B EMC)) te skep.

Nadat die twee jaar ECT- en die vier jaar B EMC-programme tot stand gebring is, was die volgende uitdaging vir die GBRSA, onderwyskundiges en onderwysverskaffers op die noodgeneeskundeterrein om artikulasie tussen die twee kwalifikasies te fasiliteer. Hierdie studie stel dit ten doel om die twee jaar ECT-kwalifikasie en die vier jaar professionele B EMC-graad krities te analiseer en te vergelyk om sodoende 'n raamwerk en oorbruggingsprogram te ontwerp wat artikulasie tussen die twee kwalifikasies kan rig en steun.

'n Verklarende, retrospektiewe analise van bestaande dokumentasie is opgevolg met 'n fokusgroeppespreking wat onderwyskundiges in die veld betrek het om potensiële struikelblokke en uitdagings ten opsigte van artikulasie tussen die ECT- en B EMC-kwalifikasies te identifiseer en te ondersoek. Laastens is 'n uitvoerige Delphi-vraelys aan gekose deskundige paneellede gestuur.

Die studie beklemtoon 'n sterk begeerte na artikulasie en akademiese vooruitgang in die nooddienstprofessie. Ooreenkomste en wesenlike verskille is identifiseer ten opsigte van die omvang, vlak en kennis van die ECT- en B EMC-kwalifikasies. 'n Raamwerk is ontwerp wat 'n oorbruggingsprogram insluit om ECT-gegradueerdes van die nodige kennis, vaardighede en insigte te voorsien om hulle in staat te stel om onmiddellik die derde jaar van die Gesondheidswetenskappe Graad in Noodgeneeskunde (Emergency Medical Care Degree) te betree.

A FRAMEWORK FOR ARTICULATION BETWEEN THE EMERGENCY CARE TECHNICIAN CERTIFICATE AND THE EMERGENCY MEDICAL CARE PROFESSIONAL DEGREE

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

In this piece of research, an in-depth study was done by the researcher with a view to designing a framework that could guide and facilitate articulation between two academic programmes within the emergency care profession. This first chapter aims to provide the context of and background and to the study. The chapter begins by describing the background to the research problem within the context of emergency care education and training internationally and locally; thereafter, the research questions, problem statement, scope, overall goal, aim and research design are discussed. Finally, Chapter 1 concludes by providing an outline of this thesis and the chapters that are to follow.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

This study took place within the field of pre-hospital emergency care education and training in South Africa. Emergency care education and training has recently been aligned with the requirements of the South African Qualifications (SAQA) Act and the National Qualifications Framework (NQF) (HPCSA 2005:1-5). The alignment necessitated a review of education and training programmes within the emergency care profession as a whole. The following section aims to orientate and place the study within the context of emergency care education and training in South Africa.

1.2.1 Emergency Medical Services

Emergency care worldwide has come to form an essential and important component of a country's health care system (Arnold 1999:97-103). Emergency Medical Services (EMS) systems and structures, although fundamentally similar, vary from country to country with respect to the level of education and training provided to EMS workers.

Logically, differences in levels of education and training lead to differences in medical scopes of practice and the professional status of EMS personnel. In some countries emergency care personnel are still not viewed as true medical professionals as they continue to function with little more than basic first-aid training. In certain EMS systems the provision of emergency care and the transportation of ill and injured persons to hospital is viewed, not as a separate profession, but rather as an add-on to a primary vocation such as law enforcement, or fire fighting (EMS Insider 2007:1-12).

In such cases, the EMS system normally provides only basic life-support interventions within the pre-hospital setting and the focus is more on rapidly transporting the patient to a receiving hospital, as opposed to providing an advanced level of care in the pre-hospital environment. On the opposite end of the spectrum are EMS systems that aim to literally "bring the hospital to the patient". Such EMS systems employ a number of highly trained and clinically skilled personnel such as doctors, nurses, emergency care practitioners and advanced life-support paramedics (Platz, Bey & Walter 2003:203-210).

1.2.2 Emergency Care Education and Training in South Africa

Prior to 1980 there were no professional qualifications or a professional board for professional emergency care providers; emergency care training was fragmented and varied from province to province (RSA NDoH 2011). A number

of standardised short courses were introduced in 1985. Namely a three-week Basic Ambulance Attendant (BAA), an eight-week Ambulance Emergency Attendant (AEA) and a four-month Critical Care Assistant (CCA) course (HPCSA 1999a, b, c).

The BAA, AEA and CCA short courses were initially offered as a form of in-service training by the Provincial Ambulance Training Colleges (ATCs). The primary focus of these short courses was on clinical skills training. The scope of practice and functioning of short-course graduates were linked to rigidly defined clinical protocols with clinical governance being provided by Medical Doctors. The need, therefore, existed for formal Higher Education (HE) qualifications, which would be recognised, regulated and registered by the Health Professions Council of South Africa as a statutory (HPCSA 2006:1-3).

The first such qualification was a three-year National Diploma in Ambulance and Emergency Technology (N. Dip AET) introduced in 1987. This three-year full-time higher education qualification would empower graduates to not only provide an appropriate standard of clinical care, but also through instilling an appreciation for research and professional academic development grow, nurture and guide the profession. From 2003 onwards a Bachelor of Technology Degree in Emergency Medical Care could be obtained, by completing an additional two years of part-time study, after obtaining the undergraduate three-year National Diploma qualification (RSA NDoH 2011) (SAQA 2009c:1).

It was acknowledged that the HE programmes would take some time to become established. The small number of HE institutions offering the three-year diploma programme led to a limited number of tertiary graduates being produced initially. This meant that output from the HE programmes could not rapidly address the immediate needs of the public. For this reason the short courses continued to be offered in tandem with the higher education offerings; the idea was that as soon as the HE programmes became established and started producing graduates short course training would be phased out.

Already qualified short-course graduates within the system could then be afforded an opportunity, through Recognition of Prior Learning (RPL) and in-service study, to attain the HE qualifications.

1.2.3 Academic developments

Apart from the four-month CCA course, which was extended to include an additional five months of clinical roadwork, the short courses remained relatively unchanged since their inception. In contrast, at the Universities the HE programmes continued to evolve and improve via a number of extensive re-curriculation efforts. From January 2005, Master's and Doctoral programmes are now also available to tertiary emergency care practitioner graduates (RSA NDoH 2011) (SAQA 2009c:1).

1.2.4 Challenges within the system of emergency care education and training

As time went on, problems within short-course education and training structures began to surface in that the short courses were not phased out as initially intended (HPCSA 2005:1-5). The private sector became significantly involved in short-course training, specifically in the offering of the three-week BAA course. This led to the HPCSA becoming increasingly inundated with requests from multiple role-players throughout the country all wishing to establish small colleges to offer short courses. With as many as 60 providers being accredited by 2005, numerous complaints began to be received by the HPCSA in relation to the quality of short-course training (HPCSA 2009:2). However, the sheer number of accredited providers meant that control over Emergency Care Education and Training had become virtually impossible. In addition to this, articulation between the short courses and the HE qualifications became increasingly difficult due to the following main reasons:

- a) The academic architecture of the short courses was such that they could not be aligned to the National Qualifications Framework (NQF);
- b) The academic architecture of the short course offerings was not SAQA compliant; and
- c) The knowledge gap between short courses (which were non-credit-bearing) and the HE qualifications grew ever-wider (HPCSA 2005:1-2).

1.2.5 Recent developments

The need to comply with the requirements of the SAQA Act provided an opportunity for the entire system of emergency care education and training to be reviewed. The challenge lay in designing a SAQA and NQF compliant education and training structure, which would also meet with the needs of the National Department of Health (NDoH) and the Emergency Care Industry.

Central to the debate were important issues of lifelong learning, academic progression, career-pathing and placement as well as further professional development.

In order to align emergency care education and training to meet the above requirements, the HPCSA as Standard Generating Body (SGB) undertook a revision of the learning outcomes of the existing short courses. The result of this review and restructuring undertaken was the design of a formal, two-year, 240-credit NQF level 5 Emergency Medical Care Technician (ECT) Qualification (HPCSA 2011:7-8). The NDoH views this ECT programme as the "Mid-Level Worker" equivalent for the Emergency Care Profession. The ECT qualification was registered with SAQA and the first intake of students occurred in 2007 at Provincial Ambulance Training Colleges as well as selected Universities of Technology.

At the HE level, the three-year National Diploma and one-year B. Tech. Programme were collapsed and submitted to SAQA in the form of a single four-

year 480-credit, NQF level 8, Professional Bachelor of Emergency Medical Care (B.EMC.) degree. The B EMC allows for direct articulation into Master's and Doctoral Programmes. The Higher Education Institutions (HEIs) offering Emergency Medical Care programmes are currently in the process of phasing out the three-year National Diploma qualification and implementing the four-year Professional degree.

More recently, the Council for Higher Education (CHE) and the Department of Higher Education & Training (DHET) have recommended to Higher Education Institutions the use of "Health Sciences" as a designator in the naming of the new four-year qualification, making the new name a Bachelor of Health Sciences in Emergency Medical Care (BHS EMC) (PBEC 2010:15).

1.2.6 Alignment of qualifications

Education and training for the emergency care profession in South Africa has recently been aligned to comply with the requirements of SAQA and the NQF. Currently, two tiers of education and training, both falling within the HE band of the NQF, are in place - the first being the two-year Emergency Care Technician (mid-level worker) programme and the second the four-year Professional Bachelor Degree. The necessary legislation has already been promulgated and registers are open at the HPCSA to accommodate graduates from these two programmes, providing them with professional registration and legislated scopes of practice (HPCSA 2011:7-8).

The concept of a tiered approach with mid-level workers and practitioners is neither unique nor foreign to the health care professions. Although new in the South African Emergency Care environment, mid-level worker programmes have already been in place in a number of other countries (Dovlo 2004:4-9:Online). If the current policies of the NDoH are to remain, mid-level health care workers will be introduced in most, if not all, of the registered professions, including medicine, radiography, and environmental health.

At this point it should also be noted that recent discussions between the NDoH and the HPCSA have introduced the idea that there may still be a need for a lower level of care - below that offered by the ECT as a mid-level worker, i.e. some form of Basic Life Support Provision (Naidoo 2011; RSA NDoH 2011). At the time of writing, no firm decisions had been taken regarding this. However, if such an idea finds favour with the regulatory authorities, we may see the emergence of a three-tiered approach to education and training in the emergency care profession. The first tier would then consist of a Basic Life Support (BLS) entry level/access qualification, followed by the Mid-Level Worker qualification in the form of the Emergency Care Technician (ECT) and then finally the professional degree, Emergency Care Practitioner (ECP).

Regardless of whether or not the system remains two-tiered or changes through the addition of an additional BLS tier, there will remain a need for articulation between the mid-level worker ECT qualification and professional B EMC degree. It is this articulation pathway that forms the focus of this study throughout.

1.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

Having established the two-year ECT and four-year B EMC programmes, the next significant challenge faced by the HPCSA, educators and educational providers within the emergency care field was that of facilitating articulation between the two new qualifications.

As already mentioned, the researcher in this study aimed to design a framework that may support and guide articulation between the ECT qualification the professional B.EMC. degree in Emergency Medical Care. In order to do this a critical analysis and comparison of the two-year ECT qualification and four-year Bachelor degree had to be conducted. The main research questions therefore became:

1. How do the ECT and B EMC qualifications compare to and with each other in terms of general academic architecture, learning outcomes and educational modes of delivery?
2. What are the obstacles and challenges that educational managers are likely to face in articulating the mid-level worker ECT with the Professional B EMC Degree qualification?
3. What type of framework could address the identified obstacles and challenges related to articulation between the ECT and the Professional B EMC qualifications?

The first graduates from the ECT programmes entered the workplace during 2009. For this reason, it was important that a framework be developed soon which could facilitate and lend guidance to articulation between the two qualifications. Articulation is necessary if one is to cater for career-pathing, further professional development and lifelong learning within the profession.

As mentioned above, higher education qualifications in emergency care have only been in place for a few decades and post-graduate programmes are less than five years old. For this reason, there is currently very little locally published literature available on emergency care education and training.

In summary, the problem that needed to be addressed was that, prior to this study, there was no clearly defined educational framework informing and guiding academic articulation between the newly legislated and promulgated two-year, mid-level worker Emergency Care Technician (ECT) and the four-year B EMC professional degree qualifications within the emergency care profession.

1.4 SIMILAR STUDIES ON EMERGENCY CARE EDUCATION

The researcher made use of a number of electronic searches using Google Scholar, Pub Med, Science Direct and the University of Johannesburg's library search engines with the following key words and/or combinations thereof: "Emergency Care Technician", "Education", "Paramedic", "Training", "Mid-Level Health Workers", "Academic", "Articulation", "Learning". The results highlighted a lack of published literature on emergency care training in South Africa. A selection of the limited existing scholarly work in this is discussed below.

A 2007 study conducted by Lloyd Christopher at Durban University of Technology focusing on non-compliance of South paramedics with protocols and guidelines noted the fact that the quality of education and training of emergency care providers in South Africa needs to improve. Christopher also saw the introduction of the ECT mid-level worker programme and the BHS EMC as positive steps in further developing the profession locally. In addition, Christopher went on to specifically mention that a strategy needs to be designed that will allow for the development and progression of existing practitioners within the emergency care profession. Similar to the findings of the researcher in this study, Christopher also laments the dearth of local research and publications within the local emergency care profession (Christopher 2007:9-14).

A 2010 study conducted by Frauke Dillschnitter at the University of Johannesburg focused on determining of the potential impact that ECTs as mid-level workers may have on the provision of Advanced Life Support in the Sedibeng district. Dillschnitter also notes a lack of published literature on the ECT qualification (Dillschnitter 2010:10) and concluded that ECTs may indeed have a significant impact on the provision of ALS care in the region (Dillschnitter 2010:38).

A 2011 study by Bernard Von Tonder, also at the University of Johannesburg looked at factors that may be used to predict the success of ECT students at two local emergency care training colleges. In his study Von Tonder emphasizes that there is a dire need for qualified emergency care personnel and furthermore that the ECT programme may be seen as an important first step to gain access to emergency care qualifications in the HE band (Von Tonder 2011:8-12).

Aside from the limited literature described above, the researcher noted a virtual absence of prior studies focusing on emergency care education and training in South Africa. The lack of pre-existing published literature in this area is conceded to be a limitation in this study and indeed posed a significant challenge to the researcher when attempting to frame and contextualise the study.

For this reason the reader will see that several of the documents and references that ended up being used in this study are in the form of newsletters of the HPCSA, minutes of professional boards and education committee meetings, and draft policies from the National Department of Health, academic documentation from SAQA, the DoE and CHE. Generic educational literature and materials such as learning guides and course content documents from the Universities and Colleges offering the ECT and BHS EMC programmes also provided a significant and valuable source of raw data and baseline information required for this study.

In conclusion, prior to this study there was very limited published literature on emergency care education and training in South Africa. Aside from developing a framework for articulation, which remains the primary aim, this study also serves to make an additional contribution to expanding the limited body of published literature on local emergency care education and training in South Africa.

1.5 OVERALL GOAL, AIM AND OBJECTIVES OF THE STUDY

1.5.1 Overall goal of the study

The overall goal of this study was to improve opportunities for emergency care education and training in South Africa. It is argued that this can ultimately contribute to improved patient care for the population. In addition, although focused on providing new, specific knowledge within the emergency care educational field, this study may also deepen the general insight and understanding of issues affecting the growth and continued professional development of mid-level workers and health care professionals in South Africa.

1.5.2 Aim of the study

The aim of this study was to design a framework for articulation between the Emergency Care Technician qualification and the Emergency Medical Care Professional Degree.

1.5.3 Objectives of the study

In pursuit of the aim stated above the following four main study objectives were identified:

1. By making use of a review of existing literature and document analysis; **to Critically compare the two-year, 240-Credit NQF 5 National Certificate Emergency Care Technology Mid-level worker Qualification to and with the 480-Credit NQF 8 Professional Bachelor's Degree in Emergency Medical Care** in terms of general academic architecture, learning outcomes and educational modes of delivery. In view of creating a deeper insight and a thorough understanding of the similarities and differences between the two qualifications. It was felt that the outcomes of this critical comparison

would provide the necessary foundational knowledge and starting point for subsequent research processes, i.e. the Focus Group Interview and Delphi Questionnaire (cf. Chapters 4 and 5).

2. The knowledge and insights stemming from the literature review and critical comparison described above were then used to formulate an agenda for a focus group interview. The focus group interview was conducted with educators in the field aimed, in order to **identify and explore potential obstacles and challenges concerning articulation between the ECT and the Professional BHS EMC qualifications** (cf. Chapters 2 and 4).
3. Using the data and insights obtained through the completion of the above two research objectives, a Questionnaire was designed and administered to experts in the field of emergency care service provision and education using the Delphi Technique. The Delphi questionnaire aimed **to elicit consensus views and opinions from experts in the field relating to potential solutions to the obstacles and challenges that educational managers are likely to face in articulating the mid-level worker ECT with the Professional BHS EMC Degree qualification** (cf. Chapters 2 and 4).
4. By making use of the researcher's own knowledge, experience and expertise within the field, combined with the new knowledge and insights gained as a result of the above research processes the researcher would, **design a framework that may inform and guide academic articulation between the newly legislated and promulgated national mid-level worker Emergency Care Technician (ECT) and BHS EMC professional degree qualifications within the emergency care profession** (cf. Chapter 6).

1.6 DEMARCATION OF THE FIELD AND SCOPE OF THE STUDY

Melville and Goddard (2001:12-16) note that proper demarcation of the research problem and a well-defined scope and boundaries are important to provide focus and direction to any proposed research activity. The scope of this study is therefore limited to the design of the proposed framework to guide and facilitate the articulation and placement of Mid-Level ECT graduates from the respective training providers into the Professional Degree Programmes offered by the Universities.

The circulation of a bridging programme and implementation and piloting of such a framework and bridging including analysis of its functionality and impact, although important, lie beyond the scope of this particular study and may provide an excellent opportunity for further postdoctoral research into this area. Although beyond the scope of this study, valuable data were obtained from the Focus Group interviews and the Delphi questionnaire to guide the possible development of a curriculum. Data obtained also assisted the researcher to better understand the problem under investigation and to develop the required framework (cf. Chapter 5).

The findings of this study were applied within the field of Health Professions Education in developing a framework for articulation between the two programmes in the Emergency Care profession.

Due to the application of the study in the field of Emergency Care the study can be classified as being interdisciplinary, in "combining or involving two or more professions, technologies, departments, or the like, as in business or industry" (Infoplease 2011:Online).

1.7 THE FOCUS GROUP AND DELPHI PARTICIPANTS

The participants in the focus group interview and Delphi questionnaire survey consisted of registered Emergency Care and Advanced Life Support practitioners who were involved in Lecturing, Academic Administration and Management, as well as Emergency Service Operations.

1.8 THE RESEARCHER

The researcher is a registered Emergency Care Practitioner with the HPCSA and is currently Head of the Department of Emergency Medical Care at the University of Johannesburg. The researcher is also a councillor of the HPCSA and member of the Professional Board for Emergency Care, where he serves as Chair of the Education Committee.

The researcher is a member of the Senate of the North West Provincial Emergency Medical and Rescue College. The researcher also serves as a member of the ministerial task team advising the Department of Health on matters relating to EMS training policy and development. Having spent the last 17 years as an academic involved in emergency care education and training, the researcher was instrumental in the development and accreditation of the ECT mid-level worker programmes.

The researcher noted the growth and establishment of the ECT programme and, having interacted with ECT students and graduates, realised a strong desire for recognition and further development. This prompted the research and him to apply his mind to the matter of articulation between the ECT programme and the four-year professional degree and how such articulation may be facilitated.

The study was conducted between June 2007 and December 2011, with the empirical research phase from 2009-2011.

1.9 SIGNIFICANCE AND VALUE OF THE STUDY

The value of this research study is that it supports the SAQA ethos of lifelong learning by creating a framework and pathway for Graduates from the ECT mid-level worker programmes to gain access to further study within the NQF that would subsequently assist them in the development of their careers within the health sector.

In addition, pathways and opportunities to uplift the general level of education of emergency care providers in South Africa will have a direct benefit to the public and patients that are seen. Finally, this study may also serve as a generic reference and useful guide for similar projects involving articulation and development of mid-level health workers in similar professional domains such as radiography, medicine, dentistry, physiotherapy and optometry.

1.10 RESEARCH DESIGN AND METHODS

1.10.1 Design of the study

This study included components of both quantitative and generic qualitative designs. A Quantitative approach was used via a Delphi questionnaire to gather, reflect on and refer to data, for purposes of defining quantifiable differences between the two qualifications as a basis for discussion and clarification.

Due to the very nature of the core objectives, it was felt that a purely quantitative or purely qualitative design would not have been able to fully address the research problem. For this reason an additional generic qualitative research design was also included in the form of a focus group interview (cf. 3.2.3). The researcher arrived at this paradigm or research approach that would best be addressing the research questions, inquiry and the deductive and inductive development of epistemology itself (Trafford & Leshem 2008:89-97).

This is supported by Leedy (1997:160-162) who notes that qualitative research designs best attempt to understand perceptions and views.

Both Creswell and Plano Clark (2007) and David and Sutton (2004) note that there are distinct advantages to the combination of qualitative and quantitative methods in a single study. They argue that the resulting mixture can strengthen the validity and reliability of findings (Creswell & Plano Clark 2007:5-12; David & Sutton 2004:44-46).

After considering the possibilities it was felt that for the purposes and depth of this doctoral study, three different empirical methodologies would need to be applied in order to gather sufficient valuable data for this study.

The researcher, having considered the above theories against the backdrop of the identified research questions and objectives of this study, decided that an exploratory, mixed-method research design would be most appropriate (Ivankova, Creswell & Plano Clark 1995:265). Within this design three distinct methodologies were applied to investigate and gather data, which were used to answer the research questions and achieve the identified objectives - ultimately leading to the accomplishment of the aim. The next section will outline these methods briefly.

1.10.2 Methods of the investigation and flow of the study

The first method consisted of a *review of literature* and *expository retrospective analysis of existing documentation*. This was done by firstly selecting and identifying set criteria against which the two qualifications could be compared and analysed. After careful consideration, the researcher elected to use criteria similar to those used by the South African Qualifications Authority (SAQA) for the recording and registering of qualifications. A thorough engagement with the literature and a document analysis was needed as part of this study to show that the researcher has the scholarly depth and to contribute to the theoretical framework (cf. Chapter 2) (Trafford & Leshem 2008:73).

It is argued that the selection of criteria used by SAQA was both logical and important as both the ECT and B EMC qualifications had been lodged with SAQA. Each of the criteria is unpacked, described and discussed within the context of existing literature on the ECT and B EMC programmes. The comparison and analysis and discussion of the two qualifications against the SAQA criteria produced many pages of valuable data and this is presented in Chapter 2. The information gathered during the literature review and document analysis was, together with the researcher's own experience as a health educator, used to formulate the focus group agenda and finally the statements for the Delphi Questionnaire.

As mentioned above, a *focus group interview* was conducted. The principle aim in all interviewing is obtaining valid and reliable information (Fielding 2003:11). The rationale behind the use of a focus group interview was that as additional information surfaced, it would be used to add to and refine the statements used for the final Delphi Questionnaire. The knowledge and insights stemming from the literature review and critical comparison described above were then used to formulate an agenda for a focus group interview. The focus group interview was conducted with educators in the field in order to identify and explore potential obstacles and challenges concerning to articulation between the ECT and the B EMC qualifications (cf. Chapter 4).

Finally, a detailed *Delphi Questionnaire* was sent to 11 purposefully selected Delphi Panel members (cf. 5.2). The Delphi method involves collecting and distilling judgments of experts using a series of statements or questions (David & Sutton 2004:92-96). The Delphi method works particularly well when there is incomplete knowledge about a problem or phenomenon. The absence of existing literature on articulation between the relatively new ECT and B EMC programmes meant that the researcher had to look toward other sources of information and data. The engagement of educators and experts currently involved in the construction and offering of these programmes was seen as a

logical step in gathering data on the content and articulation between the two programmes.

After consensus was reached, the findings of the Delphi were utilised by the researcher to design a framework and propose outcomes for a bridging programme that could facilitate for articulation between the ECT and B EMC programmes. The framework is presented and discussed in Chapter 6.

A more detailed description of the population, sampling methods, data collection and techniques, data analysis, reporting and ethical consideration is provided in Chapter 4. A schematic overview of the study is provided in Figure 1.1.

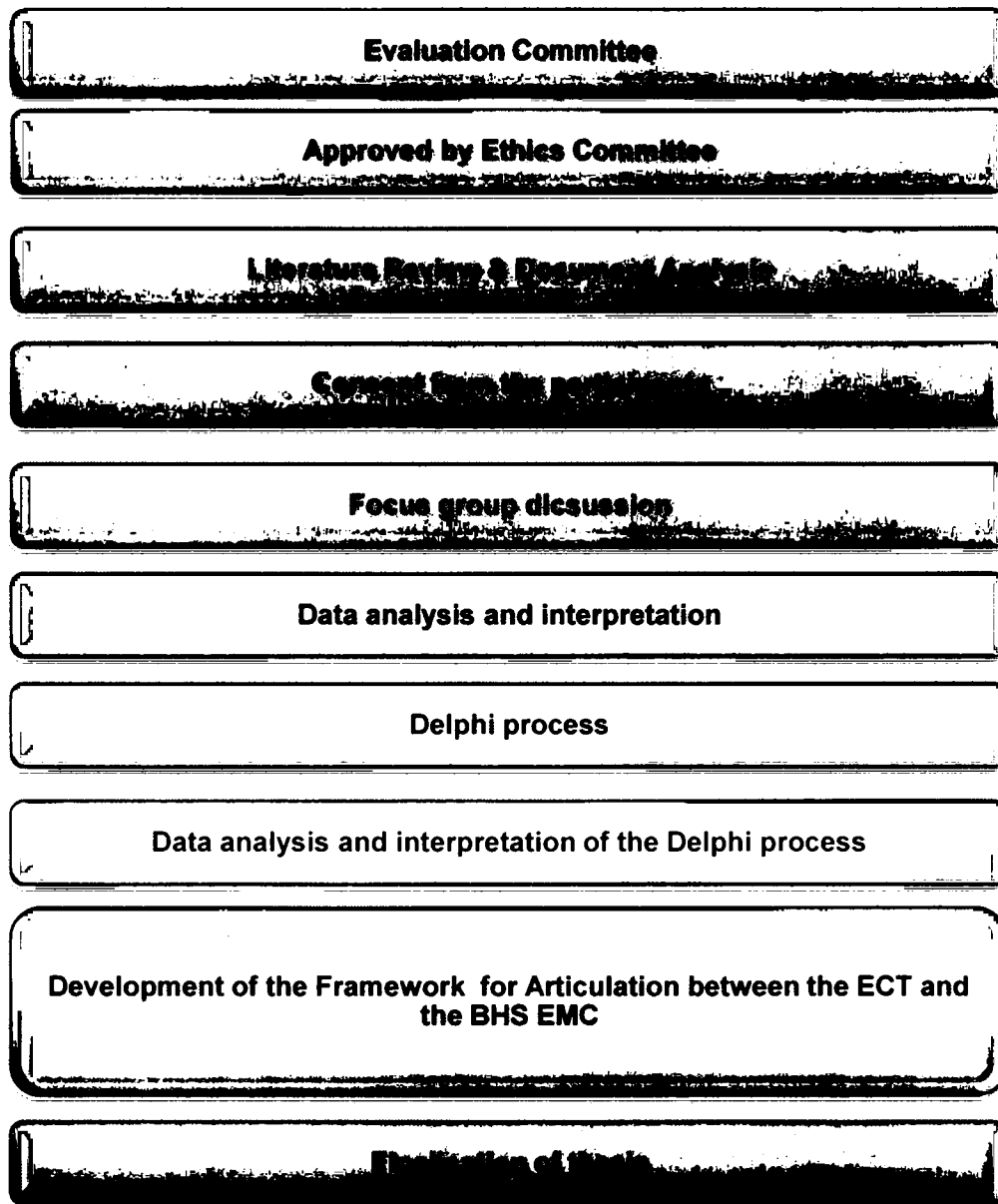


FIGURE 1.1 Schematic overview of the study

1.11 IMPLEMENTATION OF THE FINDINGS

This report containing the findings of the research will be brought to the attention of the Professional Board for Emergency Care of the Health Professions Council of South Africa, the Departments of Emergency Medical Care at the Higher Education Institutions offering Emergency Care Education as well as Colleges involved in the offering of the ECT programme. It is the intention of the researcher to pilot the framework and bridging programme developed in this study, within his department at the University of Johannesburg, with graduates from ECT programmes in the region. Given that the researcher has a distinct role in various committees and in an advisory capacity at ministerial level, he can and will use the valuable data obtained from the Focus Group interview and Delphi questionnaire to guide and inform the various role-players.

In addition to the above, the research findings will be submitted to academic journals with a view to publication, as the researcher hopes to make a contribution to the improvement of health education. The research findings will also be presented at emergency care conferences and seminars.

1.12 ARRANGEMENT OF THE REPORT

The following section provides a brief outline of the study and layout of the thesis.

In this chapter (Chapter 1), *Orientation to the study*, the researcher provided the context and background to this study by providing a list of acronyms and definitions of generally used terms that are applicable to this study. Thereafter, the background to the problem, problem statement, scope, overall goal, and aim and research design were introduced.

Chapter 2, ***Emergency Care Education and Training***, provides the theoretical orientation to the study and deals with a review of literature on Emergency Services Education and Training and the concept of mid-level health workers. The second part of the chapter contains an analysis and critical comparison of the ECT and BHS EMC qualifications.

In Chapter 3, ***Research design and methodology***, the research design and methods selected for this study are described and validated. These include a Focus Group Interview and Delphi questionnaire. The focus group interview focussed on identifying and exploring potential obstacles and challenges concerning to articulation between the ECT and the Professional BHS EMC qualifications. The Delphi technique was applied to obtain consensus opinions of experts on matters affecting articulation between the two programmes. The way in which the Delphi questionnaire was constructed and administered is also dealt with in Chapter 3, as are issues of validity, reliability and ethical considerations applicable to this study.

Chapter 4, ***The Focus Group Interview***, describes the Focus Group Interview, and the analysis of the data gathered from the Focus Group Interview, before reporting and discussing the results and findings.

Chapter 5, ***The Delphi survey***, presents the analysis, findings and results of the Delphi process.

Chapter 6, ***The Proposed Framework for the Articulation between the Emergency Care Technician Certificate and Emergence Medical Care Professional Degree***, begins by providing a description of suggested access pathways for school leavers and in-service personnel into the ECT and BHS EMC programmes. Following on from the discussion of entry and access pathways into the ECT and BHS EMC qualifications, the researcher presents, unpacks and describes the framework for articulation and its various components.

The chapter concludes by presenting a proposed model for articulation and upgrading of in-service staff qualifications.

Chapter 7, **Conclusions, recommendations and limitations of the study**, provides an overview of the study, together with a discussion on possible limitations of the study and is concluded by some recommendations.

1.13 CONCLUSION

This first chapter provides an orientation to the study, background to the problem, problem statement, scope, and overall goal and discussed aim together with a brief introduction to the research design and research methods. The chapter concludes by providing an outline of the thesis and the chapters to follow. The following chapter will provide the theoretical orientation and framework to the study and an analysis and critical comparison of the ECT and BHS EMC qualifications.

CHAPTER 2

EMERGENCY CARE EDUCATION AND TRAINING

2.1 INTRODUCTION

As explained in Chapter 1, this study aimed to investigate and describe how the two-year Emergency Care Technician (ECT) mid-level worker qualification compares to the four-year Professional degree in Emergency Medical Care (B EMC) for the purposes of designing a framework that may support articulation between these two qualifications.

A challenge faced by the researcher in terms of this study was that there was very little existing published literature on emergency care education and training in South Africa. This chapter begins by discussing the history of paramedics and paramedical training locally and abroad. In order to do this the researcher made use of an analysis of existing documentation both published and unpublished. The literature is further supplemented by a discussion of mid-level health workers internationally and in Africa, vocational education and the importance of lifelong learning and academic articulation, all of which constitute central themes applicable to this study.

Following on from the review of literature the chapter continues by providing a detailed in-depth critical documentary analysis and comparison of the structure of the ECT and EMC qualifications.

2.2 HISTORY OF PARAMEDICS

The word "paramedic" literally means "along-side medicine", a person whose job is it to assist and support doctors (The South African Oxford School Dictionary 1998:314). The need for a person specifically trained to provide immediate care to ill or injured patients in the pre-hospital setting was

identified many years ago during time of war. Injured soldiers on the front line were attended to by "medics" as opposed to doctors and surgeons who were seen as too valuable a commodity to risk placing directly in the front lines.

Early research into survival from traumatic events began to highlight the important link between rapid medical intervention and survival. The concept of the now universally recognised "golden hour" principle began to emerge. The "golden hour" was defined as the first 60 minutes post injury or insult. Injured patients who received little or no medical intervention during this first hour were noted to be less likely to survive than those who did, even though both may have ultimately ended up in the same receiving facility. This understanding redirected efforts away from simply scooping up the patient and rushing them to hospital toward initiating emergency medical treatment prior to and during transport (Joseph 2002:75).

Whilst the above idea was well supported, there remained insufficient numbers of medical doctors to deploy with each unit. The solution lay in training non-medical personal and fellow soldiers to provide first aid in the field. Initially this training was rudimentary and focused mainly on the stemming of bleeding, splinting of fractures and simple first aid. However, as time went on, army medics became better trained and their scope of practice subsequently increased. Medics became recognised as a valuable human resource that could render care at the site of injury, stabilise patients and facilitate ongoing care until such time as they could be transported and handed over to a medical doctor at a field hospital or definite care facility.

The above concept was imported into the civilian non-combat environment and it became acknowledged and accepted that ambulance crews were able to do far more than simply rush ill and injured patients to hospital hoping they would be alive on arrival (Caroline 2008:1.5-1.9).

The training and scope of practice of ambulance personnel differed vastly between different countries and even regions within the same country. Early on ambulance services were not always seen as fully evolved independent services, rather the operating of ambulances were placed under the control of other, more recognised departments within the civil service such as traffic, law enforcement or fire services (RSA NDoH 2011). Here staff and management within the various departments often saw the manning of ambulances as just an add-on or adjunct to their primary function.

In South Africa the development of the Emergency Medical Services followed a very similar pathway. In many of the urban areas ambulances were initially manned either by the municipal traffic department or by the local fire service staff. Although things have changed, the link between fire fighting, rescue and emergency care remains well established and there are still a number of large "combined" services who render all three functions both locally and abroad (Christopher 2007:1-12).

In contrast to the combined service model a number of provinces within South Africa have subsequently removed the responsibility for providing emergency medical services from the local fire/law enforcement departments at municipal level. In such areas the rendering of emergency medical services now remains the direct responsibility of the Provincial Government under the umbrella of the National Department of Health (Christopher 2007:9).

Regardless of which department or sector provides the service, ultimately patients need to be attended to by ambulance crews on the vehicles dispatched to the incidents. The level of care provided by a service is thus determined by the level of education/training and subsequent scope of practice of the staff within their service.

Education and training for emergency care personnel differ vastly between different countries and EMS systems. Certain EMS systems, such as that seen

in France offer a doctor-based system with medical doctors responding on emergency vehicles to calls. In systems like this, pre-hospital clinical decision making and medical intervention is at an advanced level and remains the prerogative of the doctor on the vehicle and not the paramedic *per se*, although doctor-driven paramedics still play an important role in these systems in acting as an assistant to the senior doctor or clinician (Nikkanen, Pouges & Jacobs 1998:31, 116-120).

At the other end of the spectrum are EMS systems that operate with ambulance crews that have as little as three to four weeks of basic training. In these systems, clinical decision making, research and development, formulation of medical protocol and associated clinical governance are undertaken by medical doctors and not paramedics. In this type of model, paramedics are not usually viewed as independent clinicians or practitioners and subsequently their associated training is more technical in nature, with a strong focus on the following of medical protocol (Ramalanjaona 1998:31, 766-768).

The different EMS systems described above entails that personnel within these services will have different levels of training and/or education and subsequently they will be able to provide differing levels of patient care. Three main tiers of emergency care have become generally recognised locally and internationally. These levels are Basic Life Support (BLS), Intermediate Life Support (ILS) and Advanced Life Support (Christopher 2007:22).

It is also important to acknowledge that the scopes of practice, associated clinical skills and/or procedures that define the boundaries between Basic, Intermediate and Advanced Life Support remain ill-defined and subject to varied interpretation. The recent emergence of the Emergency Care Technician (ECT) as a mid-level health worker (MLW) programme for the local emergency care profession has and continues to generate heated debate as to whether ECT graduates can or should be considered as advanced life-support providers.

2.3 EMERGENCY CARE EDUCATION AND TRAINING IN SOUTH AFRICA

In South Africa, Emergency Medical Care and EMS systems became established in a similar fashion to that described above. EMS education and training in South Africa historically comprised a number of "short courses" offered alongside formal Higher Education (HE) diplomas and degrees. These short courses ranged from a four-week Basic Ambulance Attendant (BAA) Course and 12-week Ambulance Emergency Assistant (AEA) course and a nine-month Critical Care Assistance (CCA) course (HPCSA 1999a, b, c).

The higher education qualifications consisted of a three-year National Diploma (N. Dip.) and an additional one-year post-graduate Bachelor (B. Tech.) Degree.

Three registers historically existed at the HPCSA to allow for professional registration. A Basic Life Support (BLS) register for BAA graduates, an Intermediate Life Support (ILS) Register for AEA graduates and an Advanced Life Support (ALS) register for CCA and N. Dip. Graduates (HPCSA 2011: Online). However, as time went on a number of problems with this model began to emerge.

2.3.1 Problems associated with the short-course system

During the 1990s and up to the present, the private sector became highly involved in short course training, specifically in the offering of the four-week BAA course. BAA training proved to be extremely lucrative with young people across the country being lured to private colleges on a promise of work, and then into paying large sums of money for the month-long BAA course. BAAs were being produced in massive numbers that far exceeded that required by the emergency services and National Department of Health (RSA NDoH 2011). This oversupply did not stop the HPCSA becoming continuously inundated with

requests from additional role-players throughout the country, all wishing to establish small colleges to offer BAA training.

Although initially compliant at the time of accreditation, many of these colleges simply did not have the capacity or the desire to significantly invest in ongoing quality assurance and current technologies; rather their main focus became filling their classrooms and offering back to back courses in an attempt to generate as much profit as possible (HPCSA 2005:1-5).

Complaints regarding colleges offering short courses began to surface at the HPCSA. Onsite inspections revealed a sad state of affairs with regard to a lack of quality assurance capacity, equipment deficits, poor teaching and learning conditions and insufficient numbers of qualified staff. With as many as 60 providers being accredited by 2005, quality assurance of emergency care education and training became virtually impossible (HPCSA 2005:1-5).

The above-mentioned factors naturally resulted in poorly equipped graduates. From an industry perspective, BAAs became viewed as cheap, semi-skilled labour. It became clear to the National Department of Health (NDoH) that continued BAA training was not good for the profession. The HPCSA and PBEC also realised that BAAs, whilst registered in the category of supervised practice, were being used as independent practitioners and that to have someone attending to ill and injured patients with only a few weeks of training is not in the interest of the public or the profession (RSA NDoH 2011).

Due to the oversupply of BAAs, thousands who register with the HPCSA are removed from the register each year due to non-payment of annual fees. The main reason cited is that they did not find work as promised by the training providers and they have remained unemployed and therefore simply cannot afford the registration fees (Naidoo 2011).

Although not as extensive as those encountered at the Basic Level, problems surrounding the quality of education and training at AEA and CCA colleges were also experienced and, despite proactive attempts by the PBECP to bring providers back in line, a number of colleges offering this type of training had to be closed down by the HPCSA (Naidoo 2011).

Despite the fact that anecdotal reports to the contrary are common, the short-course system actually failed to produce sufficient numbers of paramedics to meet the needs of the National Department of Health. Twenty years on, an ALS shortage still exists today with only around 1400 practitioners being on the ALS register (HPCSA 2011:Online;RSA NDoH 2011).

The short courses were never properly re-curriculated and as such continued to operate on more or less the same curriculum since 1990. The academic architecture of the short courses is not SAQA compliant. For example, the CCA course contains credits and notional hours in excess of 120, which is the maximum allowed for a short learning programme (SAQA 2011a:Online). For this reason the short courses lay and continue to lie, outside of the National Qualifications Framework (RSA NDoH 2011).

Articulation between the short courses and the Higher Education (HE) offerings became increasingly difficult as the knowledge gap between these non-credit bearing short courses and the HE qualifications grew ever wider. This created growing amounts of frustration within the service (HPCSA 2005:1).

None of the short course training providers were ever registered with the DoE through Umalusi, the CHE, the Department of Labour or HW Seta as training providers for emergency care. This left the HPCSA as the only ETQA for all of these providers.

The PBECP, NDoH and HPCSA sat in an uncomfortable position whereby the Emergency Care Profession continued to confer professional registration and

status to persons who had no formal qualifications and in some cases only a few weeks of training. This was in stark contrast to every other health profession in the country, and abroad where professional registration is only possible through the completion of formal higher education qualifications.

The focus of the short-course system was and remains mainly on clinical skills training and not education. The majority of short course graduates are thus not empowered to adequately function as independent practitioners, provide clinical governance and education, undertake further study within the NQF or participate in research and development. In South Africa, the Emergency Care profession has become independent and the above skills are now expected of all registered professionals.

2.3.2 Recent developments

The need to comply with the requirements of the SAQA Act (Act 58 of 1995) necessitated a review of the entire system of emergency care education and training. The challenge lay in designing a structure which would comply with the needs of the National Department of Health (NDoH) as well as the Emergency Care Profession. Central to the debate were important issues of lifelong learning, academic progression, career-pathing and placement as well as further professional development. This review and restructuring was undertaken by the PBEC functioning as the Standard Generating Body (SGB). A revision of the learning outcomes of the existing short courses resulted in the production of a formal two-year 240 credit NQF level 5 Emergency Medical Care Technician (ECT) Qualification. The NDoH views this ECT programme as the "Mid-Level Worker" (MLW) equivalent for the Emergency Care Profession. The ECT qualification is NQF compliant and registered with SAQA; the first intake of students occurred in 2007 at Provincial Ambulance Training Colleges and selected Universities of Technology (HPCSA 2011:7).

At the HE level, the three-year National Diploma and one-year B. Tech. Programme were collapsed and submitted to SAQA in the form of a single four-year 480 credit NQF level eight Professional Bachelor of Emergency Medical Care (B. EMC.) degree. The B EMC allows for direct articulation into Master and Doctoral Programmes. More recently the Council for Higher Education (CHE) and the Department of Higher Education & Training (DHET) have recommended to Higher Education Institutions the use of "Health Sciences" as a designator in the naming of the new four-year qualification making the new name a Bachelor of Health Sciences in Emergency Medical Care (EMC). On instruction from the HPCSA, Higher Education Institutions (HEIs) offering emergency medical care programmes are currently in the process of phasing out the three-year N. Dip. exit level qualification and implementing the four-year BHS EMC Degree. HPCSA (2009:2).

In summary, education and training for the emergency care profession has recently been aligned to comply with the requirements of SAQA and the NQF. For the future it was proposed that there will be two levels of education and training both falling within the HE band of the NQF. The first level is the two-year Emergency Care Technician (mid-level worker) programme. The second level is the four-year Professional Bachelor Degree. The necessary legislation has been promulgated and registers are already open at the HPCSA to accommodate graduates from these two programmes providing them with professional registration and respective scopes of practice.

This concept of a two-tiered approach with mid-level workers and practitioners is neither unique nor foreign to the health care professions. Although new in the South African Emergency Care environment mid-level worker programmes have already been in place for a while in a number of other countries (Dovlo 2004:4-9:Online). If the current policies of the NDoH are to remain, mid-level health care workers will be introduced in most, if not all of the registered professions including medicine, radiography and environmental health.

2.3.3 Uniqueness of the South African Model of Emergency Care Education and Training

The concept of an EMS "system" should be delineated from the concept of "emergency care practitioners" or "providers" who function within a given "system". Many countries, including the USA, have by and large adopted a *Technician*-based approach to the training of their paramedics. In such systems, training is more technically focused on the following of set protocols and treatment regime as opposed to definitive diagnosis and clinical decision making. Although paramedics within such systems can and often do obtain tertiary educational qualifications, it is normally only after achieving their primary EMT-B and P training which is very similar to the old short-course type format.

Higher education degrees that are on offer are mostly completed part-time or via a limited contact mode and tend to focus more on management, communication, education and humanities with limited or no clinical work, nor do they lead to and extend a medical scope of practice. Such diplomas and degrees cannot be compared to the clinically orientated four-year full-time bachelor degrees in emergency medical care that are being offered by Universities in South Africa. In these overseas "EMS" systems the role of clinical decision making, interrogation, critique and development of medical protocol is by and large owned and driven by Medical Doctors and not Paramedics.

In South Africa we have a different and unique setup whereby the emergency care profession has to a large degree developed away from a doctor-driven Technician system toward a separate autonomous Profession. This is evidenced by the fact that paramedics register with the HPCSA as independent practitioners as do Doctors and they are answerable to a separate autonomous professional board (Christopher 2007:23).

By implication, in South Africa, the responsibility for clinical decision making, interrogation, critique and development of pre-hospital medical protocol and direction is now largely driven by Paramedics. The extent to which this fledgling autonomous profession is capable of properly fulfilling these important functions is frequently debated.

Further complicating the matter is the fact that the void left when Doctors withdrew from clinical governance of pre-hospital care has never been properly filled by Degree Emergency Care Practitioners. A few of the larger quality role-players within the private sector have acknowledged this lack of medical direction and clinical governance as a problem and continue to (within their organisations) make use of Medical Doctors to fulfil this role. However, within the public sector, clinical governance and review is all but absent.

The above should not be seen as an indictment or judgment on either of the two systems. It is acknowledged that both a technician- and/or clinician-based system can work well if properly implemented. The HPCSA and NDoH have made it clear that they remain in support of a separate autonomous emergency care profession with a two-tiered or three-tiered approach to the provision of emergency care within the country. The two currently recognised and established tiers are the two-year ECT graduate functioning as a mid-level worker (MLW) and the four-year degree (practitioner.)

2.4 MID-LEVEL WORKERS (MLWs)

According to the World Health Organization (WHO) in 2006 there was already a worldwide shortage of around four million health care professionals (WHO, 2007:Online). The effects of this shortage are more prevalent in poorer, underdeveloped or developing countries with underresourced and overburdened health care systems (Lehrmann 2008:1:Online). It can be argued that South Africa as a developing nation is similarly affected by a shortage of health care professionals. Lehrman (2008) identifies a number of

factors that may contribute toward a shortage of health care professions within the health system. Factors that are in the South African scenario include low numbers of graduating professions, migration of health care professionals, poor human resource planning and the HIV AIDS pandemic.

Many countries, both developed and underdeveloped, have resorted to making use of mid-level health workers in an attempt to address the shortage of health care professionals. As mentioned above, graduates from the two-year ECT programme are seen by the NDoH and HPCSA as the Mid-Level Workers for the Emergency Care Profession and subsequently the production of ECTs is seen as a way of addressing the current shortage of paramedics within the country (HPCSA 2011:7).

Despite the fact that mid-level workers have been used in many countries throughout the world for a number of years, at present their role, function, impact and placement within the health care system is often poorly researched and understood (Hongoro & Mc Pake 2004:1451-1456).

Dovlo (2004:1:Online) notes that the term Mid-level worker may have different meanings. The WHO sees mid-level workers as front-line health workers who are not doctors but who have been trained to diagnose and manage commonly encountered illnesses or injuries including the management of emergencies and the transfer of patients to facilities where definitive care can be provided (WHO 2001:Online). This definition is most applicable to both ECTs and ECPs within the emergency care profession.

The mid-level workers' purpose is to improve access to and the quality of health services. They are to strengthen and expand existing health work forces, not replace existing qualified health care personnel. Mid-Level Workers (MLWs) are usually less intensively trained and less specialised. Only certain functions are delegated to them. They work under supervision and guidance of a fully

qualified person. MLWs receive a formal certificate and accreditation through their countries licensing bodies (Lehrmann 2008:3-15:Online).

2.4.1 Examples of mid-level workers internationally

Even in well-developed first-world countries, shortages of health care professionals can exist and have existed for some time. As early as 1960, a survey conducted in the United States of America highlighted a shortage of primary care physicians. An attempt was made to address this shortage through the production of *physician assistants*. Physician assistants (PAs) are health care professionals licensed to practice medicine under the supervision of a registered physician. The PAs' clinical scope of practice include patient assessment, diagnosis, treatment, interpretation of test results, health counselling and preventative health care and in some cases even extends to assisting in surgery and writing prescriptions. Studies conducted on PAs who work under supervision of physicians showed that the level of care provided is comparable to that provided by physicians (American Academy of Physician Assistants 2011:Online).

Canada views PAs as skilled professionals who practice in a physician extender role. They perform tasks similar to those performed by their physician supervisors. Unlike the South African ECTs, PAs in Canada and the US do not practice independently, but work under the direction of supervising physicians within a patient-centred care team. (Canadian Association of Physician Assistants 2011:Online).

2.4.2 Mid-Level health workers in Africa

It was during the beginning of the 20th century that MLWs began to feature on the African continent. MLWs rapidly became an important component of the human resource structures in rural health centres and district hospitals where they assist doctors and nurses with their tasks (Dovlo 2004:2-12:Online).

These countries include Botswana, Zimbabwe, Kenya, Malawi, Angola, Ghana, and South Africa.

In South Africa a three-year, mid-level medical worker programme (Clinical Associate) has recently been introduced to produce clinical associates who could assist doctors in district hospitals. These mid-level workers are trained to work in emergency units, maternity units, outpatient departments, medical and paediatric units and surgical units. Their training will provide them with limited knowledge, skills and competencies allowing them to function in an assistant role and as a team member in district hospitals, but not as independent practitioners.

As mentioned previously, there is limited rigorous research evidence on mid-level workers in general and prior to this study there has been no literature on MLWs in the local emergency care environment. However, the rationale for the production on ECTs as mid-level workers is linked to a critical shortage of ALS care providers. Data shows that, currently, of the 55 000 persons registered with the HPCSA, only around 3% are capable of providing ALS care (NDoH, presentation on New ECT Programme, received July 2008). It is specifically for this reason that the NDoH and HPCSA have introduced a mid-level worker type programme for the emergency care profession. This two-year programme is called the ECT programme and is currently being offered at accredited provincial ambulance training colleges.

2.5 VOCATIONAL EDUCATION, MOTIVATION AND THE DESIRE TO STUDY FURTHER

Both the ECT and B EMC qualifications are vocational in nature and are aimed at providing graduates with knowledge and skills relevant to a specific medical discipline. The following section will briefly explore the role of vocational education within the workplace as well as the factors that may motivate and drive adult learners to study further. In the case of this study this would apply

to the desire for ECTs as mid-level workers to continue with their studies and complete the B EMC qualification.

Cloete and Bunting (2000:43-44) note that employers, when assessing educational offerings, invariably focus on work-related skills. Where education is more vocationally orientated, learners appear to engage more readily in learning opportunities that result in the attainment of qualifications that are recognised by their employer and are also linked to promotional opportunities.

The National Department of Health (NDoH) as an employer and service provider must therefore ensure that its workforce is skilled and can adapt and respond to the growing needs of the public. There is currently a mal-distribution of qualifications and skills within the local emergency care profession, with the majority of the workforce having no formal qualifications and only trained to a basic life-support level. The short-course model of training has failed to produce sufficient numbers of properly qualified individuals to take the profession forward. The introduction of the ECT MLW programme focused on the upgrading of knowledge skills for persons within the service and the concept of lifelong learning therefore becomes very important in a vocational setting of this nature.

It has long been recognised that vocational education is not something that occurs at the start of a career, but rather continues throughout the whole of an individual's working life (Knowles 1980:207-212). Government reports also emphasise the significance of knowledge for work. In many service related industries and specifically the emergency medical service sector, there are certain professional requirements and competencies that can be directly linked to the successful achievement of recognised courses and qualifications. Posts, positions and ranks are often directly linked to and/or associated with the attainment of specified courses and qualifications (Hall & Adams 1998:5-10). Thus, prior to embarking on a learning experience, adult learners within this sector would most likely ask two key questions: (1) how will these learning

outcomes make me better at performing my current duties? (2) If I successfully complete this course/qualification, will I stand a better chance of being promoted?

Therefore, in order to have a successful programme, planners must be able to design offerings that are consistent with the mandate of the sponsor (employer) and are also considered to be of value by the learner (Cooksen 1998:274-275). It could, thus, be argued that ECT graduates would be more motivated to engage meaningfully with their study material if they perceive the learning outcomes to be valuable in relation to not only the improvement of their functioning in their current position, but also to prepare them for further study and promotion. Increased motivation levels have a significant effect on the learning process (Caffarella 1994:120-128).

2.6 ARTICULATION BETWEEN THE EMERGENCY CARE TECHNICIAN (ECT) AND THE BACHELOR DEGREE IN EMERGENCY MEDICAL CARE (B EMC)

Articulation as defined by the Oxford dictionary refers to "*connecting by a joint*" (The South African Oxford School Dictionary 1998). In this study the term "*articulation*" refers to the progression, transfer and/or movement between qualifications, programmes and/or learning outcomes.

The importance of articulation between qualifications is well supported by international and local educational literature. The 1997 White Paper on Education stresses the importance of facilitating horizontal and vertical mobility through the development of a framework for higher education qualifications (RSA DoE 1997a). One of the Council for Higher Education (CHE)'s accreditation criteria specifically requires that programmes are able to articulate between other qualifications and programmes (CHE 2004b:6-8).

The importance of academic progression, lifelong learning and articulation between qualifications is equally well supported in both local and international educational literature. However, what constitutes appropriate articulation is a complex and often confused matter. Effective articulation is not just about alignment of formal entry requirements; rather it is achieved by ensuring appropriate forms of support for students making the transition (CHE 2007:23).

In line with the above it becomes important that opportunities are created which will assist the mid-level ECT graduates to receive recognition for the learning outcomes already achieved during the completion of the ECT qualification and allow for access and advanced placement into the BHS. EMC. Degree programmes at the Universities. This study intends to design a suitable framework that may guide such articulation.

2.7 ANTICIPATED CHALLENGES RELATING TO ARTICULATION BETWEEN THE ECT AND THE B EMC QUALIFICATIONS

The South African Higher Education Quality Committee (HEQC) notes that minimum standards must be stipulated to protect students from poor quality programmes and safeguarding the credibility or qualifications when facilitating meaningful articulation between programmes (CHE 2001). DoE and HE legislations and regulations speak to the issue of maximum permissible credit transfer. Access and articulation also have to be taken into account when attempting to articulate between different programmes (RSA DoE 2004:34).

In the context of this study it may be argued (from a simplistic viewpoint) that ECT graduates, having completed two years of training should simply be accommodated into the third year of the four-year professional degree programmes. Although similarities in the teaching, learning and assessment of ECT and Professional Degree students exist, it is conceded that there remain significant fundamental differences in relation to where an ECT graduate would stand academically and practically compared to a student who has completed

the second year of the B EMC degree programme. In addition, issues such as clinical experience and contribution to the workforce and cost of further studies need to be considered.

Therefore (as desirable as it may appear) discussions with educators (Principals, Academic Heads and Programme Managers) and employers in the field indicate that the immediate and direct articulation and placement of ECT graduates directly into the third year of the professional degree programmes would not be desirable nor possible in the absence of a form of bridging included in a clearly defined framework to facilitate such articulation.

This study therefore aims to design such a framework, allowing for, and facilitating, academic articulation between the two-year 240 Credit NQF level 5 National Certificate: Emergency Care Technology Qualification and the 480 Credit NQF level 8 Professional Bachelor's Degree in Emergency Medical Care. As mentioned previously, articulation between these qualifications is important for career-pathing and professional development within the profession.

2.8 ANALYSIS AND COMPARISON OF THE EMERGENCY CARE TECHNICIAN PROGRAMME TO THE BACHELOR OF HEALTH SCIENCES DEGREE IN EMERGENCY MEDICAL CARE

2.8.1 Introduction

As mentioned in chapter one, education and training for the emergency care profession in South Africa have recently been aligned to comply with the requirements of SAQA and the NQF. The Health Professions Council of South Africa will in future recognise two qualifications both falling within the HE band of the NQF. The first is a two-year Emergency Care Technician/Paramedic (mid-level worker) programme. The second, is a four-year Bachelor of Health Sciences Degree in Emergency Medical Care (HPCSA 2005:1).

One of the main research questions in this study was how these two qualifications compare to each other in terms of general academic architecture, learning outcomes and educational modes of delivery. The literature review began by addressing education and training of emergency care personnel and mid-level health workers. The following section attempts to provide a detailed in-depth critical comparison of the ECT and BHS EMC qualifications. This critical comparison based on documentary analysis aims to elicit the necessary foundational knowledge that underpins subsequent research processes within the context of this study.

2.8.2 Criteria for comparison of the ECT and EMC Qualifications

When attempting to compare educational offerings it is important that well-defined and generally accepted educational criteria be utilised. Within South Africa, we have the Centre for the Evaluation of Educational Qualifications (CEEQ). The CEEQ is a functional unit of the South African Qualifications Authority (SAQA). SAQA is responsible for the development and implementation of the National Qualifications Framework (NQF). One of the main objectives of the NQF is to facilitate access to, and mobility and progression within, education, training and career paths (SAQA 2011b:Online).

In striving to achieve these objectives, Keevy and Blom (2007:2) note the importance of using a set of agreed principles, practices, procedures and standardised terminology when comparing qualifications.

Taking the above into account, and for the purposes of this comparison, the researcher elected to make use of the following criteria utilised by the CEEQ and required by the SAQA for the purpose of registering all qualifications:

- Qualification name/titles
- Standard generating bodies (SGBs)
- Education training quality assurors (ETQAs)

- Providers
- Qualification types
- Fields
- Sub-fields
- Abet bands
- Minimum credits
- NQF levels
- Qualification class
- Purpose and rationale of the qualifications
- Recognition of previous learning
- Learning assumed to be in place
- Access to the qualifications
- Qualification rules
- Exit level outcomes (ELOs)
- International comparability
- Teaching, learning and assessment practices
- Articulation options

In the remainder of this chapter each of the criteria above will be unpacked, described and discussed and both qualifications placed within the context of each of the respective criteria.

2.8.2.1 *Qualification names and titles*

Educational literature reveals a number of similar definitions of the word *qualification*. The South African Council for Higher Education (CHE) defines a qualification as "*a set of purposeful and structured learning experiences*" (CHE 2010:Online).

SAQA defines a qualification as "*The formal recognition of the achievement of the required number and range of credits and other requirements at specific levels of the NQF determined by the relevant bodies registered by SAQA*"

(SAQA 2009b:Online). The word "*title*" may be defined as an identifying name given to a book, play, film, musical composition, or other work.

Whilst the words *qualification* and *title* are easily identified and described, finding a precise definition for the term "*qualification title*" proved to be more problematic than originally anticipated. Whilst there appears to be much written about the importance of registering a qualification title, a precise definition of this term remains elusive.

The Welsh Assembly Government regulatory body for the Qualifications and Credit Framework (Ofqual/08/3726) sets out the requirements that will apply to the organisations that operate within, and the qualifications that are accredited into their National Qualifications and Credit Framework (QCF) (The Welsh equivalent of the South African NQF). Ofqual states that qualification titles should identify the level and size of a qualification and give a precise and concise description of the content of a qualification (Ofqual 2010:Online).

The South African Higher Education Act, 1997 (Act No. 101 of 1997) and the Higher Education Qualifications Framework (HEQF) both mention the importance of consistent use of qualification titles, their designators and qualifiers in facilitating public understanding of the achievements represented by higher education and developing confidence in academic standards of higher education institutions.

The South African Higher Education Qualifications Framework (HEQF) introduces three terms "*qualification type*", "*designator*" and "*qualifier*" all of which are required in the naming of qualifications within the framework. These are discussed under points 2.8.2.5; 2.6 & 2.7 below.

The name of the mid-level worker ECT qualification as registered with SAQA is **National Certificate in Emergency Care**. The name of the Professional practitioner qualification as registered with SAQA is **Bachelor Degree in Emergency Medical Care**. However, as mentioned in Chapter 1 the Higher

Education Qualifications Committee (HEQC) has recently recommended the use of a designator of "Health Sciences" to be used in the title. It seems as if, at the time of writing, the title of the Bachelor Degree in Emergency Medical Care as lodged with SQAQ (B. EMC) will in fact change to Bachelor of Health Sciences in Emergency Medical Care (BHS EMC).

2.8.2.2 *Standard generating bodies (SGBs)*

According to SAQA, an SGB is a body registered in terms of the SAQA Act, responsible for establishing education and training standards or qualifications, and to which specific functions relating to the establishment of national standards and qualifications have been assigned.

In the case of both the Emergency Care Technician (National Certificate in Emergency Care) and the Emergency Care Practitioner (Bachelor Degree in Emergency Medical Care) the SGB was the Professional Board for Emergency Care Practitioners at the Health Professions Council of South Africa. The Professional board is made up of registered members of the emergency care profession (HPCSA 2005:1-2).

2.8.2.3 *Education and training quality assurors (ETQAs)*

These bodies are accredited in terms of the SAQA Act (Act **58 of 1995**). As the name implies, the role of an ETQA is to monitor and audit achievements in terms of national standards or qualifications, and to which specific functions relating to the monitoring and auditing of national standards or qualifications have been assigned in terms of the Act. Simply put ETQAs are responsible for ensuring that education and training activities within field are properly conducted and of a high quality.

In the case of the two-year, mid-level worker ECT qualification there is currently only one legislated ETQA that fulfils the above role. This ETQA is the

Health Professions Council of South Africa (HPCSA) via their Professional Board for Emergency Care Practitioners (PBECP) (HPCSA 2005:1). It must, however, be acknowledged that the National Department of Health (NDoH) has also been substantially involved in the development and quality assurance of mid-level worker training through the establishment of the principles forum which provides a platform for all of the principal of the provincial training colleges offering or intending to offer the ECT programme.

Things are somewhat different when it comes to the four-year professional Bachelor Degree (EMC) programme and also the ECT when it is offered by one of the Higher Education Institutions. In such a case, the role-players involved in accreditation and quality assurance are not only the HPCSA/PBECP, but now also include the Higher Education Quality Committee (HEQC) and to a certain extent the Department of Education (DoE).

2.8.2.4 Providers

The South African Qualifications Authority define a provider as "An education and training body (institution/organisation, company, centre, collaborative partnership, or consultancy) which delivers learning programmes that culminate in specified NQF standards or qualifications and manages the assessment thereof" (SAQA 2009b:Online). Medical care is a regulated profession; it is illegal for any party to function as a provider within the emergency care field unless the provider has been inspected and accredited by the HPCSA. Both the ECT (NQF 5) and BHS EMC (NQF 8) programmes fall within the Emergency Care Field and Higher Education Band (levels 5-10) of the NQF. This means that all providers wishing to offer either of these programmes should be registered with the DoE as Higher Education Institutions in addition to being accredited by the HPCSA. Currently with regard to the offering of the ECT programme this is not the case as none of the provincial college offering the ECT programme have yet received DoE accreditation to function as Higher Education Institutions. These colleges are currently offering the ECT programme on provisional accreditation

by the HPCSA/PBCEP. The Cape Peninsular University of technology is currently the only HEI offering the ECT programme.

At the time of writing providers of the ECT programme are as indicated below:

1. North West Province Emergency Medical and Rescue College situated in Orkney within the North West Province.
2. Lebone College of Emergency Care (Gauteng Provincial College) situated in Pretoria within the Gauteng Province.
3. Kwazulu Natal Provincial Emergency Medical and Rescue College situated in Pinetown within the Kwazulu Natal Province.
4. Limpopo Provincial Emergency Medical and Rescue College.
5. The South African Military Health Services Training Academy situated in Thaba Tshwane Gauteng with two satellite campuses: one in Bloemfontein in the Free State province and the other in Simonstown in the Western Cape Province.
6. The Cape Peninsular University of technology (*currently the only HEI offering the ECT programme) situated in Bellville in the Western Cape Province.
7. The Free State Emergency Medical and Rescue College.

The current and future providers of the B EMC programme are indicated below:

1. University of Johannesburg (UJ) situated in Johannesburg in the Gauteng Province.
2. Central University of Technology (CUT) situated in Bloemfontein in the Free State Province.
3. Durban University of Technology (DUT) situated in Durban in the Kwazulu Natal Province.
4. Cape Peninsular University of Technology (CPUT) situated in the Western Cape Province.

- * Both the University of Johannesburg and the Durban University of technology are exploring the option of offering the ECT programme in future.

2.8.2.5 Qualification types

The HEQF currently lists of the following nine qualification types:

Undergraduate

- Higher Certificate
- Advanced Certificate
- Diploma
- Advanced Diploma
- Bachelor's Degree

Postgraduate

- Postgraduate Diploma
- Bachelor Honours Degree
- Master's Degree
- Doctoral Degree

The name of the mid-level worker ECT qualification as currently registered with SAQA is **National Certificate in Emergency Care**. The ECT qualification fits in within the undergraduate type of qualification listed above. However, although the qualification names "*Certificate*" and "*Higher Certificate*" appear in the new HEQF, the name "*National certificate*" does not. Therefore, the ECT qualification currently has a SAQA registered name that does not appear in the new HEQF. This will need to be addressed via the SGB in the near future. Again it must be mentioned that, at the time of writing, the Higher Education Qualifications Framework (HEQF) in South Africa is being revisited and it would

appear as if the name of the ECT qualification is set to change from a "Certificate" to a "National Diploma".

The name of the Professional practitioner qualification as registered with SAQA is **Bachelor Degree in Emergency Medical Care**. As can be seen from the above list of qualification types, reference to Bachelor's Degree appears in both the undergraduate and postgraduate groupings. The undergraduate bachelor degree types are normally three years' qualifications. The postgraduate grouping refers to a Honours Bachelor's degree and it is at this level that the four-year professional B EMC degree fits in.

2.8.2.6 *Fields and designators*

Both the ECT and B EMC qualifications are registered with SAQA under the field 09 - Health Sciences and Social Services. A designator also describes a generic field of study and is usually stated in the qualification name. For example, a Bachelor of **Science** degree is a designator of the generic Bachelor's degree. Such designators apply only to degrees and not to certificates or diplomas.

Taking this into account it is worth noting that as a certificate qualification the ECT qualification cannot have a designator. Whilst it would have been possible to have a designator for the B EMC qualification, the SAQA registered qualification title also does not have any designator. However, certain of the universities applying to the DoE and HEQC to offer the qualifications are using the Bachelor of Science (BSc) designator, making their qualification name a BSc in Emergency Medical Care. As mentioned above, at the time of writing, the title of the Bachelor Degree in Emergency Medical Care as lodged with SQAQ (B EMC) may in fact change to Bachelor of Health Sciences in Emergency Medical care (BHS EMC).

2.8.2.7 Sub-fields and qualifiers

It is noted that the sub-field currently linked to the ECT qualification is "*curative health*" whereas the subfield linked to the B. EMC. qualification is "*preventative health*". The reason for this difference is not apparent, remains unexplained, and may quite possibly have been erroneously captured during the registration process. Qualifiers are also used in all qualification types in order to indicate a sub-field of specialisation. The Council for Higher Education (CHE) determines all primary qualifiers for bachelor's degrees, honours and master's degrees. It is possible for institutions to add secondary qualifiers. In order to use a qualifier, at least 50% of the minimum total credits for the qualification and at least 50% of the minimum credits at the qualification's exit level must be in the field of specialisation denoted by the qualifier.

The qualifier for the mid-level worker programme is ***Emergency Care***. The qualifier for the professional degree is ***Emergency Medical Care***. The difference between emergency care and emergency medical care is ill-defined and the subject of ongoing debate. Some feel that emergency medical care refers to higher levels of education or to professional clinicians providing specialised medical treatment in an emergency whilst emergency care is a lower level of training focused on interventions ranging from the activities of first aiders or lesser-qualified individuals.

2.8.2.8 ABET bands

Abet is an acronym for Adult-based education and training (ABET). Adult learning deals with the education of adults to fulfil their roles as educators, workers, citizens and parents (Erasmus & Van Dyk 2003:128). The Adult Basic Education and Training Act, Act 52 of 2000,) under the auspices of the National Training Board, regulates adult learning. Adult basic education refers to education and training provision for people over the age of 15, not engaged in formal schooling or higher education and who have an educational level of less

than grade nine (Aitchison 1997:Online). ABET includes training in: language, literacy and communication; mathematical literacy; natural sciences, art and culture; life orientation; technology; economic and management science; small, medium and micro enterprises and tourism. As formal higher education qualifications, neither the ECT nor the B EMC programmes have defined ABET bands.

2.8.2.9 Credits

To understand the concept of an education credit one must also understand the idea of notional learning time. A notional hour of learning time is the time it would conceivably take the average learner to achieve a defined learning outcome. Notional learning hours includes contact time, time spent in structured learning in the workplace, and individual learning (CHE 2009:36).

A credit is a set value assigned to a given number of notional hours of learning. Currently one SAQA credit is equivalent to 10 notional learning hours. Most Higher Education programmes in South Africa are therefore divided into multiples of 120 credits, with 120 SAQA credits being approximately equivalent to one year of full-time study (CHE 2009:13-14). Certificate, Diploma, Bachelor's Degree and Honours Bachelor Degree qualification types assume a 30-week full-time academic year (RSA DoE 2007:8). Both the ECT and B EMC programmes are no exception to this rule. The ECT programme is currently 240 credits or 2400 Notional hours. This roughly translates to two academic years of full-time study. The BHS EMC programme is 480 credits or four years of full-time study. The learning time for the ECT is around half of that for the professional degree; this is in line with most mid-level worker programmes (Dovlo 2004:1:Online).

It is also worth mentioning at this stage that although the ECT programme was written up by the HPCSA as SGB and lodged with SAQA as a two-year programme with an exit level at 240 credits the newly promulgated Higher

Education Qualification Framework does not make provision for 240 credit exit level qualifications. This may pose a problem when trying to articulate the programme with qualifications such as the B EMC, which are aligned to exit levels of the new HEQF. Another potential mismatch between the ECT and the B EMC qualifications lies within the scope of practice. Here it is noted that although the ECT is a mid-level worker programme and only half of the credits and learning time of the Professional B EMC degree, the scope of practice of the mid-level graduate is not that far off that of the degree practitioner.

2.8.2.10 NQF levels

As alluded to in Chapter 1, the South African Higher Education and Training landscape has recently been realigned. Part of this realignment saw the introduction of a new Higher Education Qualifications Framework, which came into effect on 1 January 2009 (RSA DoE 2007:8). It was felt that this new framework would allow for easier articulation of programmes and transfer of students between programmes and higher education institutions than the old framework, which had separate and parallel qualifications framework structures for Universities and Technikons.

The Education White Paper 3: *A Programme for the Transformation of Higher Education* (1997) supports the need for a single qualifications framework applicable to all higher education institutions. Whereas the old HEQF featured an 8-level NQF, the new HEQF sees 10 NQF levels. The 10 level NQF is presented in table 2.1

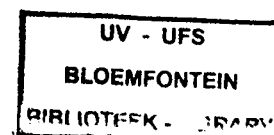


TABLE 2.1 The 10 level NQF (The ECT is currently a level 5, the B EMC at level 8)

NQF Level	Descriptions of qualifications	Providers
Higher Education and Training Band		
10	Doctoral Degrees	Universities & Universities of Technology
9	Master's Degrees	Universities & Universities of Technology
8	Post Graduate Diplomas, Honours Degrees, Professional four-year Bachelor Degrees	Universities & Universities of Technology
7	Bachelor Degrees	Universities & Universities of Technology
6	Diplomas, Advanced Certificates	Universities & Universities of Technology
5	Higher Certificates	Universities & Universities of Technology, Public FET colleges
Further Education and Training Band		
4	National Senior Certificates	Secondary Schools, Public and Private FET Colleges
3	Occupationally directed qualifications	Secondary Schools, Public and Private FET Colleges
2	Occupationally directed qualifications	Secondary Schools, Public and Private FET Colleges
General Education and Training		
1	Senior Phase (ABET 4), Primary and Secondary Schools Grade 7-9	Public & Private Schools, NGO ABET Centres, Employer Provider programmes
	Intermediate Phase (ABET2-3), Primary School Grade 4-6	Public & Private Schools, NGO ABET Centres, Employer Provider programmes
	Foundation Phase (ABET1), Primary School Grade 1-3	Public & Private Schools, NGO ABET Centres, Employer Provider programmes

As indicated in table 2.1, the new National Qualifications Framework has 10 levels. All Higher education qualifications now reside on level five to ten of the NQF. These are further divided into undergraduate (Levels 5-7) and postgraduate (level 8-10).

Deciding which level of the NQF a particular qualification should reside on required a comparison of the nature and complexity of the learning

achievements to the level descriptors of the NQF. Level descriptors provide guidelines for differentiating the varying levels of complexity of qualifications on the framework. The positioning of two or more qualifications on the same NQF level indicates that the qualifications are broadly comparable in terms of the general level of learning achievements.

The ECT and B EMC qualifications were both lodged with SAQA prior to 1 January 2009 when the new 10 level NQF came into effect. The old NQF only featured 8 levels with the ECT at NQF level 5 and the B EMC degree at NQF 7. In line with the new NQF the B EMC is now appearing as NQF level 8 (SAQA 2009c: Online). The ECT is, however, still currently placed at NQF level 5; it should, subject to review, become a level 6 on the new NQF.

The generic level descriptor for the NQF level five qualifications (such as the ECT) states these qualifications are seen as *entry-level* higher education qualifications. These qualifications are mostly vocational, or industry oriented. NQF 5 qualifications deal with basic introductory knowledge, cognitive and conceptual tools and practical techniques required for further higher education studies in the chosen field of study. There is a strong emphasis on general principles and application.

Achieving an NQF level 5 qualification signifies that the student has attained a *basic level* of higher education knowledge and competence in a particular field or occupation and is capable of applying such knowledge and competence in an occupation or role in the workplace.

The Higher Certificate typically includes a simulated work experience or work integrated learning (WIL) component (RSA DoE 2011:1-2). Whilst some of the above describes the nature of the ECT programme accurately, the scope of practice of the ECT is far from "Basic" and therefore the ECT qualification would arguably be better described and placed as an NQF 6 qualification on the new 10 level structure.

When considering the B EMC degree it can be seen from table 3.1 above that bachelor degrees may reside on either level 7 or 8 of the NQF. The descriptors for these degrees are clearly very different from the current NQF 5 level of the ECT qualification. Bachelor's Degrees such as the BHS EMC at NQF level 8 are often referred to as "professional" Bachelor's Degrees, and have a higher volume of learning and a greater cognitive demand than those on NQF level 7. Some also require a practicum or work-based component.

A professional Bachelor's Degree demands high intellectual independence and development of research capacity in the methodology and techniques of that discipline. A professional Bachelor's Degree is able to articulate directly into a Master's Degree whereas a normal Bachelor's degree leads to an Honours degree and then on to a Master's degree. Professional Bachelor's Degree programmes are often designed in consultation with a professional body (in this case the HPCSA) and recognised by a professional body as a requirement for a licence to practice that profession. Such a qualification requires a thorough grounding in the knowledge, theory, principles and skills of the profession or career concerned and the ability to apply these to professional or career contexts (RSA DoE 1997b:23). The above description is well suited to, and accurately describes, the B EMC qualification.

2.8.2.11 *Qualification class*

There are two main classes of qualification registered with SAQA. One class of qualification is Unit Standards or course based; these qualifications are achieved through the completion of a number of recognised courses or learning units. In South Africa, such learning units are registered with SAQA as Unit Standards. Each Unit Standard has a number of allocated credits. Unit standards are portable and may serve as credits towards more than one qualification. Many qualifications in the USA are course based (CHE 2010:Online).

The ECT and B EMC qualifications are from a different class to that described above as they are neither Unit Standard nor course based; rather both have been lodged with SAQA as "*whole qualifications*" consisting of Exit Level Outcomes and Assessment Criteria (ELOAC) and appear on the SAQA website. Their Qualification Class is therefore registered as "Regular-ELOAC" (SAQA 2009c:Online).

It is more difficult to articulate Unit Standards based qualifications with qualifications that are not based on Unit Standards. The fact that both the ECT and BHS EMC are from the same qualification class is an advantage when it comes to articulation between the two.

2.8.2.12 Purpose and rationale of the ECT and BHS EMC qualifications

As early as 1997 the White Paper on Education mentioned that higher education in general has several related purposes. According to the White Paper it should contribute to and support the process of societal transformation outlined in the Reconstruction and Development Programme (RDP) whilst supporting a vision of people-driven development leading to the building of a better quality of life for all (RSA DoE 1997a:1-15). As both the ECT and B EMC qualifications are offered at the higher education level, these qualifications should ideally support the above concepts.

Jewison (2008:19) in his work on the National Qualification Framework notes that all Qualifications must be "fit for purpose" – in other words, the purpose of the qualification must be stated and the qualification must fulfil a defined purpose or need.

The Higher Education Qualification Framework makes mention of the fact that a Programme should be a purposeful and structured set of learning experiences that leads to a qualification. Programmes may be discipline based,

professional, career-focused, trans-, inter- or multi-disciplinary in nature. All higher education programmes and qualifications must have a core component and may have a fundamental and/or elective component that will depend on the purpose of the programme or the qualification (RSA DoE 1997b:23).

2.8.2.13 *The purpose of the Emergency Care Technician (ECT) qualification*

The ECT has been designed by the HPCSA and NDoH as an entry-level qualification addressing the key competences required of Emergency Care Technicians who are able to work independently in a variety of contexts. This qualification will be particularly useful for individuals wishing to enter the emergency care profession. The qualification may also serve as a vehicle for existing members of the emergency care profession who have only obtained short-course qualifications and who wish to obtain a tertiary (HE) qualification for purposes of career advancement. Graduates from the ECT programme will be able to function in and around the ambulance, within wide ranging contexts, including rural, urban, military, coastal, corporate, mass gatherings, homes and workplaces (SAQA 2009d:Online).

2.8.2.14 *The purpose of the Bachelor Health Sciences Degree qualification*

As the ECT mid-level worker qualification and the EMC degree are from the same discipline, one would expect the purpose of both qualifications to have similarities in their purpose and rationale. This is indeed the case and many of the benefits mentioned above in relation to the ECT qualification are naturally also applicable to the B EMC. However, as a four-year professional bachelor degree is at a higher NQF level than the ECT, the purpose of the B EMC programme should be significantly different. In the purpose statement of the B EMC qualification, we can begin to see these differences.

According to SAQA the purpose of this B. EMC. qualification is to develop a learner competent in the knowledge, attitude, insight and skills required for the emergency medical care and rescue professions. Here we see the appearance of two words not used in the ECT purpose statements, the one being the word emergency "*medical*" care as opposed to just emergency care.

As mentioned above, the difference between emergency care and emergency medical care is ill-defined and the subject of ongoing debate. Some feel that emergency medical care refers to higher levels of education or to professional clinicians providing specialised medical treatment in an emergency whilst emergency, care is a lower level of training focused on interventions ranging from the activities of first aiders or lesser-qualified individuals.

Having said this, the ECT qualification is far removed from even the most advanced first-aid course. The second word that is unique to the B EMC purpose statement is "*rescue*". This provides a clue as to the dual nature of the B EMC degree programme which focuses not only on the medical management of the patient but also on the specialised technical rescue of patients from a variety of contexts. Although there is rescue training within the ECT programme, it takes the shape of a small elective (24 credits) focusing on three foundational rescue modules (High Angle Rescue, Fire Search and Rescue and Motor Vehicle Rescue).

The following exit-level competencies are documented in the B. EMC. SAQA submission, which further allude to the more advanced and specialised nature of the B. EMC. Degree, in comparison to the ECT qualification:

Provide independent, specialised emergency medical care and rescue services to all sectors of the community. The key words *specialised*, emergency *medical* care and *rescue* seen in this outcome do not appear in the outcomes of the ECT.

Apply management, education and research skills during independent practice and function in a supervisory, clinical governance and/or quality assurance capacity within emergency services and healthcare environments.

As a mid-level worker NQF level qualification the ECT qualification does not currently deal with *management*, *research* or *education* to any significant extent. These types of outcomes are normally associated with higher levels of NQF. Graduates from the B EMC professional degree exiting off NQF level 8 would be expected to fulfil these roles within the profession.

2.8.2.15 *Rationale for the ECT qualification*

As mentioned in Chapter 1, the ECT qualification is designed to produce a mid-level worker who will provide emergency care services primarily within local contexts that range from rural, disadvantaged communities to sophisticated, highly technological urban areas.

The ECT graduate should take cognisance of South African history and be able to adapt to the unique circumstances of a changing South Africa with emphasis on equity in health care and reduction of burden of disease (SAQA 2009d: Online).

Besides defining the competences needed by the Emergency Care Technician (ECT), the ECT qualification should also provide the necessary foundational knowledge, skills and insights needed to form a platform for further study in the field of Emergency Care. The qualification is thus designed to enable learners to pursue further personal and professional development and to promote life-long learning. The extent to which this is achievable is in fact a central theme of this study concerning the way in which articulation between the ECT with the B EMC degree, may be facilitated.

2.8.2.16 Rationale for the EMC qualification

According to (SAQA 2009c:Online) the B EMC qualification is designed to produce professionals who are independent clinical practitioners and rescue specialists within the emergency medical care and rescue environments.

Again, when analysing and comparing the rationale for the ECT and B EMC one can see the appearance of key words that clearly differentiate the B EMC from the ECT qualification. Graduates from the B EMC are seen as being responsible for not only medical management of patients but also for participating *research*, *innovation* and *management* within the profession.

Simply put the ECT is designed (as the name implies) to produce "technicians", the focus being the provision of protocol-driven emergency care to ill and injured patients. ECTs, by following approved protocols will be able to manage a vast number of everyday emergency cases independently. However, there will be patients who are critically ill or injured and who require *specialised medical* interventions that fall outside of the scope of practice of the ECT as a mid-level worker. These specialised clinical interventions will necessitate the attendance of Emergency Care Practitioners (ECPs) operating not as "technicians" but rather as "clinicians". ECPs will function as clinical decision-makers and will have the ability to not only use, but also to inform medical protocol.

A clear understanding of the noteworthy differences between "clinicians" and "technicians" or, "mid-level workers" and "professional practitioners" becomes central to the design of a framework that seeks to provide a pathway for the ECT "technician" to become an ECP "clinician". There is a tendency within the emergency care profession to oversimplify this issue and fixate purely on differences in scope of practice. Such an approach is both superficial and simplistic, as it does not take into account the fact that both the ECT and B EMC are higher education qualifications, which are designed to provide holistic

learning experiences leading to exit-level outcomes that differ significantly. These differences go far beyond just the medical scope of practice of the graduates.

2.8.2.17 *Benefit to holders of the ECT qualification*

According to the SAQA submission, the ECT qualification provides an entry point to the career path of emergency care services while opening doors for employment and providing mobility for the individual to move between different areas within emergency care.

The qualification provides for holistic development of individuals and the competencies required to do the job. The NDoH has identified the emergency care profession, as a focus area for future growth and development. There is currently a national and international shortage of qualified emergency care personnel and therefore many job opportunities exist within this field.

Taking into account the current shortage of jobs in South Africa, a qualification such as the ECT within the Emergency care field is becoming both sought after and lucrative. In fact, it is specifically this dire shortage of qualified emergency care personnel that prompted the NDoH to develop the ECT "mid-level worker" qualification.

2.8.2.18 *Benefit to holders of the B EMC qualification*

Holders of the B EMC will be able to register with the HPCSA as independent practitioners on a separate register to the existing paramedics and ECTs. They will enjoy a larger clinical scope of practice and will be able to occupy governance and management roles within the service. Graduates from the B EMC programmes will also be qualified rescue technicians and will be able to form part of elite specialised rescue teams.

2.8.2.19 *Benefit of the ECT qualification to the emergency care profession*

Within South Africa, the idea of introducing "*mid-level worker*" qualifications created a certain amount of "angst" within many of the well-established health professions such as medicine, dentistry and optometry. There were members of the local health sector that saw mid-level worker programmes as a quick-fix, sub-standard substitute for properly qualified professionals. The real "benefit" of having a mid-level worker programme within an established medical profession is still the source of heated debate.

The benefit of having the ECT qualification within the emergency care profession was recognised immediately by many senior members of the profession. This is most likely because the ECT qualification could replace the existing short courses, which were not able to articulate meaningfully within the profession. The ECT qualification is currently therefore seen to be of potential benefit to the emergency care profession for the following reasons:

- It provided a consistent and coherent foundation for practice at an entry level and progression within the profession in the context of a national qualifications framework. This was not the case with the short-course system of training.
- It provided a means for the critical function of formal certification and registration within the profession, thus ensuring society is served by competent Emergency Care Technicians.
- It helps to legitimise the ALS level of practice in particular, as well as the profession as a whole.
- It provides a comparable benchmark within the health profession as a whole.

- It should lead to a reduction in the burden on other health structures and practitioners. This concept is central to the rationale for mid-level workers in any of the health domains.
- It should lead to a reduction in the number of disciplinary occurrences that take place due to inadequate or inappropriate training. The HPCSA is the legislated body that has to deal with complaints from the public regarding practitioners who have delivered sub-standard levels of care. The HPCSA has identified a need for better-qualified practitioners to reduce the number of complaints being received and to enhance the societal image of the profession through improved quality of emergency care services.
- It should promote emergency care as a preferred career option as well as to encourage individuals within the profession to enhance and develop the profession itself through their own innovation.
- It will help in the planning, implementation and monitoring of continuing professional development and provide alignment to other health care professions with regard to a more equitable basis for remuneration.

2.8.2.20 *Benefit of the B EMC qualification to the emergency care profession*

This qualification will provide the profession with members who are empowered to not only provide a high level of clinical care, thereby elevating the status of the profession, but who can also through research and development provide management, clinical governance and guidance to the profession as a whole.

2.8.2.21 *Benefit of the ECT qualification to society*

The two key benefits of the ECT qualification to society are that:

- (i) Sick and injured members of the public are attended to by competent Emergency Care Technicians, thus increasing their chances of survival and hastening their recovery. This will reduce the cost of health care and hospitalisation through the more efficient use of resources. With a decreased burden on health structures, there are resultant benefits to allied services that are trying to meet EMS needs due to current inadequacies in competencies, e.g. reduced contamination of crime scenes; how to give evidence in court; and issues related to child abuse.
- (ii) Given South Africa's role as one of five developing nations, this qualification may provide a benchmark for the African continent.

2.8.2.22 *Benefit of the B EMC qualification to society*

Graduates from the B EMC qualification are uniquely empowered to operate as independent clinicians and in so doing render a higher level of specialised pre-hospital medical care to critically ill and injured patients. Furthermore, the overall management of the emergency services will be improved through the quality assurance activities of degree graduates working within the service.

2.8.2.23 *Recognition of previous learning (RPL)*

Recognition of prior learning (RPL) is a concept and idea that has received much attention within the South African education and training environments post democracy in 1994. Prior to this point, the apartheid policies of the government of the day severely discriminated against non-white people when it came to accessing higher education. Many of these previously disadvantaged individuals did not have equal opportunities to complete schooling or study

further. Rather, they were absorbed into the labour force - mostly in low positions with poor pay.

Post 1994, RPL is regarded in South Africa as one of the means whereby equity and redress for past inequalities can be promoted. The introduction of the concept of RPL was legislated in the Higher Education Act (Act No. 101 of 1997) and was highlighted in the White Paper on Higher Education (White Paper 3 of 1997). The recognition of prior learning should thus enable potential students, including those who had suffered disadvantage in the past to be admitted to higher education programmes depending on their assessed knowledge and skills (RSA DoE 1997b, c).

RPL is an educational concept that is well recognised locally and internationally. There are many definitions for RPL and/or the concept of RPL. Table 2.2 below shows the commonly used abbreviations applicable to the concept of RPL internationally.

TABLE 2.2 Abbreviations for RPL Internationally

Term/abbreviation	Country
APCL Assessment of Prior Certificated Learning	UK
APEL Assessment of Prior Experiential Learning	Southern Ireland
APL Assessment of Prior Learning	UK
PLA Prior Learning Assessment	Canada and USA
PLAR Prior Learning Assessment and Recognition	Canada
RPL Recognition of Prior Learning	Australia and RSA

The Council for Higher Education (CHE) sees RPL as the formal identification, assessment and acknowledgement of the full range of a person's knowledge,

skills and capabilities acquired through formal, informal or non-formal training, on-the-job or life experience (CHE 2004a:20).

SAQA also clearly indicated that all qualifications registered should be able to be achieved in whole or in part through the RPL, which includes learning outcomes achieved through formal, informal and non-formal learning and work experience. The approach to the Recognition of Prior Learning must reflect the objectives and principles of the NQF and must be in line with the SAQA policy document (SAQA 2005:11).

Support for RPL is also seen in a number of other pieces of South African Legislation. *The Employment Equity Act (Act 55 of 1998)* describes affirmative actions to be taken to ensure equal opportunities on all levels for historically disadvantaged citizens. This act describes a 'suitably qualified person', as a person who qualifies as a result of not only formal qualifications but also **prior learning** and relevant experience.

The *Skills Development Act (Act 97 of 1998)* highlights the need for providers of education, such as the University, together with the Higher Education Quality Assurance (HEQA), to implement RPL so as to ensure that the goal of education for social development is achieved.

RPL within the HE sector involves the 'comparison of previous learning and experience' by a learner, 'howsoever obtained, against the learning outcomes required for a specified qualification, and the acceptance of such learning for purposes of qualification of that which meets the requirements' (University of Johannesburg 2011:2). Therefore the main purposes of RPL at a University is to recognise all forms of prior learning in order to provide wider access to learning programmes, allow for advance placement within a learning programme and to advance mobility and progression within learning programmes.

The above literature supports the link between RPL and academic articulation, which is the focus of this study. Therefore, any framework that is designed to facilitate articulation between the ECT and B EMC programmes will have to take into consideration the role of RPL in the articulation process. RPL will not only be an important factor in the progression from the ECT into the B EMC programme but will also have to be taken into account for persons who hold short course qualifications and who wish to have access to, or achieve advanced placement, into either the ECT or B EMC qualifications.

2.8.2.24 *Assessment of prior learning*

There are two main components to RPL. The first is the ability for students through RPL to be accredited with certain learning achievements. The second is the assessment of students through RPL to gauge their potential for entry to a specific learning programme. In the context of this study if the prior learning of ECTs as mid-level workers is going to be considered for purposes of access, articulation and advanced placement into the B EMC Programme, then there must be some form of assessment of these prior learning outcomes.

SAQA in their comment on the National Qualifications Framework and Curriculum Development (May 2000) note that society needs to be reassured that if a learner has been awarded a particular qualification, there is a guarantee that that learner has indeed demonstrated applied competence in the specific skills and content areas. If one accepts that achievement of learning outcomes is possible through a variety of learning programmes, then the real challenge lies in the evaluation of the learning programme development, delivery and assessment i.e. how effective is the learning programme and assessment that has taken place in ensuring that the degree of excellence specified in the qualification has been met (Illeris 2007:84-95).

The above comment by SAQA becomes extremely valid as it implies that a key factor from an articulation perspective is to establish the extent to which the

providers offering the ECT programme are only graduating persons who have met with the exit-level outcomes of the qualification. This is in contrast to an approach where one merely assumes that as they have the ECT qualification they have achieved all the exit level competencies.

2.8.2.25 Access to the ECT and B EMC qualifications

In a developing country such as South Africa, the need to widen access to higher education is balanced against the need to ensure that persons entering the higher education system have the necessary foundational knowledge and academic potential to be successful.

According to the Council for Higher Education the decision to admit students to higher education programmes is the responsibility of higher education institutions (RSA DOE 1997c). Admissions policies of the respective higher education institutions (HEIs) must in turn be consistent with the Act. Therefore, whilst the NQF aims to facilitate access and articulation, this does not mean that learners should assume that progression and/or admission to specific programmes is ever guaranteed.

Taking the above into account, deciding on the minimum admission/entry criteria for a programme becomes a challenge for higher education providers as they try to balance the need to provide wider access with the need to ensure academic success.

One of the measures of academic success both locally and internationally is the number of students who graduate within the minimum time. This would be 2 years in the case of the ECT Certificate and 4 years for the B EMC degree. Haug and Tauch (2001:Online) in their work on trends and issues in learning structures in higher education in Europe comments that in many countries is a governmental push towards the reduction of the real duration of studies. Denmark and Austria seem to disagree about who has the "slowest" students

on earth, graduating after some seven to eight years from courses that last officially only four or five years.

A similar problem has long been reported from Germany, Italy (only one third of those registering for the Laurea complete it, of which only 11% graduate in time), the Netherlands and France (only about one third of students completing a Maîtrise do so in just the planned four years).

Whilst there are many things that may affect drop out, throughput and time taken to graduate, one of the accepted factors remains the academic foundation of the student entering the system.

In South Africa, the minimum admission requirement to new programmes from 1 January 2009 is the National Senior Certificate as published in the Government Gazette, Volume 481, No 27819, July 2005. The Department of Education states that these are the minimum admission requirements that should be used for Higher Certificate, Diploma and Bachelor's Degree Programmes requiring a National Senior Certificate (*Government Gazette, Volume 482, No 27961, August 2005*). These criteria are briefly discussed below in the context of the ECT and B ECM qualifications.

Higher Certificate (ECT)

According to the DoE, the minimum admission requirement is a National Senior Certificate (NSC) as certified by the Council for General and Further Education and Training (Umalusi). Institutional and programme needs may require appropriate combinations of recognised NSC subjects and levels of achievement. According to SAQA it is assumed that the persons wishing to gain access to the ECT programme have a Grade 12 qualification or recognised equivalent with NQF level 4 mathematical literacy, or mathematics, literacy skills and Life Sciences and are able to use information technology to access, present, record and disseminate information (SAQA 2009d:Online).

Bachelor's Degree (B EMC)

In contrast with the above, the minimum admission requirements for degree studies are more demanding with the minimum being a National Senior Certificate (NSC) as certified by Umalusi with an achievement rating of 4 (Adequate Achievement, 50-59%) or better in four subjects chosen from the recognised 20-credit NSC subjects.

As mentioned previously whilst Satisfactory Achievement in four designated NSC subjects provide the primary basis for admission to a Bachelor's Degree programme. An educational institution is however entitled to specify an appropriate level of subject achievement for a particular programme

According to SAQA the learning assumed to be in place for persons wishing to enrol for the B EMC degree is specific knowledge within the health sciences field including knowledge of communication, information technology and sciences at NQF Level 4.

In line with the above, persons accessing this qualification must have an NSC (Grade 12) or a recognised equivalent qualification at NQF Level 4, or in accordance with the selection policy of the National Department of Education and the respective educational provider. In addition, learners will have passed Mathematics or Mathematical Literacy and Physical Sciences or Life Sciences at NQF Level 4 (SAQA 2009c:Online).

The fact that the ECT Certificate has lower academic admission criteria than that required for the B EMC means that the ECT becomes an important vehicle for increasing access to the profession. Persons who would not initially have gained access into higher education within the emergency care field now have an option of completing the ECT as a mid-level worker programme.

Graduates from the ECT mid-level worker programme would then have a foundational qualification at the NQF 5 level. This could potentially allow them to gain access into other higher education programmes such as the B EMC - which they would not initially have qualified for on the basis of their existing NSC/Grade 12/NQF 4 results. How this access and articulation could work and the degree to which the ECT qualification allows for access (and possibly advance placement) into the B EMC degree remains the central focus of this study.

2.8.2.26 Qualification rules

Qualification rules refer to requirements that are legislated and that need to be met in order to have the qualification awarded. For the B EMC qualification, the rules state that students need to achieve all the credits (480) for both the fundamental and core components of the qualification. There are no electives in this qualification. The qualification is competency based. Notional hours will include both theoretical and clinical competencies as required by the Professional Board for Emergency Care Practitioners (SAQA 2009c:Online).

In the case of the ECT qualification, the qualification rules state that the student must achieve the Fundamental components (16 credits), the core component (200 credits) as well as one of the four Electives (24 credits).

2.8.2.27 Exit level outcomes (ELOs)

Exit level outcomes are a description of what a student will be able to do after they have successfully completed a learning unit or learning event.

In an outcome-based education (OBE) system such as that which has been adopted by the DoE in South Africa, learning outcomes are first determined and then a curriculum is designed to support learning events all of which should lead to achievement of the defined exit-level outcomes. Exit-level outcomes of

a qualification, therefore, are crucial and provide a good idea of the nature and structure of a learning programme.

The exit-level outcomes of the ECT qualification as registered with SAQA are as follows:

1. Communicate with patients, colleagues and other services through oral, written and electronic media (10 credits).
2. Promote awareness of HIV and AIDS in self and among others (6 credits).
3. Demonstrate understanding of the structure and function of Emergency Medical Service (EMS) systems in South Africa and how the EMS relates to the broader health-care structures within the country (4 credits).
4. Demonstrate understanding of and apply the principles of medical ethics, professional behaviour and the legal framework to the context within which the emergency care provider operates (10 credits).
5. Maintain personal health, wellness and safety (10 credits).
6. Demonstrate knowledge and understanding of clinical gross human anatomy (20 credits).
7. Demonstrate understanding of fundamental human physiology and bioprocesses (20 credits).
8. Demonstrate understanding of fundamental integrated sciences underpinning emergency care (30 credits).
9. Provide clinical emergency care independently within an EMS environment (66 credits).
10. Perform clinical assessment and clinical decision making, and provide treatment for minor injuries and minor ailments in specific controlled circumstances (30 credits).
11. Carry out operational routines within an Emergency Medical Services environment (10 credits).

Electives

1. Perform medical rescue in selected contexts: (24 credits).
2. Provide support in specialised transport of patients: (24 credits).
3. Carry out call taking and dispatch in an emergency communication centre (24 credits).
4. Provide emergency care within a military environment: (24 credits).

Critical cross-field outcomes

- Identify and solve problems using critical and creative thinking in relation to the assessment and treatment of patients.
- Work effectively with others as a team, group, organisation and community within the context of providing emergency care and supporting other services.
- Organise and manage oneself and one's activities responsibly and effectively in the preparation for emergency care as well as during the provision of emergency care.
- Collect, analyse, organise and critically evaluate information for the assessment and treatment of patients.
- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation, particularly through reports and the handover of patients to other services.
- Demonstrate cultural and aesthetic sensitivity in dealings with patients, colleagues and communities.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
- Demonstrate ethical and professional behaviour in relation to personal conduct, and interactions with patients, colleagues and other services.
- Lay the foundation for life-long learning and ongoing competency.

The exit-level outcomes of the B EMC qualification as registered with SAQA are as follows:

1. Demonstrate effective communication and apply the principles of medical ethics, professional behaviour and the legal framework to the context within which emergency care practitioners operate while maintaining personal health, wellness and safety (20 credits).
2. Practice, supervise and facilitate the provision of emergency medical care to all sectors of the community utilising specialised strategies and technologies (200 credits).
3. Perform medical rescue in a wide range of rescue contexts (120 credits).
4. Demonstrate knowledge and understanding of human and basic sciences underpinning emergency medical care (100 credits).
5. Provide in-service education and training in emergency medical care and rescue (8 credits).
6. Demonstrate an understanding of the management, structure and function of Emergency Medical Service (EMS) systems in South Africa and provide operational and clinical supervision within an emergency medical and rescue service (12 credits).
7. Develop research skills and conduct research in emergency medical care and rescue (20 credits).

Critical Cross-Field Outcomes:

- Identify and solve problems using critical and creative thinking in relation to the assessment and treatment of patients.
- Working effectively with others as a member of the team, group, organisation and community within the context of providing emergency care and supporting other services.
- Organise and manage oneself and one's activities responsibly and effectively in the preparation for emergency care as well as during the provision of emergency care.

- Collect, analyse, organise and critically evaluate information for the assessment and treatment of patients.
- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and or written presentation, particularly through reports and the handover of patients to other services.
- Demonstrate cultural and aesthetic sensitivity in dealing with patients, colleagues and communities.
- Demonstrate effective use of science and technology, showing responsibility towards the environment and health of others.
- Demonstrate an understanding of the world as a set of related systems by recognising that the problem-solving contexts do not exist in isolation.
- Demonstrate the need for continuous professional development and life-long learning.

When looking at the exit level outcomes, one can clearly see both similarities and substantial differences between the ECT as a mid-level worker programme and the B EMC as a professional degree. It was also clear that there are indeed a number of similarities in terms of the expected assessment criteria between the two qualifications. Notable differences include the appearance of assessment criteria linked to education, management and research in the Bachelor Degree. Furthermore, it is apparent that although there are a number of learning areas, outcomes and assessment criteria that appear similar or are repeated in both qualifications, the depth at which these are dealt with differs between the two qualifications. Such differences are in line with and supported by the different NQF levels of the two qualifications

2.8.2.28 *Presence of electives*

There are currently no formal electives in the Bachelor degree. Having said this, the research project that is required to be completed in the final year of study may be considered by some to be a form of elective as the topic of the research is selected by the students.

Students on the ECT programme have the option of taking one of following three electives:

1. **Rescue elective** - consisting of a) introductory rope rescue, b) fire search and rescue and c) motor vehicle rescue.
2. **Military elective** – focusing on emergency care within a combat/military environment.
3. **Specialised transport elective** – focusing on the intensive care transportation of patients between medical facilities.

2.8.2.29 *International comparability*

The ECT qualification was compared to the United States qualifications for an EMT-Paramedic which are established by United States Department of Transportation National Highway Traffic Safety Administration.

The USA has been a world leader in establishing EMT standards since The National Highway Traffic Safety Administration (NHTSA) assumed responsibility for the development of training courses that are responsive to the standards established by the Highway Safety Act of 1966 (amended). These training courses are designed to provide national guidelines for training. NHTSA's intention is that they be of the highest quality and be maintained in a current and up-to-date status from the point of view of both technical content and instructional strategy. The EMT-Paramedic: National Standard Curriculum represents the highest level of education in EMS pre-hospital training (United States Department of Transportation 2011:Online).

The US EMT-Paramedic certificate course typically is a 1000 - 1200 hour course. Students follow the one-year paramedic programme, which consists of classroom instruction, clinical, field, and skills training. Successful completion of the programme prepares students to take the National Registry EMT-P

certification examination (United States Department of Transportation 2011:Online).

The South African four-year, full-time professional Bachelor of Health Sciences Degree becomes more difficult to compare internationally as many of the paramedical "degree" programmes are of a more generic nature. A limited number of colleges offer a four-year Bachelor of Science in Emergency Medical Services (BSEMS). The bachelor's degree requires 128 semester hours of course work and is completed as an adjunct to the primary paramedical training liberal arts core courses as well as 51 hours of paramedic course work. Students going for the BSEMS will focus on concentration areas such as Emergency Medical Services Administration, Emergency Medical Services education, or Upper level EMS Clinical Courses during their third and fourth year of school. Many students in the clinical concentration use these classes as pre-med classes.

The South African Professional Degree in Emergency Medical Care is similar to a four-year programme in the USA. Educational institutions offering an EMT-P bachelor's degree in the USA must adhere to the United States Department of Transportation National Highway Traffic Safety Administration standards and objectives. The assessment criteria for the different Exit-Level Outcomes are very similar to the objectives stated in the USA's National Curriculum for EMT-P programmes (United States Department of Transportation 2011:Online).

2.8.2.30 *Teaching, learning and assessment practices*

Teaching, learning and assessment practices vary from provider to provider; however, by and large, all training providers involved in both the ECT and B EMC programmes make use of varying degrees of the following didactic methods:

- Contact sessions – face-to-face theory lecturing and instruction

- Tutorial sessions
- Case study presentations
- Clinical portfolios and workbooks
- Classroom practical sessions and laboratory simulations
- Work-integrated learning in the pre-hospital and clinical environments
- Assignments

2.8.2.31 *Articulation options*

For the ECT programme, articulation options include:

- Vertical articulation into the Bachelor degree (how this may occur is the focus of this study).
- Horizontal articulation that is limited to science-related credits in common with other health-related fields.

The B EMC programme serves to provide candidates with the foundational knowledge, cognitive and conceptual tools and practical techniques in ancillary health services and acts as a springboard from which learners may progress to NQF Level 9 qualifications. Horizontal articulation is limited to science-related credits in common with other health-related fields.

2.9 CONCLUSION

The concept of a two-tiered approach with mid-level workers and practitioners is neither unique nor foreign to the health care professions. Although new in the South African Emergency Medical Care environment, mid-level worker programmes have already been in place in a number of other countries (Dovlo 2004:4-9:Online). Literature confirms the importance and value of vocational education in relation to career-pathing, professional development and the motivation experienced by adult learners to study further. The ECT and B EMC degree qualifications are both vocationally-orientated higher education

programmes designed to produce mid-level workers/technicians and clinical practitioners respectively. The MLWs' limited scope of practice and promotional prospects creates a need and desire for ECT graduates to further their studies in order to expand their clinical scope of practice and to prepare them for promotion.

As would be expected, the in-depth comparison of the two-year Emergency Care Technician qualification to the four-year Bachelor degree reveals both a number of similarities as well as significant differences. Although each of the qualifications aims to prepare graduates to function within the pre-hospital emergency care environment, documentary analysis confirms differences in academic architecture, complexity, level and depth. These similarities and differences become very important considerations for those attempting to create a framework or pathway for articulation between the two qualifications. The following chapter will focus on the research design and methods employed in this study.

CHAPTER 3

RESEARCH METHODS AND PROCEDURES

3.1 INTRODUCTION

As mentioned in Chapter 1, the aim of this study was to design a framework for articulation between the Emergency Care Technician (ECT) qualification and the Bachelor of Health Sciences Emergency Medical Care (BHS EMC) Professional Degree. This chapter begins by providing theoretical perspectives on the research design and methods selected for use in this study. This is followed by a more detailed description and discussion of the literature review, documentary analysis, focus group interview and Delphi questionnaire that were applied by the researcher in order to gather, analyse and present the valuable data required for the design of the framework. The chapter concludes by discussing trustworthiness and ethical issues applicable to this study.

3.2 THEORETICAL PERSPECTIVES ON THE RESEARCH DESIGN

3.2.1 Theory building

Selecting an appropriate research design is a critical component of any research process. David & Sutton (2004:35-40) speak of two main designs, *quantitative* and *qualitative*. However, Johnson & Onwuegbuzie (2004:14-26) mention that for over a century proponents of the qualitative and quantitative designs have engaged in heated debate over the relative value and shortfalls of each design. **Quantitative** research methods and designs see the researcher as completely separate from the phenomenon under investigation. In the quantitative paradigm inquiry should be objective. Extrapolation of this concept means that educational researchers should be unbiased and emotionally detached and should not become concerned with the objects of their study (Cresswell 1994:5).

In contrast to the above view, advocates of the *qualitative* paradigm argue that, specifically in the field of social and educational research, generalisations are neither desirable nor meaningful unless they are properly contextualised (Johnson & Onwuegbuzie 2004:15).

In the qualitative paradigm logic flows from specific to general and explanations are derived inductively from the data. This means that the researcher and the subject of the research cannot be separated as the subjective researcher becomes the only source of reality (Guba 1990:1). Whilst qualitative styles of writing are normally passive and detached, qualitative writing styles include rich, thick and detailed description, often written somewhat informally (Babbie & Mouton 2001:1-10). Qualitative designs are also more commonly used for social and educational research activities as they lend themselves more toward the collection and analysis of qualitative data (Babbie 1995:280-281).

Therefore, whilst *quantitative* research focuses mainly on data obtained by measurements, which may be statistically analysed, *qualitative* research on the other hand focuses on investigating and describing a phenomenon as it occurs (Polgart & Thomas 1995:109-110).

More recently a third research paradigm has emerged known as *mixed methods* research. Mixed methods research is defined as a *class* of research where the researcher mixes or combines both qualitative and quantitative techniques in a single study (Creswell & Plano Clark 2007:5).

Using more than one approach may be useful when attempting to better understand a research problem and also in enhancing the validity and reliability of findings (Creswell 1998:20). Mixed methods are seen as expansive and creative based on the primary assumption that research methods should follow the research questions.

Creswell and & Plano Clark (2007:6) and Johnson and Turner (2003:2) all note that there are distinct advantages to the combination of qualitative and quantitative methods in a single study. In line with Creswell (1998) they argue

that the resulting mixtures can assist in strengthening the validity and reliability of findings.

After having considered the above theories against the backdrop of the identified research questions and objectives of this study it was felt that a mixed method design would indeed be most appropriate for this study.

3.2.2 Types of methods

Three main research methods were used in this study. The first consisted of a retrospective literature review and documentary analysis or content analysis (Nieuwenhuis 2007a:101). In mixed-method studies, reviews of existing literature and documents are applied in a way consistent with the overall design and strategy of the study (Creswell 2009:29). Literature reviews also assist in providing a framework for establishing the importance of the research (Creswell 2009:25-29), with an added benefit of providing an unobtrusive source of raw data (Bryman 2004:381-384). The end-result is normally in the form of a "review"-type report (Melville & Goddard 1996:5).

The second research method applied consisted of a focus group interview. Focus group interviews emerged in the 1940s and have since 1980 become popular in the social sciences (David & Sutton 2004:92). In support of this Babbie (1995:84) and Creswell (2007b:124) note that focus group interviews are now a commonly used method for expository research within the qualitative and mixed methods research domains where the researcher wishes to better understand a topic and/or test the feasibility and develop methods for a further study. Focus group interviews are also a useful way of generating and sharing new ideas and obtaining consensus (Bless & Higson-Smith 1995:113)

The third and final method applied in this study consisted of a Delphi questionnaire. The Delphi method involves collecting and distilling judgments of experts using a series of statements or questions (Skulmoski, Hartman & Krahn 2007:Online).

3.2.3 The research design in this study

As alluded to above, to best address the specific aims and objectives of this particular study the researcher decided to make use of an exploratory, mixed-method design of a sequential nature. Such a design is characterised by a qualitative phase of research which is followed by a quantitative phase. Exploratory mixed method designs are useful if one aims to explore a topic using qualitative data before attempting to measure it quantitatively as was in this study - by first employing the Focus group interviews followed by the Delphi method as portrayed in figure 3.1 (Ivankova *et al.*1995:265).

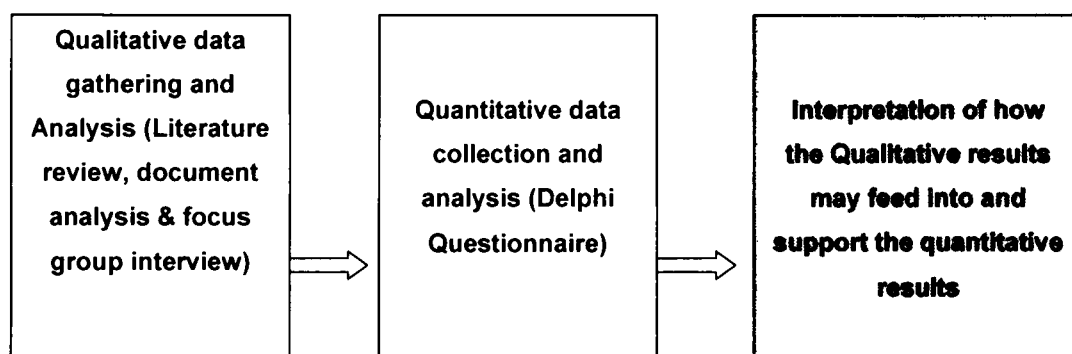


FIGURE 3.1 Linear nature of the exploratory mixed method design used in this study

In figure 3.1 one can see that three distinct methodologies were applied to gather the data, which were used to research the objectives, ultimately leading to accomplishment of the aim. This next section will further outline and describe each of these three methods and their application within the context of the aim and objectives of this study.

3.3 RESEARCH METHODS AND PROCEDURES

In order to contextualise and argue the relevance of the research methods and procedures selected for use in this study, the reader is again reminded of the main research questions which were:

- a) How do the ECT and B EMC qualifications compare with each other in terms of general academic architecture, learning outcomes and educational modes of delivery?
- b) What are the obstacles and challenges that educational managers are likely to face in articulating the mid-level worker ECT with the Professional B EMC Degree qualification?
- c) What would a framework look like that could address the identified obstacles and challenges related to articulation between the ECT and the Professional B. EMC. qualifications?

In an attempt to answer the above research questions three main research objectives were identified. This next section will provide a description of the methodologies used to achieve each of the identified research objectives. Figure 3.2 displays the research process that was followed.

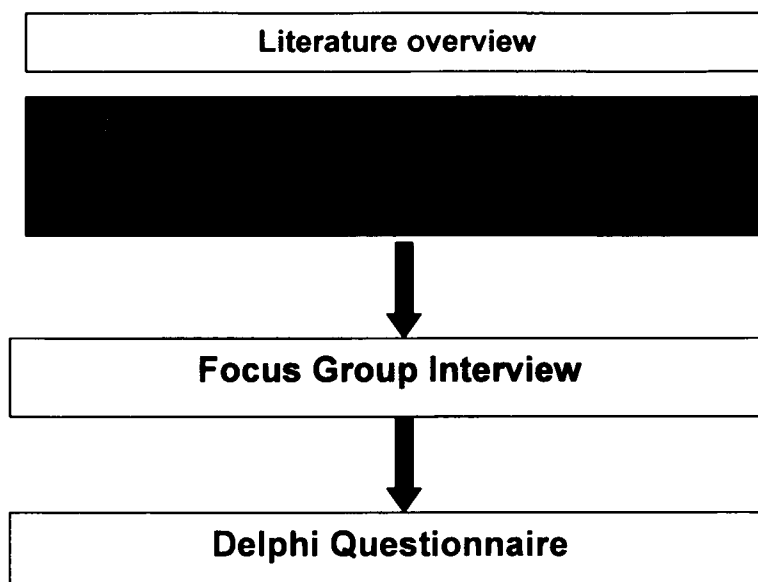


FIGURE 3.2: Schematic outline of the sequence of the three research methods

3.3.1 Literature review

The starting point in this study prior to beginning a critical comparison of the two qualifications was to review existing literature on paramedics, education and mid-level health workers in South Africa and abroad (cf. Chap 2). Singleton and Straits (1999) note that a literature review assists in contextualising a study against existing theory and research and also ensures that the researcher has sufficient background knowledge and understanding of the topic to allow for meaningful interaction with the topic. As mentioned in Chapter 1, the researcher made use of a number of electronic searches using Google scholar, Pub Med and the UJ library search engines with the following key words and or combinations thereof: "Emergency Care", "Education", "Paramedic", "Training", "Mid-Level Health Workers", "Academic", "Articulation", "Learning". Regretfully as mentioned in Chapter 1 and 2 despite these searches the researcher could locate little published literature in this area

internationally and hardly any local literature on the ECT and B. EMC programmes in South Africa.

3.3.2 Document analysis

The document analysis followed on from the literature review and was linked to the achievement of the first research objective which was to:

Critically describe and compare the two-year 240 Credit NQF 5 National Certificate Emergency Care Technology Mid-level worker Qualification to the 480 Credit NQF 8 Professional Bachelor of Health Science Degree in Emergency Medical Care in terms of general academic architecture, learning outcomes and educational modes of delivery.

After reviewing the limited existing literature around paramedic education and training, the researcher conducted an in-depth analysis of existing documents that spoke to the design and structure of the ECT and BHS EMC programmes. This purposeful and critical comparison of the two qualifications provided deeper insight and a more thorough understanding of the similarities and differences between them.

The analysis and comparison of the two qualifications was guided by the selection and identification of set criteria against which the two qualifications could be compared. After careful consideration the researcher elected to use similar criteria to those required by the South African Qualifications Authority (SAQA) for the registering of qualifications. It is argued that the selection of the SAQA criteria was both logical and important as both qualifications had been lodged with SAQA on similar templates.

Each of the selected criteria was unpacked, described and discussed within the context of existing literature on both the criteria and each of the programmes

being compared. The comparison and analysis and discussion of the two qualifications against the SAQA criteria produced many pages of valuable data as presented in Chapter 2.

The outcomes of the critical comparison completed via the document analysis provided the necessary foundational knowledge and starting point for subsequent research processes, i.e. the Focus Group Interview (cf. Chap 4) and Delphi Questionnaire (cf. Chapter 5).

3.3.3 The focus group interview

A focus group interview was conducted to generate additional valuable data that could both support and expand on the findings stemming from the literature review and document analysis discussed above. In addition to this, the focus group interview also aimed to begin to address the second identified research objective which was to:

Identify and explore potential obstacles and challenges relating to articulation between the ECT and the Professional B. EMC. qualifications.

3.3.3.1 Theoretical aspects

Babbie (1995:84-86) notes that focus group interviews are commonly used within the field of social research and are especially well suited to instances where the subject of the study is new and as yet unexplored. As mentioned above, the researcher could not locate any pre-existing literature or data focusing on articulation between the ECT and BHS EMC programmes. For this reason a focus group interview with educators in the field became both a pragmatic and logical option for the generation of new, thick and rich data in this study.

3.3.3.2 Focus group interview for this study

The knowledge and insights stemming from the literature review and document analysis described above were used by the researcher to formulate an agenda for the focus group interview (Appendix 1). The agenda and questions were therefore both purposefully and carefully constructed and informed by the outcomes of the preceding research processes, i.e. the literature review and documentary analysis.

The agenda and questions in the focus group interview focused on the exploration of the following four key areas:

- (a) The need for articulation between the ECT and BHS EMC Qualifications.
- (b) How well the ECT programme prepares a graduate for further study.
- (c) The academic structure of the ECT and B. EMC. programmes.
- (d) The need for a bridging programme and potential problems associated with bridging.

The focus group interview was conducted at the University of Johannesburg in the boardroom of the Faculty of Health Sciences. There were seven participants who were purposefully selected in an attempt to ensure that the important role-players involved in emergency care education and training were all represented.

3.3.3.3 Sample selection

As mentioned above, participants for the focus group interview were purposefully selected. Purposeful sampling is appropriate in situations where the researcher has a sound knowledge of the population and the research aims. Babbie (1995:225), Creswell (2009:178) and Bryman (2004:332-334) further note that purposefully selecting participants in qualitative research may assist

the researcher to best understand a problem and the research question. In this study the researcher purposefully invited focus group participants whom he felt would have the necessary experience, knowledge and insights related to the research topic, thereby ensuring that their responses would indeed generate rich, thick and meaningful data (Skinner 2007:320).

3.3.3.4 Description of sample

Morgan (1997:34) suggests that focus groups should ideally have between six and ten participants. In this study, seven participants were purposefully selected in an attempt to ensure that the important role-players involved in emergency care education and training were all represented.

The sample was constituted as follows:

- One representative from the National Department of Health (HR and Training)
- Two Principals from Provincial Health Training Structures (Gauteng, & Limpopo)
- One Academic from Higher Education involved in the offering of the Professional degree
- One members of the Health Professions Council of South Africa
- One Member of the Education Committee of the Professional Board for Emergency Care
- One member of a Local Authority as a potential employer and training provider for Mid-Level workers in the form of ECTs.

Mindful of the subsequent Delphi process, care was taken by the researcher not to include in the sample potential Delphi panellists.

3.3.3.5 The pilot study

Due to a shortage of potential participants, no pilot study was conducted prior to the focus group interview. The agenda and interview questions were however carefully constructed and reviewed by the researcher and research supervisors prior to conducting the focus group interview.

3.3.3.6 *Data gathering*

David and Sutton (2004:99) note that a good quality tape-recording is essential for focus group interviews together with notes taken during the interview. In this study the focus group interview was audio recorded on a digital audio recorder and a verbatim transcript produced. The researcher also made use of field notes captured during the interview.

3.3.3.7 *Data analysis*

No consensus exists for the analysis of qualitative data; therefore analysing different types of data and text in a mixed method study such as this may present a significant challenge to researcher (Creswell 1998:138-140). Content analysis was used and data were placed into common themes and categories were established.

In this study transcription of the voice recording from the focus group interview produced 20 pages of valuable raw data. The researcher then carefully read and analysed the transcript in order to identify and explore and both individual and group responses to each of the questions as well as themes and trends that were interesting, useful and could be linked to the aim and objectives of the study (Creswell 2009:188-190).

3.3.3.8 *Data interpretation*

Interpretation is a process whereby the researcher draws inferences from the data and/or turns to theory to provide structure for his or her interpretations (Creswell 2009:183-185). Similarly in this study the researcher made use of the insights obtained during the literature review and documentary analysis together with his own prior knowledge and expertise as an educator in the field to extract, interpret and present the main findings stemming from the analysis

of the data obtained during the focus group interview. The results and findings stemming from the focus group interview are presented in Chapter 4.

3.3.4 The Delphi Technique

The absence of existing literature on articulation between the relatively new ECT and B. EMC. programmes meant that the researcher had to look toward other sources of information and data. Following on from the literature review, documentary analysis and focus group interview, the researcher decided to obtain the opinions of educators and experts currently involved in the construction and offering of the ECT and BHS EMC programmes. This was seen as a logical final step in gathering additional quantitative data on the content and articulation between the two programmes. This engagement took place in the form of a Delphi questionnaire.

The Delphi questionnaire was therefore focused on addressing the third research objective that being to:

Elicit consensus views and opinions from experts in the field relating to potential solutions to the obstacles and challenges which educational managers are likely to face in articulating the Mid-Level Worker ECT with the Professional BHS EMC Degree qualification.

3.3.4.1 Theoretical aspects

The Delphi method works particularly well when there is incomplete knowledge about a problem or phenomenon. The use of the Delphi method dates back to the 1950s when it was used by the US military. Since then this method has been well-described in literature. Rowe and Wright (1999:353-375) characterise the Delphi method by four key elements:

1. *Anonymity of participants.* The participants do not know one another; this allows them to freely express their opinion and not feel pressurised to conform to tours?
2. *Iteration.* This allows the participants to refine their views in lights of the progress between different rounds.
3. *Controlled feedback.* This allows the participants to see one another's response and provides them with an opportunity to reflect on this, and to change or clarify their views.
4. *Statistical aggregation of responses.* This allows for quantitative analysis and interpretation of data.

3.3.4.2 The Delphi questionnaire in this study

The Delphi statements in the questionnaire were designed and refined by the researcher after reflecting on the data and findings that stemmed from the literature review, document analysis, critical comparison of the content of the two qualifications as well as the focus group interview. The final Delphi questionnaire consisted of seven sections, **A-G**. Sections A-C consisted of key statements that were central to the primary aim of this study by exploring the participants' views on:

- a) The possible framework and format for articulation and bridging of ECT graduates as mid-level workers into the universities B EMC programmes
- b) The extent to which the ECT as a mid-level worker qualification prepares the graduate MLW for further academic study such as the B EMC professional degree
- c) The demand for articulation between the ECT as a mid-level worker qualification and the B EMC as a professional degree

Extending somewhat beyond the original aim and scope of the study, the researcher included a further four sections (D-G) to the Delphi. These statements were obtained directly from the learning outcomes of the study guides of the HE degree programmes and aimed to obtain consensus views from the participants on the possible physiology, pathology, diagnostics and health sciences content of a bridging programme that could assist to facilitate articulation. This was felt necessary as very little literature and very few studies have been done in this area. The comprehensive Delphi could address and assists educators in the establishment of a curriculum for their bridging programmes.

3.3.4.3 *Sample selection*

It was decided that 11 participants would be invited to take part in the Delphi process so as to cater for the possibility that some participants may drop out of the study. It so transpired that all 11 remained in the study. As in the case of the focus group interview, participants for the Delphi process were also purposefully selected by the researcher so as to ensure that they had the requisite experience, knowledge and insights related to the research topic, thereby ensuring that their responses would indeed generate valid and reliable data that could satisfy the aims and objectives of the study (Babbie 1995:225; Bryman 2004:332-334; Creswell 2009:178).

3.3.4.4 *Description of sample*

The Delphi participants consisted of senior academics, academic heads and programme managers from departments at Universities offering the BHS and or ECT programmes. The sample also included senior operational managers from the emergency services as well as Principals of Provincial Colleges offering the ECT programme. All of the participants were registered advanced life support paramedics and emergency care practitioners with the professional board.

3.3.4.5 *Pilot study*

Due to a shortage of potential participants no pilot study was conducted prior to the administration of the Delphi. The sections and statements were however carefully constructed and reviewed by the researcher and research supervisors prior to sending round one out to the participants.

3.3.4.6 *Data gathering*

The Delphi questionnaire was emailed to the 11 participants over three rounds. The participants completed the questionnaire electronically and then emailed it back to the researcher after each round. In the body of the email (Appendix 2) the researcher provided a detailed explanation of the questionnaire, as well as how the participants were to indicate their choices. The format of the Delphi and statements remained the same throughout all three rounds.

3.3.4.7 *Data analysis*

The researcher recorded and analysed the responses of each participant per statement. Using this data a percentage of agreement/consensus was calculated for each statement at the end of round one, round two and round three at **82%**. It is a high response rate and adds to the reliability of the study. There were 11 Delphi panellists and nine out of eleven had to agree for reaching consensus and that yielded a figure of 82%.

The researcher elected to make use of colour coding to assist in the analysis and presentation of the data. Statements where a consensus of 82% or more was achieved between the participants during round one were highlighted grey.

Statements where consensus was reached at the end of round two were highlighted in yellow.

Statements that achieved consensus during the third and final round were highlighted in green and those few statements where stability occurred or where consensus could not be reached after all three rounds remained un-highlighted.

A result column was included that reflects the selections made by each of the panel members. Depicted in the results column is the majority selection and percentage of agreement.

3.3.4.8 Data interpretation

The results and findings from the Delphi questionnaire were interpreted and compared by the researcher to the findings stemming from the preceding research processes (literature review, critical comparison, and focus group interview).

Making use of the researcher's own knowledge, experience and expertise within the field, combined with the new knowledge and insights gained as a result of all of the above research processes, the researcher was able to address the fourth and final research objective which was to:

Design a framework that may inform and guide academic articulation between the newly legislated and promulgated national mid-level worker Emergency Care Technician (ECT) and BHS EMC professional degree qualifications within the emergency care profession.

3.4 TRUSTWORTHINESS

As discussed above, three different methods were used to obtain data for this study. A review of literature, subsequent documentary analysis, focus group interviews and the three rounds of the Delphi technique enabled the researcher to establish reliability in the study.

The focus group interview assisted in obtaining additional qualitative information and in refining and adding to the original Delphi statements.

The researcher was thus able to triangulate and link data and outcomes from the qualitative research processes to the administration of a quantitative questionnaire through the recognised and validated Delphi method. These activities further strengthened the validity and reliability of this study (Adler & Ziglio 1996; Delbeq, Van de Ven & Gustafson 1975:15).

Leedy (1997:32-34) furthermore notes that validity is concerned with the soundness and effectiveness of the research tool and that reliability is the consistency with which the measuring instrument performs. In the case of this study it becomes important to ensure that the way in which the questionnaire and focus interviews were used to document, analyse and interpret the data were both valid and reliable. The following section describes in more detail the steps taken by the researcher in an attempt to adequately address issues of validity and reliability within this study.

Lincoln and Guba (1985:290) refer to alternative constructs that reflect the qualitative paradigm. In this study *credibility* refers to the correct identification and description of the subjects to be studied. The researcher established the correct subjects to be studied. The *transferability* of the findings is limited as the study is done in a particular context. Nevertheless, the multiple sources of data used acts as a strengthening factor to replicate the study elsewhere. The setting(s) under which the study takes place was not altered or changed-adding

to the *dependability* of the study and account for limited changing conditions. The confirmability of the study can be validated by the data collected and by the sources consulted-adding to overall trustworthiness of the findings.

Concerning the focus group interview, the principle aim in all interviewing is obtaining valid and reliable information (Fielding 2003:11). In this study, issues of validity and reliability were addressed in a number of ways, one of which being the use of specially pre-designed agenda and focused questions. The questions were therefore carefully and meaningfully structured and informed by the analysis and interpretation of data gathered from the literature review and critical comparison of the two qualifications.

Another strategy for promoting validity and reliability within the context of a study is to ensure that the researcher is able to provide rich and thick descriptions of the phenomenon under investigation and acts as primary instrument for data collection (Merriam 2002:25). It is argued that the combination of literature review, Delphi questionnaire and focus group interview did indeed elicit sufficient detailed and indepth data for this study. Attempts were made at all times to establish a strong chain of evidence between the research questions, methodology, raw data and the findings to further strengthen the validity of this study (Leedy 1997:169).

Voice recordings (with permission) of the focus group interview, selected field notes and transcriptions by the researcher together were additional strategies that were utilised to further address issues of validity and reliability linked to the focus group interview.

Finally, critical self-reflection by the researcher regarding the processes of data analysis and interpretation coupled with adequate engagement in data collection also contributed toward ensuring validity and reliability in this study (Merriam 2002:25-28).

3.5 ETHICAL CONSIDERATIONS

Participation in this study was voluntary and both the Delphi and Focus Group Interview participants were provided with a background to the study and invited to participate (cf. Appendix 2 and 4).

All participants signed consent forms (cf. Appendix 3 and 4) stating that they agree to participate in the study. Due to the design and nature of this study the names and identities of individual participants are not declared by the researcher and do not form part of the data that are presented.

Data were stored in electronic format within password-protected files that only the researcher and promoters were able to access.

Ethical approval was granted by University of the Free State Faculty of Health Sciences Ethics Committee (cf. Appendix 6). Such committees are important quality assurance structures responsible for ensuring that all research conducted is both ethical and has suitable academic merit at Ph.D. level.

3.6 CONCLUSION

This chapter provided theoretical perspectives on the exploratory mixed method research design and associated methods selected and used in this study. These methods included a literature review and documentary analysis, a focus group interview and finally a Delphi questionnaire. The chapter concluded by discussing validity, reliability and ethical issues applicable to this study. In the following chapter the researcher will discuss in more detail the focus group interview and discussion.

CHAPTER 4

THE FOCUS GROUP INTERVIEW

4.1 INTRODUCTION

As mentioned in the previous chapter, a qualitative linear model consisting of three different research methods was applied in order to gather raw data for this study. The first consisted of a retrospective documentary analysis and critical comparison of the format, structure and academic architecture of the two-year ECT Mid-Level Worker Programme to that of the four-year Professional Bachelor Degree in Emergency Care. The results of this analysis were presented in Chapter 2. The second method consisted of a focus group interview leading into a Delphi questionnaire.

This chapter begins by presenting and discussing the focus group interview and the associated results and findings that were used by the researcher to construct, inform and refine the statements in the Delphi questionnaire. The Chapter continues and concludes by unpacking, describing and discussing the Delphi.

4.2 THE FOCUS GROUP INTERVIEW

The principle aim in all interviewing is obtaining valid and reliable information (Fielding 2003:11). The validity and reliability of data from the focus group interview was ensured in a number of ways, one of which being the use of a specially pre-designed agenda and questions focusing on the following four key areas:

- (a) The need for articulation
- (b) How well the ECT programme prepares a graduate for further study

- (c) The structure of the ECT and B EMC programmes
- (d) The need for a bridging programme and potential problems associated with bridging

The agenda and questions were therefore purposeful and carefully structured and informed by the analysis and interpretation of data gathered during the analysis and comparison of the two programmes and focused on critical aspects of the proposed framework.

The focus group interview was conducted at the University of Johannesburg in the boardroom of the Faculty of Health Sciences. There were eight participants who were purposefully selected in an attempt to ensure that the important role players involved in emergency care education and training were all represented. These role players were:

- 4. National Department of Health (HR and Training)
- 5. Provincial Health Training Structures (Gauteng, North West & Limpopo)
- 6. Higher Education involved in the offering of the Professional degree
- 7. Health Professions Council of South Africa
- 8. Education Committee of the Professional Board for Emergency Care
- 9. Local Authority as a potential employer and training provider for mid-Level workers in the form of ECTs

As mentioned in chapter 3 the focus group interview was audio recorded and a verbatim transcript produced. The researcher then analysed the transcript to identify responses, themes and trends that were interesting, useful and could be linked to the aims of the study.

4.2.1 Results and findings of the focus group interview

The following section will deal with the results and findings stemming from the focus group interview. This will be done by introducing the focus areas and

related questions that were posed to the participants during the group interview followed by a discussion of the responses.

4.2.1.1 Focus area one - The need for articulation

Question 1.1 - Do you feel that there will be a sustainable demand for mid-level ECTs to upgrade their qualification to Bachelor degrees?

This question was core to this study for to go ahead and design a framework and bridging programme to facilitate articulation would be meaningless if there were no proven need for articulation.

All of the participants agreed that there would be a strong sustained demand for ECT graduates to study further and obtain the professional degree.

"...there will always be a demand, there will always be people who will be career pathing, because that is encouraged..." "...at any stage there should be that opportunity to progress..." - Representative from the National Department of Health.

Question 1.2 - What do you feel are the factors and forces that would drive the demand for articulation?

This question flowed from 1.1 above and attempted to further explore factors the participants felt would drive ECT graduates to study further and obtain the professional degree.

The following main factors were identified:

a) Desire for academic growth and more knowledge

"..stronger (academically) students who want to go on" ..." and I think there will always be that desire...."- Academic from a University.

b) Desire for more promotion and better wages

"...there will always be people who will be career-pathing" "what we think might influence this (desire for articulation) is remuneration...that's the first thing..." - Representative from National Department of Health.

c) Better recognition and an increased scope of practice

One of the strong emerging themes that is revisited as it resurfaces throughout this study was the fact that the new ECT programme appears not to have been adequately marketed and introduced to the profession. As a consequence of this, the role of the ECT as a Mid-Level Worker remains unclear and poorly understood by the broader Emergency Service Community and Profession as a whole.

Conversely, the four-year professional degree has become well respected and widely recognised as a valuable and meaningful qualification. The current clinical scope of practice of the ECT falls below that of the Degree practitioner and even the current CCA short course. This becomes significant when one considers the fact that the South African Emergency Care Industry has a long history of linking positions, posts and subsequently salary to clinical scope of practice.

"....this need for recognition in terms of the fact that as we are all aware there is this issue of scope of practice and capabilities and skills...." - A Principal from a Provincial Ambulance Training College.

These factors combine to create a view amongst many in the profession that the ECT programme is of limited value on its own but is more of a stepping stone toward the ultimate prize - that being gaining entry into the better recognised four-year bachelor degree.

"...people believe that they have a certificate or qualification but the employer does not recognise this or even know what to do with them so they don't want to stop with ECT but rather they want to carry on and obtain a qualification which is more recognised..." - Principal from a Provincial College.

4.2.1.2 Focus area two - How well does the ECT programme prepare the graduate for further study?

Question 2.1 - How well, in your opinion, does the ECT programme prepare graduates in the area of general academic development?

As mentioned in chapter two, the ECT programme's primary function is to produce competent technicians for the emergency care profession; however, as a formal HE programme falling within the NQF it should also provide a springboard for further learning. This question required the participants to provide their opinion of how well the ECT fulfilled this secondary function.

Responses to this question indicated a fair degree of uncertainty.

"....I am not sure that those academics themselves (instructors at the ECT colleges) in those environments actually know where to start..." "there is still a lot to be done and from what has been said about the way the programme is structured" – Representative from the Resuscitation Council of Southern Africa and Education Committee of the Professional Board.

"...having chatted to a lot of people receiving feedback from graduates who are out there...there is not fantastic feedback from out there..." - Education Committee member of the Professional Board

"...the way the course is structured itself is not a problem but the way it is delivered is very challenging because we still have staff that do not have the necessary skills (referring to instructors at the colleges)...to be able to deliver at an HE level so there is quite a lot of those gaps..." -Principal from a Provincial Ambulance Training College.

Certain responses also highlighted that the way in which the ECT applicants are selected did not conform to criteria for a Higher Education programme.

"the calibre (academically) of candidates coming through into the course it is quite challenging ...ja... to try and prepare them for that (entering HE) but I think to a certain extent there will be a difference between someone from and Matric (grade 12) entering a degree programme at a University and someone who has been through the ECT programme..." -Principal from a Provincial Ambulance Training College.

Question 2.2 - The DoE stipulates minimum academic entry requirements in order to gain access into a Bachelor's degree. The ECT programme currently only requires a grade 12 or equivalent NQF 4 qualification. Do you feel that all graduates who have completed the ECT programme would be able to cope with the academic content and learning expectations associated with a University degree?

The above question was asked to further explore the participants' views regarding the extent to which the ECT programme prepares graduates for further study within the NQF.

There were mixed responses to this question with some participants expressing concern that there may be a lack of understanding and capacity by the current providers as to the importance of life-long learning and how the ECT programme serves to lay a generic foundation for further study.

"there are colleges that have had an academic responsibility thrust upon them prematurely... having been thrown into another dimension where the more holistic lifelong learning academic expectation is now very much there... and I am not sure that those academics themselves (instructors at the ECT colleges) in those environments actually know where to start or how to do that.." – Member of the Education Committee of the Professional Board.

The constructivist approach to teaching and learning at the ECT colleges was seen as possibly beneficial in that it encourages self-directed learning which is necessary for study at Universities.

"I don't know how successful the whole constructivist approach has been... I know it has been a key word in the ECT thing but I mean if that is implemented successfully and these students are accustomed to self-directed learning and doing things on their own I don't foresee from that perspective that there would be a problem..." - Academic from a University.

However, other members indicated that the teaching/learning approach may not be the only factor and that culture and background of the learners may also impact on their ability to integrate into a University degree programme even if they have the foundational knowledge from the ECT. *"...there are also factors that are also involved...this constructivism has been thrown around but that alone I personally don't think that it is enough, there are other factors like the way that cultures operate, how you develop that learning culture within a particular ethnic people..."* – Principal from a Provincial Ambulance Training College.

4.2.1.3 Focus Area three - Structure of the ECT and B EMC programmes

The ECT is a two-year 240 credit NQF 5 qualification. The new HEQF does not feature such an exit level.

Question 3.1- What possible impact do you foresee this having in relation to recognition and articulation of the ECT qualification?

The ECT and the Professional Degree programmes are both vocationally focused and are designed to produce workers for the emergency services

health sector. Therefore, it is logical to assume that a number of the learning outcomes achieved by students on these two programmes would be similar.

A simplistic view on placement and articulation would therefore be to say that as the ECT programme is 240 credits completed over two academic years and the Professional degree programme is 480 credits completed over four academic years, the ECT graduates should simply enter directly into the third year of the degree programme.

The aim of this statement and question was to attempt to establish if the academic structure of the ECT is seen as a problem when it comes to articulation. This question, however, did not result in any meaningful debate within the group. The representative from National Health did concede that this was a problem that affected not only the ECT but also a number of other mid-level worker programmes such as physiotherapy, radiography and occupational therapy. It was indicated that a meeting between National Health and SAQA would be convened to try and sort out this matter. At the time of writing the DoE have engaged in a process of reviewing the HEQF in an attempt to address some of the general concerns raised by educators relating to articulation within the HEQF.

Question 3.2 - To what extent do you feel that the ECT programme sufficiently addresses the basic health sciences (physics and chemistry) that appear in the first year of the University degree programmes?

Whilst some of the participants debate the level of physics and chemistry needed to become a paramedic all were in agreement that the extent to which these are covered in the ECT is much less than that on the Degree programme. The ECT curriculum did not include specific subjects like physics and chemistry. Limited principles of physics and chemistry did appear to be covered during certain of the medical and rescue modules.

"I think almost not at all" -Principal from a Provincial College offering the ECT.

Question 3.3 - How do you feel the ECT graduates' knowledge and skills in Emergency Medical Care would compare to those obtained by University students after two years of study?

This question was designed to obtain the views of the group on whether the learning achieved is similar enough to support an application to faculty boards for a direct credit or whether, rather, the route of RPL should be explored, or whether ECTs should simply be required to challenge final EMC I and II papers.

Responses to this question indicated that there are both similarities and differences in the depth and scope of the emergency care content that the ECT students would have covered during their two-year programme compared to that which second-year students on the degree programme would have covered.

Whilst it is conceded that Universities offering the four-year programme will not all follow exactly the same curriculum, it was felt that in general the pure emergency care component of the ECT would be similar enough to the emergency care covered in the first two years to obtain some form of RPL or credit.

The emergency care scope of practice of the ECT on graduation is in fact quite close to that of the degree practitioners and therefore (in certain instances) the clinical skills and exposure of the two-year ECT graduate may in fact exceed that of the University student after completion of the second year of the Bachelor degree.

Question 3.4 - Do you feel as if the ECT graduate and the University student after year two of the degree programme would have a similar competence and understanding of professional practice?

This question focused on assessing the participants' views on whether or not ECTs, would they have both been exposed to a similar number of patients and hours of operational duty compared to that of the degree students at the end of their second year of study. In addition the participants' view on issues of possible credit or RPL was also explored relating to the foundations of professional practice.

Responses indicated that within the group it was acknowledged that in the area of professional practice ECTs would have met and most likely exceeded the clinical work and expectations of second-year students. A strong point was made that as the ECT exits after year two, much more time is spent on clinical learning and pre-hospital patient interaction than that in the first and second years of the professional degree programme.

"we must not forget the point that X has raised and realised that the ECT after two years is a qualified person" – Member of the professional Board.

"what is done at the University in the first and second year as this is fairly limited and I would imagine that there is much more done on the ECT where they spend more time in the field..." – Academic from a University.

Question 3.5 - In your opinion, to what extent is the anatomy and physiology covered during the ECT equivalent to the anatomy and physiology, which would have been covered on the degree programme during the first two years?

Response to this question indicated that although anatomy and physiology does feature in the ECT programme it remains by and large on a basic foundation level and does not have the same scope and depth as that covered during the first two years of the four-year degree programme.

"..as the physiology goes not enough is covered on the ECT programme compared to the degree course so an improvement is needed..." –Principal from a Provincial College.

The researcher's own comparison of the learning guides and modules covered in ECT programme and those from the degree programmes supported this and found that whilst the level of anatomy covered was similar the level, scope and depth of physiology included in the degree programmes were far higher than that in the ECT programme. The focus group participants were in agreement with this viewpoint.

"...you simply cannot compare the two; there is quite a big difference..." – Principal from a Provincial College.

Question 3.6 - As the ECT programme is focused at producing Technicians and not Clinicians, how would you compare the diagnostic and clinical assessment knowledge, insights and skills of the ECT to the University student after two years?

It has been previously highlighted in this and the preceding chapter that although the ECT is a mid-level worker programme designed to produce technicians and the professional degree programme at double the duration is designed to produce clinicians the scope of practice of the ECT far exceeds that which would be considered half that of the degree practitioner. Rather, the scopes are in fact fairly close. However, those few clinical interventions and procedures that remain reserved for degree practitioners are viewed by many as "advanced", "invasive" and associated with "significant side effects". For this reason one would expect a superior level of diagnostic and assessment ability on the degree graduate to that of the ECT.

Responses to this question were in support of the above:

"my personal feeling is they might need a bit more..." – Academic from a University.

"the expectation generally from educators is that they expect a technician to perform at a clinician level so that's a problem" –Principal from a Provincial College.

Question 3.7 - In your opinion, would the knowledge of general pathology and disease processes covered during the ECT programme be sufficient to support additional learning required in the third and fourth year of the degree programme?

Similar arguments and views were expressed to those discussed above in relation to the pathology component of the ECT, which was seen as rudimentary in comparison to the pathology covered in the degree programmes.

"my personal feeling is they might need a bit more..." – Academic from a University.

Another theme that emerged was that there is not clear understanding of the concept of clinical vs. technician within the profession at present.

"...there is confusion between that because the expectation generally from educators is that they expect a technician to perform at a clinician level so that's the problem." –Principal from a Provincial College.

"There is not a clear universal idea about what academic level the MLW should be pegged at. This makes it difficult for educators to produce the end product."
– Principal from a Provincial College.

"...I am not sure that even the term technician versus clinician has been defined in the formal centres." – Member of the professional Board.

"...one can say the clinician will have so much in depth knowledge but the question is do they apply their knowledge for a particular scenario?" - Principal from a Provincial College.

Question 3.8 - Should and could the medical rescue training covered on the ECT programme and by the ambulance training colleges generate a direct credit towards similar rescue modules offered as part of the University Programme?

There was unanimous agreement from members that a direct credit for these modules could be obtained. The researcher's comparison between the elective rescue modules in the areas of introductory rope work (High Angle I), Fire Search and Rescue and Vehicle Rescue supports the view that there are strong similarities.

Question 3.9 - Current Higher education legislation currently stipulates that not more than 50% of credits obtained in one qualification may be transferred to another. Do you in any way see this as creating a problem when it comes to articulating the ECT programme with the Professional Degree?

This was not seen as a problem by the group as there was general agreement that the credits that could be transferred from the ECT programme to the Degree programme prior to bridging would not realistically approach the 50% mark.

4.2.1.4 Focus area four - The possible need for a bridging programme

Question 4.1 - Do you feel that it is necessary to have some form of bridging programme for the ECT graduate before advanced placement into the degree programme is considered?

All of the participants agreed that a form of bridging would be required to assist ECTs in articulating with the professional degree.

Question 4.2 - What do you think the main focus of the bridging programme should be?

The responses were in line with the points that emerged in the previous questions and discussions above. The following main areas were reconfirmed:

- a) Diagnostics – The diagnostics and patients assessment methods taught to degree students exceeds that expected from the ECTs as mid-level workers.
- b) General Pathology –The expected breadth and depth of knowledge relating to injury and disease processes was far greater on the degree course.
- c) Basic Sciences – Shortfalls in terms of physics and chemistry.
- d) Physiology - Participants felt that the expected breadth and depth of knowledge relating to physiology was far greater in the degree course.

Question 4.3 - Who do you think should be engaging on the bridging programme? Should this be the top ECTs? Do you feel it should be open for everyone who wants to try it?

Due to the fact that the colleges are producing many more ECT graduates annually than the four universities currently offering the ECP degree programme it is not feasible or possible for every ECT graduate to immediately go on and study further even if they all had the desire to do so.

Responses indicated that although there was general acknowledgment of the individual's right to progression and lifelong learning, not every ECT will be able to go on and enrol for the professional degree. National Health were also against this idea as it was seen to undermine the primary function of the ECT programme which is to produce a cadre of workers who will remain and function within the workforce as mid-level workers.

"I think straight out we are trying to discourage everyone from just going on..."
–Representative from National Department of Health.

Another theme that emerged in line with the above concept was that ECTs should not be allowed to articulate directly with the degree programme without having actually worked for a period of time as mid-level workers within the profession.

"...If you are someone who has done ECT you will have to do your two years in service. There has to be that stipulated condition..." – Representative from National Department of Health.

Whilst the majority of the group tended to agree that a period of clinical work (around 2 years) would be expected prior to engaging in the bridging programme and further study, there were certain members of the group who did not agree with this.

"...I say that educationally we don't need any time (work time) and it's actually bad to get people out of that environment..." – Member of the Professional Board.

4.2.1.5 Focus area five - Potential challenges

Question 5.1 - Are there any other potential challenges that you are aware of that you have not yet mentioned and which you feel should be addressed relating to articulation of ECTs into the degree programmes at the Universities?

Aside from possible funding implications, no additional significant points were raised that could not be linked to the above responses.

4.3 CONCLUSION

The results and findings from the focus group interview supported the initial findings that stemmed from the researcher's critical analysis and comparison of the two qualifications discussed in chapter four. The following main themes emerged and/or were strengthened:

- a) There will be strong sustained demand from ECTs as mid-level workers that wish to embark on further study in the form of the Professional Degree in Emergency care.
- b) The main factors that are seen to be driving this demand are the ECTs' desire for improved chances of promotion and recognition within the industry along with the associated benefits such as increased pay.
- c) Although similarities exist between the content and learning outcomes on the two-year ECT programme and the first two years of the four-year professional degree, there remain significant differences.
- d) The differences were seen to lie in the following key knowledge areas:
 - Physiology
 - General Pathology
 - Basic Sciences (Physics and Chemistry)
 - Diagnostics
- e) Due to the shortfalls the scope and depth of knowledge in the above areas ECT graduates will not be able to enter directly into the third year of the professional degree without some form of a bridging programme.
- f) This bridging programme would need to focus on ensuring that the knowledge gaps between the ECT graduate and the University student entering third year are closed so that both begin the third year of the professional degree on the same academic foundation.

- g) It is neither possible nor desirable for every ECT graduate to go on and complete the professional degree. ECTs are expected to work for a period of time as mid-level workers prior to engaging in further study.
- h) There is currently a poor understanding within the emergency care profession, and indeed broader health community, about exactly what the new cadre of mid-level workers are. Mid-level worker programmes, including the ECT, are currently poorly marketed, understood and subsequently undervalued. The integration of ECTs into the emergency services has not been properly managed thus far.

As mentioned previously one of the main challenges experienced by the researcher in relation to this study was the virtual absence of published literature on emergency care education and training as well as mid-level health workers in South Africa. The design of the framework for articulation would therefore need to be based on data obtained not through further literature reviews but rather via consultation with recognised educators and leaders within the emergency care field.

To do this the researcher carefully considered all the insights obtained through completion of the critical comparison of the two qualifications (discussed in Chapter 2) and the findings of focus group interview presented above, and used these to design a comprehensive Delphi questionnaire. The Delphi questionnaire aimed to elicit consensus views and opinions from experts in the field relating to potential solutions to the obstacles and challenges which educational managers are likely to face in articulating the mid-level worker ECT with the Professional B EMC Degree qualification. In the following chapter the Delphi questionnaire is presented and discussed.

CHAPTER 5

THE DELPHI TECHNIQUE OF THE RESEARCH

5.1 INTRODUCTION

As already mentioned, three different methods were used to gather sufficient deep rich data for this doctoral study. The first method consisted of a literature review and critical comparison of the ECT mid-level worker qualification to the Professional Bachelor's Degree in Emergency Medical Care. This comparison is described and discussed in Chapter 2. The second method involved a focus group interview with key role players within the emergency care field. The focus group interview and results thereof have been discussed in Chapter 4. This Chapter now deals with the findings stemming from the third and final data gathering method which consisted of a detailed Delphi questionnaire.

5.2 THE PARTICIPANTS

Theory on the Delphi method, selection of participants, construction and administration for the Delphi questionnaire have already been described, discussed and defended in Chapter 3. Table 5.1 below provides detail for selection used describing the 11 panel members together with the criteria used to inform their selection.

TABLE 5.1 Delphi panel members

	Registration with HPCSA as ECP or ALS practitioner	Involvement in ECT as lecturer/ training manager	Involvement in the B EMC as Senior lecturer/ programme manager/HOD	Educational Qualification	Professional Qualification	Previous or current membership of the Professional Board for Emergency Care
1	√ (ECP)	√ (HOD at a University offering ECT)	√ (HOD at a University offering (B EMC)	√ Higher Diploma in Education	√ Master's Degree in Emergency Medical Care	√ Chairperson of the Professional Board for Emergency Care
2	√ (ECP)		√ HOD at a University offering (B EMC)	√ Higher Diploma in Education)	√ Master's Degree in Emergency Medical Care	√ Chairperson of the Education committee of the Professional Board for Emergency Care
3	√ (ECP)		√ (Programme manager at a University offering (B EMC)		Currently completing a Masters in Emergency Medical Care	√ (Member of the Professional Board for Emergency Care)
4	√ (ECP)	√ (Principal of a College offering the ECT programme)	√ (Moderator of Rescue components of the B EMC Programme at a University)		√ (B Tech Degree in Emergency Care)	
5	√ (AET)	√ (Principal of a College offering the ECT programme)	√ (Assessor of clinical components of the B EMC Programme at a University)			√ (Member of the Professional Board for Emergency Care)
6	√ (ECP)		√ (Senior Lecturer at a University offering ECT)	√ (Higher Diploma in Education)	√ (Master's Degree in Emergency Care)	√ (Member of the education committee of the Professional Board for Emergency Care)

	Registration with HPCSA as ECP or ALS practitioner	Involvement in ECT as lecturer/ training manager	Involvement in the B EMC as Senior lecturer/ programme manager/HOD	Educational Qualification	Professional Qualification	Previous or current membership of the Professional Board for Emergency Care
7	√ (ECP)		√ (HOD at a University offering (B EMC)		√ (Master's Degree in Emergency Care)	√ (Previous chairperson of the Professional Board for Emergency Care)
8	√ (ALS)	√ (Manager of the tertiary wing of a College offering the ECT programme)				
9	√ (ECP)		√ (Lecturer of diagnostics, pathology and emergency care at a University offering B EMC)		Currently completing a Master's in Emergency Medical Care	
10	√ (ECP)		√ (Moderator and member of the EMC research committee at a University offering ECT)		√ (B Tech Degree in Emergency Care)	√ (Member of the Professional Board for Emergency Care)
11	√ (ECP)		√ (HOD at a University offering N Dip EMC)		Currently Completing a Master's Degree in Emergency Medical Care	

5.3 CLARIFYING THE FOCUS OF THE QUESTIONNAIRE

As explained in Chapter 3, the Delphi Questionnaire was divided into 7 sections (A-G) and focused on addressing the third research objective, which was to:

Elicit consensus views and opinions from experts in the field relating to potential solutions to the obstacles and challenges which educational managers are likely to face in articulating the mid-level worker ECT with the Professional BHS EMC Degree qualification.

It is important from the onset of this chapter to note that Sections A, B and C of the questionnaire together with their associated statements are central to the aim and above objective in this study for they specifically focus on factors affecting informing the design of the framework for articulation.

Sections D, E, F and G of the questionnaire do not contribute directly to the framework for articulation; rather, these sections are aimed more at establishing expert opinion and consensus agreement on potential learning outcomes of a bridging programme. The researcher chose to add these additional four sections as it had become apparent from the preceding focus group interview (**cf. Chapter 4**) that meaningful articulation without some form of bridging programme would not be possible.

Therefore, whilst the addition of sections D to G indeed made the questionnaire very long (a point which is acknowledged as a limitation in (**cf. Chapter 7**), it is argued that having taken the effort to identify and validate the selection of the expert panel members from across the country it would be a wasted opportunity to not also attempt to obtain their consensus views on possible learning outcomes that should be achieved through completion of a bridging programme. The comprehensiveness of the Delphi questionnaire also assisted the researcher in developing the proposed framework, as all the aspects related to articulation were clearly understood and taken into consideration (cf. 1.6).

Therefore, whilst responses to each of the 39 statements from sections A, B and C are analysed and discussed in detail in this Chapter, the same is not done for each of the numerous statements stemming from sections D to G. Rather, for these sections the researcher presents only the final percentage of agreement and during which round consensus was achieved.

The responses in sections D to G have provided a valuable starting point for further inquiry and a useful guide to inform articulation and development of bridging programmes which, although critical for articulation, falls beyond the focus and scope of this study.

5.4 PROCEDURE FOR ADMINISTRATION OF THE DELPHI QUESTIONNAIRE

As mentioned in **Chapter 3** the Delphi questionnaire was e-mailed to the 11 participants described in Table 5.1 above, who then completed the questionnaire electronically and then e-mailed it back to the researcher after each round. In the body of the email correspondence prior to each round the researcher provided a detailed explanation of the questionnaire, as well as how the participants were to indicate their choices. The format of the Delphi and statements remained consistent throughout the three rounds.

5.5 FORMAT OF THE QUESTIONNAIRE AND PRESENTATION OF RESPONSES

5.5.1 Format of the questionnaire

For sections **A**, **B** and **C** space was created next to each of the statements and the participants were required to indicate their response as either:

1 = Agree

2 = Undecided/Neutral

3 = Disagree

For sections **D to G** which as explained above focused more on establishing potential learning outcomes that may be included in a bridging programme, the participants were required to indicate if the stated learning outcomes were in their opinion **Essential, Useful** or **Unnecessary**.

5.5.2 Analysis and Presentation of responses

According to Linstone and Turoff (2002:Online) the Delphi Method (cf. 3.3.3.1) may be "characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem". In this study, the Delphi Method was used to obtain a useful result and the objectives of the study sought by selecting participants and structuring a group communication process.

A Delphi is characterized by a number of phases or "rounds". The first round involves initial exploration of the subject under discussion. During the first round individuals contribute information they feel is pertinent to the issue. The second round provides an opportunity for participants to reach an understanding of how the group views the issue (i.e., where the members agree or disagree). If there is significant disagreement, then that disagreement is explored in a third round. The last phase of the Delphi process (a final evaluation), occurs when all previously gathered information has been initially analyzed and the evaluations have been fed back for consideration (Linstone & Turoff 2002:Online).

It was also observed in all early forecasting Delphi's that a point of diminishing returns is reached during the various rounds. Most commonly, three rounds proves sufficient to attain stability in the responses; further rounds tended to show very little change and excessive repetition was unacceptable to participants (Linstone & Turoff 2002:Online). Consensus is assumed to have been achieved when a certain percentage of the votes fall within a prescribed range-for example, when the interquartile range is no larger than two units on

a ten-unit scale. Measures of this sort, however, do not take full advantage of the information available in the distributions (Linstone & Turoff 2002:Online).

For the purpose of this study, consensus was defined as having been achieved where at least 9/11 or **82%** of the participant's responses fell in the same range i.e. a 1, 2 or 3 as indicated per statement.

In line with the above, the Delphi process in this study consisted of three rounds. After each round the researcher analysed the responses from each of the panel members. Chapter 3 describes the Delphi process as a quantitative methodology wherein the researcher aims to elicit consensus from expert panel members. Consensus is assumed to exist when there is **82%** or more agreement between the members of the panel. In this study there were 11 participants/panel members and therefore consensus was assumed to have been achieved when at least 9 of the 11 participants all chose the same option.

The researcher has elected to make use of a colour coding system in presenting and discussing the response to each of the statements.

- Statements that have been Highlighted **Grey** are those in which consensus as described above was achieved during the first round.

- Statements that have been highlighted **Yellow** indicate that consensus was achieved after round 2.

- Statements that achieved consensus during the third and final round are highlighted **Green**.

Those statements where stability occurred and/or where consensus could not be reached after all three rounds remain un-highlighted.

A results column reflects the final selections made by each of the panel members, including the majority choice and percentage of agreement.

5.6 RESPONSES TO SECTION A

Section A - contained eight statements focusing on exploring participants' views regarding the demand, desire and/or motivation for articulation between the ECT and B EMC and possible factors affecting such a demand. This next section will present and discuss the responses to each of the statements in Section A.

5.6.1 The desire for an increased scope of practice

		Agree	Undecided	Disagree	Responses
A1.	The MLW/ECT graduate's desire for an increased clinical scope of practice is a strong motivating factor for him or her to study further (B EMC). *Please comment based on the current HPCSA scope of practice for the ECT and ECP.	1	2	3	3 1 1 2 1 1 1 1 1 1 1 Round one (1) 82%

Comment: Consensus was achieved during round one with 9 out of 11 participants agreeing that a desire for an increased scope of practice is a strong motivation for ECT students to study further. This finding is supported by the findings of the focus group interview (cf. Chapter 4) where participants also indicate that a desire to increase clinical scope of practice within the emergency care profession is a strong motivation to undertake further study.

5.6.2 Desire for promotion

		Agree	Undecided	Disagree	Responses
A2.	The MLW/ECT graduate's desire for promotion within the service will motivate them to try to move on and complete the B EMC degree.	1	2	3	1 1 1 1 1 1 3 2 1 1 1 Round one (1) 73% Round two (1) 82%

Comment: Consensus initially sat at 73% after round one but was achieved after round two with 9 out of 11 participants agreeing that a desire for promotion is indeed a motivating factor driving ECTs to study further. This is also in line with the feelings of the focus group participants and supported by previous studies on the motivation of adult learners EMS to engage in further studies (Vincent-Lambert 2006:30).

5.6.3 The role and function of the ECT in the service

		Agree	Undecided	Disagree	Responses
A3.	There is currently a poor understanding within the service of exactly what the ECTs' role and function are.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 Round one (1) 100%

Comment: All participants were in agreement in round one with the fact that there is currently a poor understanding within the emergency services about the role and function of the ECT. This is also supported by views of members of the focus group interview and remains a problem highlighted in previous literature on mid-level health workers.

5.6.4 Link between lack of recognition and desire to study further

		Agree	Undecided	Disagree	Responses
A4.	If you agreed with the above statement (A4) do you agree that this lack of clarity may create even more of a demand from ECT graduates to study further and obtain a more recognized qualification (i.e. the B EMC)?	1	2	3	1 1 3 1 1 1 1 1 1 1 2 Round one (1) 45% Round two (1) 64% Round three (1) 82%

Comment: It is interesting to note that 82% consensus was only able to be achieved after round three and there was initially in round 1 only 45% agreement on this statement. This was a surprise to the researcher as his own anecdotal experiences within the profession had led him to believe that the fact that the role and function of ECTs is currently not well understood and that this lack of clarity in turn plays a major role in stimulating the ECT's desire to study further.

5.6.5 Desire for the employer for ECTs to study further

		Agree	Undecided	Disagree	Responses
A5.	The individual ECT graduate's desire/push for further study and articulation into the B EMC is currently higher than that of the service or organisation they work for.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 Round one (1) 82%

Comment: The consensus views above (achieved after round) are in the researcher's opinion a current reality within the emergency care profession and reflect poorly on EMS management, many of whom themselves do not hold any formal qualifications. This creates an environment where staff development and support for staff wishing to engage in further study has historically been substandard.

5.6.6 The number of ECTs who would wish to study further

		Agree	Undecided	Disagree	Responses
A6.	Not all ECTs will wish to enrol for the B EMC Programme.	1	2	3	1 1 1 1 3 2 1 1 1 1 1 Round one (1) 82%

Comment: The panel were in agreement during round one that not every single ECT would have the desire to further their studies by engaging in the BHS EMC programme. The researcher supports this concept as there may be

other areas they may wish to specialise in, such as management or purely rescue-related areas.

5.6.7 Sustained demand for articulation

		Agree	Undecided	Disagree	Responses
A7.	The Demand for articulation of ECT graduates into the University Degree Programmes will be sustained.	1	2	3	1 1 1 1 1 2 1 1 1 1 3 Round one (1) 64% Round two (1) 64% Round three (1) 82%

Comment: Analysis of the responses shows no change in percentage of consensus agreement between rounds one and two. The participants did, however achieve consensus after round three regarding the above statement.

The researcher argues that determining if demand from ECT graduates to study further and obtain the BHS EMC degree will be sustained is important as it would not make sense for Universities to invest in implementing the framework and associated bridging programme if the demand for articulation will peter out. From his interactions within the profession the researcher is in agreement with the expert panel that whilst the EMC and BHS degree programmes exist there will be a steady and continuous pool of ECTs wishing to articulate between the two programmes.

5.6.8 Desire for knowledge and insight vs. desire for increased scope

		Agree	Undecided	Disagree	Responses
A8.	The ECTs' demand for new knowledge and insight is not as strong as their demand for increased scope and recognition.	1	2	3	1 1 1 1 1 3 1 1 3 1 1 Round One (1) 82%

Comment: The panel were in agreement during the first round that the desire for an increased scope was stronger than a desire for new knowledge and insight. The researcher argues that this is indeed logical as an increased clinical scope of practice leads to the achievement of additional desirable outcomes such as higher status and recognition within the profession as well as better wages. These concepts were supported and reinforced by participants during the focus group interview.

5.6.9 Summary

Analysis of the statements and responses in Section A of the questionnaire confirms that there is a real and sustained demand for articulation between the ECT and BHS EMC programmes. The main factors driving this demand are the ECTs' desire for increased recognition and status within the professions, enhanced clinical scope of practice and associated benefits such as promotion and better wages.

5.7 RESPONSES TO SECTION B

Section B - contained 19 statements focusing on the extent to which the ECT Programme prepares the graduate for further academic study within the NQF and more specifically to articulate into the Professional Bachelor of Health Science degree in Emergency Medical Care.

5.7.1 Primary function of the ECT programme

		Agree	Undecided	Disagree	Responses
B1.	Although academic articulation is important, the primary function of the ECT Programme is to produce competent mid-level emergency care workers for the health sector.	1	2	3	1 1 1 1 1 1 1 1 1 2 1 Round One (1) 91%

Comment: Ten out of the eleven panel members agreed in round one that the primary function of the ECT should be to produce mid-level workers for the emergency care profession. This is an important consideration when designing a framework for articulation, for to simply have ECTs graduate and move directly into the BHS degree programme would create a qualification with no meaningful exit or impact.

The researcher, from an academic perspective, acknowledges the fact that education programmes within the NQF should allow for and support articulation into other programmes. However, having said this it is further argued that to include too much additional content that is unnecessary for the achievement of the exit-level outcomes of a particular programme merely to improve the possibility of advanced placement in other programmes may become self-

defeating. This is due to the fact that the additional content is more often than not more complex and on a higher NQF level and it may be seen as unfair and unnecessary to grapple with addition unnecessary content as not all ECT graduates may wish to pursue further study in the form of the BHS EMC degree.

5.7.2 Ability of ECT graduates to cope with University degree studies

		Agree	Undecided	Disagree	Responses
B2.	The ECT Programme is a higher education programme and therefore it is expected that graduates would have demonstrated an ability to engage academically within the NQF levels of the HE band.	1	2	3	1 1 1 1 1 1 1 3 1 1 1 Round one (1) 73% Round Two (1) 91%

Comment: Currently there is only one University (CPUT) offering the ECT programme; the remaining providers are all provincial colleges that are not currently registered as Higher Education institutions and, therefore, the assumption is that all of them are sufficiently empowering their graduates to continue to study within the Higher Education band of the NQF. By the end of round two 10 of the 11 panel members agree that part of the exit level outcome of the ECT programme should be the ability to undertake students at the Higher Education level.

5.7.3 Importance of the ECTs ability to become self-directed learners

		Agree	Undecided	Disagree	Responses
B3.	The ability of ECT graduates to function as adult learners and take responsibility for their own learning is important.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 Round One (1) 100%

Comment: All the panel members felt that it was important that ECTs who wish to study further are able to study independently as self-directed learners. This is an important concept as the framework (**Chapter 6**) suggests a limited contact bridging programme as compared to a lectured full-time offering.

5.7.4 Didactic methods used on the ECT programme

		Agree	Undecided	Disagree	Responses
B4.	The didactic methods used on the ECT Programme are similar to those employed at the Universities for the Bachelor degree Programmes.	1	2	3	3 3 3 3 1 3 3 3 3 3 3 Round one (3) 64% Round Two (3) 91%

Comment: It was interesting to note that the majority of the expert panel members indicated that teaching and learning methods employed on the current ECT programmes are different from those employed by the universities

on their professional degree programmes. If this is true, then the bridging programme should also serve to fulfil an additional function of introducing and exposing ECT graduates to the didactic methods they will be subjected to during the final two years of the BHS EMC programmes.

5.7.5 Ability of graduates from the ECT programme to cope with degree studies

		Agree	Undecided	Disagree	Responses
B5.	<u>All</u> graduates from the current ECT Programmes will be able to cope with the academic requirements of a Professional Bachelor degree at the NQF 8 level. (The DoE stipulates minimum academic entry requirements for a Bachelor degree, whereas entrance to the ECT Programme currently only requires a person to have passed grade 12 or equivalent NQF qualification.)	1	2	3	3 3 3 3 2 3 3 3 3 3 Round One (3) 91%

Comment: Nine out of 10 participants felt that not all ECT graduates would be able to cope with the increased academic demands of the bachelor degree programme. This implies a form of selection and/or filtering may be necessary before allowing ECT graduates to enrol for the BHS degree programme. It is argued that a bridging programme may fulfil this type of function. Those candidates who fail to pass the bridging programme would naturally be excluded from enrolment into the bachelor degree whilst those who successfully complete the bridging programme would have proved the ability to manage the academic requirements associated with bachelor degree studies.

5.7.6 Point of entry into the Professional Degree programme

		Agree	Undecided	Disagree	Responses
B6.	ECT graduates having completed two years of study would be able to enter directly into the third year of the Professional Bachelor degree Programme without any form of bridging or preparation. (The ECT and B EMC Degree Programmes are both vocationally focused and are designed to produce workers for the Emergency Service/pre-hospital Health Sector. A simplistic view on placement and articulation would be to say that because the ECT is 240 credits and two years and the Professional degree is 480 credits and four years the ECT graduates should simply enter directly into third year.)	1	2	3	3 3 3 3 3 2 3 3 3 3 3 Round One (3) 91%

Comment: Nine out of 10 panel members agreed during round one that it would not be possible to take ECT graduates directly into the third year of the bachelor degree programme without some form of bridging programme. Many of the perceived shortfalls are highlighted below.

5.7.7 Science component of the ECT programme

		Agree	Undecided	Disagree	Responses
B7.	The ECT Programme does not sufficiently address the basic sciences components (Physics and Chemistry) of the University B EMC degree Programmes.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 Round One (1) 73 % Round Two (1) 100%

Comment: By round two all eleven participants agreed that the current structure of the ECT programme does not include sufficient physics and chemistry learning outcomes to obtain a credit for similar offerings in the University degree programmes. By implication, should a bridging programme feature in the framework for articulation, one of the learning areas should address this shortfall.

5.7.8 Diagnostic abilities of ECT graduates

		Agree	Undecided	Disagree	Responses
B8.	As a programme designed to produce Technicians and not Clinicians the ECT Programme does not pay the same amount of attention to diagnostics and clinical decision-making as do the University B EMC degree programmes.	1	2	3	1 1 1 2 1 3 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was achieved in round one that ECTs do not have the same level of knowledge and insight as would degree students on completion of the second year of study of the degree programme in the area of patient assessment and diagnostics. This is supported by the critical analysis of the structure of the two programmes (**Chapter 2**) as well as comments from the focus group participants (**Chapter 4**). By implication, should a bridging programme feature in the framework for articulation, one of the learning areas should address this shortfall.

5.7.9 Level of Anatomy in the ECT programme

		Agree	Undecided	Disagree	Responses
B9.	The extent and level of anatomy covered during the first two years of the Universities degree programme is greater/higher than that covered during the two year ECT Programme.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 Round One (1) 91%

Comment: Consensus was achieved in round one that ECTs do not have the same level of knowledge and insight as would second-year students on the university degree programmes in the area of Anatomy. This is supported by the critical analysis of the structure of the two programmes (**cf. Chapter 2**) as well as comments from the focus group participants (**cf. Chapter 4**). By implication, should a bridging programme feature in the framework for articulation, one of the learning areas should address this shortfall.

5.7.10 Level of Physiology in the ECT programme

		Agree	Undecided	Disagree	Responses
B10.	The extent and level of physiology covered during the first two years of the University degree Programme is greater and or higher than that covered during the two year ECT Programme.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 Round One (1) 91%

Comment: Consensus was achieved in round one that ECTs do not have the same level of knowledge and insight as would degree students on completion of the second year of study of the degree programme in the area of physiology. This is supported by the critical analysis of the structure of the two programmes (**cf. Chapter 2**) as well as comments from the focus group participants (**cf. Chapter 4**). By implication, should a bridging programme feature in the framework for articulation one of the learning areas should address this shortfall.

5.7.11 Level of Emergency Care in the ECT programme

		Agree	Undecided	Disagree	Responses
B11.	The level of emergency medical care theory covered on the ECT Programme is equitable to that which would have been covered by students after their second year on the B EMC degree Programme. (Sufficient to obtain a credit for the first-and second-year emergency medical care theory modules/subjects.)	1	2	3	3 3 3 2 3 1 3 3 3 3 3 Round one (3) 82%

Comment: Whilst consensus was achieved in round one that ECTs do not have the same level of knowledge and insight as would degree students after the completion of their second year of the degree programme, this finding was not supported by the critical analysis of the structure of the two programmes (**cf. Chapter 2**) as well as comments from the focus group participants (**cf. Chapter 4**). The researcher is of the opinion that ECT graduates would by and large have met and exceeded the pure emergency care learning outcomes in years one and two of the degree programme.

5.7.12 Clinical skills and scope of practice of ECT graduates

		Agree	Undecided	Disagree	Responses
B12	The clinical skills covered and current scope of practice of the ECT graduate meets and or exceeds that of the second-year degree student. (Assuming they have reached the end of second year and are ready to enter the third year of the degree course.)	1	2	3	3 3 3 3 1 3 3 3 2 3 Round One (3) 73% Round Two (3) 73% Round Three (3) 82%

Comment: Consensus on the above statement was only achieved on round three with stability (73%) being noted between rounds one and two. Although the Delphi participants felt that the clinical skills and scope of practice for second-year students in their degree programmes exceed that of ECT graduates, these views were not supported by the focus group members or by the researcher's critical comparison of the two qualifications.

5.7.13 Clinical learning component of the ECT programme

		Agree	Undecided	Disagree	Responses
B13	The work-integrated clinical learning within the ECT Programme meets and/or exceeds that which would be expected from a Degree student during their first two years of study.	1	2	3	3 3 1 3 1 1 3 3 3 2 Round One (3) 36% ; (1) 36% Round Two (3) 73% Round Three (3) 64%

Comment: The above statement was the only statement from Section B on which consensus was not reached after all three rounds. This may be due to the fact that the structure of the learning programmes at the Universities offering the Degree programme does differ somewhat. The greatest degree of consensus was in round two where 73% of the participants felt that the ECT programme does not include the same amount of clinical work as the first two years of the degree programme. This is, however, unsupported by the researcher's critical analysis of the SAQA credit allocations and structure of the ECT and degree programmes.

5.7.14 The high angle rescue components of the ECT programme

		Agree	Undecided	Disagree	Responses
B14.	The High Angle Rescue covered in the ECT rescue elective is equitable to the introductory rope-rescue modules/subjects on the B EMC degree Programme. (Sufficiently similar as to obtain a direct credit.)	1	2	3	3 1 1 1 1 1 1 1 1 1 1 Round One (1) 73% Round Two (1) 91%

Comment: Consensus was reached in round two that the rope rescue component of the ECT programme as sufficiently similar to the rope rescue covered in the first two years of the degree programmes at the Universities in order for a credit to be awarded. This is supported by the findings of the focus group interview as well as the documentary analysis and comparison of the two programmes.

5.7.15 Standard of vehicle rescue on the ECT programme

		Agree	Undecided	Disagree	Responses
B15.	The Vehicle Rescue covered in the ECT rescue elective is equitable to the introductory rope-rescue modules/subjects on the B EMC degree Programme. (Sufficiently similar as to obtain a direct credit.)	1	2	3	2 3 1 1 1 1 1 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was reached in round one that the vehicle rescue component of the ECT programme as sufficiently similar to that covered in the first two years of the degree programmes at the Universities in order for a credit to be awarded. This is supported by the findings of the focus group interview as well as the documentary analysis and comparison of the two programmes.

5.7.16 Standard of fires search and rescue on the ECT programme

		Agree	Undecided	Disagree	Responses
B16.	The Fire Search & Rescue covered in the ECT rescue elective is equitable to the introductory rope rescue modules/subjects on the B EMC degree Programme. (Sufficiently similar as to obtain a direct credit.)	1	2	3	2 3 1 1 1 1 1 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was reached in round one that the fire search and rescue component of the ECT programme as sufficiently similar to that covered in the first two years of the degree programmes at the Universities in order for a credit to be awarded. This is supported by the findings of the focus group

interview as well as the documentary analysis and comparison of the two programmes.

5.7.17 ECT graduates' knowledge of professional practice

		Agree	Undecided	Disagree	Responses
B17.	On completion of the ECT Programme a graduate MLW's foundational knowledge of Professional practice and general grounding within the Pre-hospital Emergency Care Profession is similar to that of a student who has completed the second year of the B Degree Programme. (Sufficiently similar as to obtain a direct credit for the equivalent first and or second year offering of the degree course.)	1	2	3	1 1 1 1 1 1 1 1 1 1 3 Round One (1) 91%

Comment: Ten out of the 11 participants agreed in round one that foundational knowledge of Professional practice and general grounding within the Pre- hospital Emergency Care Profession is similar to that of a student who has completed the second year of the B Degree Programme. This is in line with the findings of the focus group interview as well as the documentary analysis and comparison of the two programmes.

5.7.18 Exit level credit allocation and structure of the ECT programme

		Agree	Undecided	Disagree	Responses
B18.	The fact that the current structure of the ECT is that of a two-year 240 credit exit level offering which is not aligned to the new HEQF poses a challenge when trying to offer and articulate this Programme with other HE qualifications. (From an enrolment, subsidy and funding perspective.)	1	2	3	1 1 1 1 3 2 1 1 1 1 1 Round One (1) 82%

Comment: During the time that this study was conducted, the Higher Education Qualifications Framework (HEQF) in South Africa did not feature a two-year 240 credit exit level qualification. This naturally created a challenge in that the ECT (and many other proposed mid-level health workers qualifications) are two years long and feature a 240-credit structure. At the time of writing this matter is under review and it would appear that adjustments to the HEQF are imminent. The majority of the panel members agreed during round one that this was an issue that poses a significant challenge to Universities wishing to offer the ECT programme.

5.7.19 The Maximum number of credit ECTs that could be awarded toward the professional degree programme

		Agree	Undecided	Disagree	Responses
B19.	The ECT Programme would not generate more than 50% of the credits toward the Bachelor degree in Emergency Medical Care.	1	2	3	1 1 1 1 1 1 1 1 1 1 Round One (1) 100%

Comment: Current regulations of the South African Department of Education limit the maximum number of credits that can be awarded towards a qualification to 50% of the total number. However, the panel members reached consensus agreement that this would not be a problem as completion of the ECT programme would not generate more than 50% of the credits toward the bachelor degree.

5.7.20 Summary

Analysis of the statements and responses in Section B of the questionnaire confirms there are a number of differences and similarities between the learning outcomes achieved on the two-year ECT programme and those achieved during the first two years of the professional degree. These differences and similarities become important considerations when attempting to guide articulation between the two qualifications.

5.8 RESPONSES TO SECTION C

Section C – contained 10 statements aimed at eliciting the participants' views around the possible format and structure of a framework and bridging programme that may support academic articulation between the ECT MLW qualification and the B EMC Degree.

5.8.1 Format for the offering of a bridging programme

		Agree	Undecided	Disagree	Responses
C1.	The bridging programme should be offered as a limited-contact programme to minimize the time ECT MLWs who are participating are away from work.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 Round (1) 64% Round Two (1) 82%

Comment: The consensus achieved in round two was that the bridging programme should be offered as a limited-contact programme to limit impact on service delivery that may be felt as a result of operational ECTs leaving the service to study further. The focus-group interview also touched on this area and minimising impact on service delivery was an area of concern. The

researcher in proposes a model in **Chapter 6** that may go some way to limiting the impact on service delivery whilst encouraging staff development.

5.8.2 The need for institutions to personalise the bridging programme

		Agree	Undecided	Disagree	Responses
C2.	The bridging programme would need to be altered slightly for each of the HEIs due to the fact that their B EMC Programmes and local requirements may not all be exactly the same.	1	2	3	1 1 1 1 3 2 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was reached in round one that institutions wishing to facilitate articulation and offer a bridging programme for ECTs would need to personalise the programme to suit their individual needs. This is further discussed in the following Chapter.

5.8.3 A work period of work before articulation into the degree programme

		Agree	Undecided	Disagree	Responses
C3.	ECT graduates must work for a period of time as MLWs before applying to study the degree Programme.	1	2	3	1 1 1 1 2 1 1 1 1 1 1 3 Round One (1) 55% Round Two (1) 73% Round Three (1) 82%
C4.	ECT graduates should work for a <u>minimum</u> of 1 year within a clinical environment before applying to study the B EMC.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 3 Round One (1) 55% Round Two (1) 64% Round Three (1) 91%
C5.	ECT graduates should work for a <u>minimum</u> of 2 years within a clinical environment before applying to study the B EMC.	1	2	3	1 3 3 3 3 3 3 3 3 3 3 Round One (3) 91%

Comment: Responses to statements C3, C4 and C 5 above are discussed simultaneously as all focus on the concept of a mandatory work period for ECTs prior to further study. There was much debate amongst the focus-group participants about the potential merits and merits of mandatory service prior to further study. The researcher having considered all the above inputs, recommends a one-year work period prior to engaging in the bridging programme, which is further discussed and argued in the following chapter.

5.8.4 The bridging programme may be undertaken whilst working

		Agree	Undecided	Disagree	Responses
C6.	A bridging programme could be completed during the above - mentioned work period.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 Round One (1) 91%

Comment: Consensus was achieved in round one with nine out of the 11 participants supporting the idea that the bridging programme could be undertaken whilst working as an ECT.

5.8.5 Point of entry and aim of the bridging programme

		Agree	Undecided	Disagree	Responses
C7.	The main aim of a bridging programme would be to prepare the ECT graduate to enter directly into the third year of the degree Programme	1	2	3	1 1 1 1 1 1 1 1 1 1 1 Round One (1) 73% Round Two (1) 100%

Comment: By the end of round 2 all 11 of the panel members were in agreement that the main aim of a bridging programme would be to prepare the ECT graduate to enter directly into the third year of the degree programme.

5.8.6 Completion of the bridging programme should be mandatory for ECTs wishing to enjoy advance placement within the degree programme

		Agree	Undecided	Disagree	Responses
C8.	Successful completion of a bridging programme would be a requirement for advance placement and enrolment of MLWs onto the degree Programme.	1	2	3	1 1 3 1 3 1 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was achieved after round one with nine of the 11 participants indicating that they felt it should be mandatory for ECT graduates to complete a bridging programme prior to being allowed access into the degree programmes.

5.8.7 Modules in the bridging programme should be credit-bearing

		Agree	Undecided	Disagree	Responses
C9.	The modules/subjects in the bridging programme should be credit-bearing toward similar outcomes in the B EMC degree.	1	2	3	1 1 3 1 3 1 1 1 1 1 1 Round One (1) 82%

Comment: Consensus was achieved in round one that the modules making up the bridging programme should be credit-bearing against similar offerings in the first and second year of the degree programme. This concept is further discussed in the following chapter.

		Agree	Undecided	Disagree	Responses
C10.	It would not be feasible to offer the bridging programme to <u>all</u> ECT graduates.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 Round One (1) 91%

Comment: Nine out of the ten panel members reached consensus in round one that it would not be possible to have every single ECT graduate move on and complete the B EMC degree. The researcher is in full agreement with this viewpoint, for the ECT colleges are producing larger numbers of ECT annually and there are simply not enough Universities or resources available to allow for each and every ECT graduate to enter bridging programmes and then move into the B EMC degree programmes. For this reason a form of selection and or filter mechanism needs to be in place. The researcher argues that the bridging programme may serve as one such filter.

5.8.8 Summary

Analysis of the responses of the Delphi statements in Section C, highlight strong similarities and agreements with the themes and trends that emerged from the focus group interview (c.f. chapter 4).

The following summary attempts to briefly discuss the main findings from these processes that were used to design the framework which is presented and discussed in the next chapter.

- a) It is acknowledged that the primary function and design of the ECT and B EMC programme are to produce mid-level workers and professional practitioners respectively. For this reason the level of depth, complexity and

scope of the two qualifications differ significantly. Having said this, there are common areas of similarity which have emerged. These areas include the foundation knowledge of anatomy, emergency medical care, professional practice and introductory rescue.

- b) Whilst the above similarities assist in gaining credits towards and advance placement within the B EMC degree, differences in the scope and level of depth achieved in some areas preclude ECT graduates from entering directly into the third year of the B EMC degree. Areas that have been identified as requiring deeper understanding include physiology, diagnostics, general pathology and health sciences (Chemistry and Physics).
- c) The didactic methodologies of the colleges offering the ECT programme were seen as very different from those at the Universities offering the B EMC programmes. This may require some adjustment by the learner.
- d) The National Department of Health have expressed a strong desire for ECT graduates to spend some time working as mid-level workers before they continue their studies. Certain academics are in favour of this, arguing that it will consolidate their knowledge and improve their clinical skills before entering the degree programme. Others argue that a break in studies is not always desirable due to potential knowledge decay.
- e) There is agreement on the need for a bridging programme if ECT students are to enter the third year of the B EMC. It is, however, acknowledged that bridging programmes cannot be perfectly standardised as the academic architecture of the B EMC degree differs between the various Universities.
- f) There is a desire to limit the time away from work when ECT graduates embark on further study, and for this reason it is suggested that the bridging programmes be offered as a limited-contact programme.

5.9 RESPONSES TO SECTION D

Section D - focused on the Knowledge, Skills and Values that participants felt should stem from completion of the **physiology** component of the bridging programme. Eighteen different areas of physiology were explored through the use of 275 possible learning outcomes. Whilst final percentage of agreement and round in which consensus was achieved is indicated, the researcher does not analyse and discuss each statement in detail, for as already explained, this falls outside of the scope of this study. The consensus views remain an important starting point for future research and development of a curriculum for bridging programmes in the profession.

		SECTION D			
		CRUCIAL PHYSIOLOGY LEARNING OUTCOMES FOR STUDENTS			
		COMPLETING A BRIDGING PROGRAMME			
		Essential	Useful	Unnecessary	Responses
D1 (Lymphatic system)	1.1 Describe the structure and general functions of the lymphatic system and its major components.	1	2	3	2 2 3 2 3 2 2 2 2 2 2 (2) 82%
D2 (Immune system)	2.1 Describe the structure and functioning of the innate immune system.	1	2	3	2 2 3 2 2 2 2 2 2 2 2 (2) 91%
	2.2 Describe the structure and functioning of the acquired immune system.	1	2	3	2 2 3 2 3 2 2 2 2 2 2 (2) 82%
	2.3 Explain the pathophysiology of Immune systems disorders (Allergic reactions).	1	2	3	2 2 3 1 1 1 1 1 1 1 1 (1) 73%
D3 (Endocrine system)	3.1 Provide an Overview of the endocrine system.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	3.2 Discuss Hormone structure and hormone interaction.	1	2	3	1 1 3 1 1 1 1 1 1 1 2 (1) 82%
	3.3 The relationship between the hypothalamus and the pituitary gland.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	3.4 Explain the abnormalities of thyroid hormone secretion, i.e. hyperthyroidism, hypothyroidism.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
D4 (The thyroid Gland)	4.1 Explain how thyroid hormones increase the transcription of large numbers of genes.	1	2	3	3 3 3 3 2 3 3 3 3 3 3 (3) 91%
	4.2 Elaborate on the effects of the thyroid metabolic hormones on specific bodily mechanisms.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	4.3 Outline the regulation of the release of the thyroid hormones.	1	2	3	1 1 3 1 1 1 1 1 1 1 2 (1) 82%
	4.5 State the effect of parathyroid hormone on calcium and phosphate concentrations in the extra cellular fluid.	1	2	3	2 1 3 1 1 1 3 1 2 2 1 (1) 55%
	4.6 Discuss the physiological effects associated with deficiency and excess production of PTH.	1	2	3	2 2 3 2 2 2 2 2 2 2 2 (2) 91%

D5 (The adrenal glands)	5.1 Explain the effects of cortisol on carbohydrate, protein, and fat metabolism.	1	2	3	2 2 3 2 2 2 2 2 2 1 2 (2) 82%
	5.2 Identify the function of cortisol in stress and inflammation.	1	2	3	1 1 1 1 1 1 2 2 1 1 1 (1) 82%
	5.3 Describe the abnormalities of cortisol secretion.	1	2	3	1 1 3 1 1 1 1 1 1 1 2 (1) 82%
	5.4 Explain the physiological significance of diseases associated with hypo- and hyper-secretion of adrenal hormones.	1	2	3	1 1 1 1 1 1 2 2 1 1 1 (1) 82%
D6 (The pancreas)	6.1 Describe the pathological physiology of diabetes mellitus types 1 and 2.	1	2	3	1 1 1 1 3 3 1 1 1 1 1 (1) 82%
D7 Other endocrine and hormone related topics	7.1 Describe the role of calcitonin in calcium homeostasis.	1	2	3	2 2 3 2 1 2 2 2 2 2 1 (1) 73%
	7.2 Discuss the role of erythropoietin in regulating blood volume and blood pressure.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	7.3 Describe the role of thymosin in immunity.	1	2	3	2 2 3 2 2 3 2 2 2 2 2 (2) 82%
	7.4 Describe the role of the enzyme renin in regulating blood volume and blood pressure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	7.5 Explain the functional changes in the endocrine system as the body ages.	1	2	3	1 1 3 1 1 2 1 1 1 1 2 (1) 73%
	7.6 Briefly explain the influence of hormones on the central nervous system.	1	2	3	1 1 1 1 1 1 1 1 2 1 1 (1) 91%
	7.7 Name the hormones involved in growth, and explain their individual and collective roles in this process.	1	2	3	2 2 3 2 2 2 2 2 2 3 2 (2) 82%
	7.8 Discuss the role of atrial natriuretic peptide in regulating blood volume and blood pressure.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
D8 (Metabolism and energetics)	8.1 Define metabolism and describe its purpose.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	8.2 Explain carbohydrate metabolism.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	8.3 Explain lipid metabolism.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	8.4 Explain protein metabolism.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	8.5 Explain nucleic acid metabolism.	1	2	3	2 2 1 2 2 2 2 2 2 2 2 (2) 82%
	8.6 Describe the metabolic interactions between the absorptive and post-absorptive states.	1	2	3	2 1 1 1 2 1 1 1 1 1 2 (1) 73%
8.7 List the sources of important dietary molecules, and describe the constituents of a good diet.	1	2	3	1 1 1 1 3 1 3 1 1 1 1 (1) 82%	
D9. (Muscle Mechanics)	9.1 Compare the following types of muscle contractions: muscle twitch; wave summation; tetanus (incomplete and complete); isotonic and isometric contractions; muscle relaxation and return to resting length.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	9.2 Describe the mechanisms by which muscle fibres obtain the energy to power contractions.	1	2	3	1 1 3 1 1 1 1 1 1 1 3 (1) 82%
	9.3 Distinguish between the energy production changes in a resting muscle, a moderately active muscle and a muscle at peak levels of activity.	1	2	3	1 1 3 1 1 1 1 2 1 3 3 (1) 64%
	9.4 Explain muscle fatigue and recovery from fatigue.	1	2	3	2 1 3 2 1 2 2 2 1 3 2 (2) 55%
	9.5 Explain the role of different hormones on muscle activity.	1	2	3	2 2 1 2 1 2 2 2 2 3 2 (2) 73%

	9.6 Relate the types of muscle fibres to muscle performance.	1	2	3	2 2 1 2 1 2 2 2 2 2 2 (2) 82%
	9.7 Distinguish between aerobic and anaerobic endurance and explain their implications for muscular performance.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	9.8 Specify the effects of exercise and ageing on muscles.	1	2	3	1 1 3 1 3 1 1 1 1 3 3 (1) 64%
	9.9 Understand the background behind the following terms:				
	A – Botulism	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	B - Duchenne's muscular dystrophy	1	2	3	1 1 2 2 1 1 2 2 2 2 1 (2) 55%
	C - Myasthenia gravis	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	D – Polio	1	2	3	1 1 2 1 2 1 1 1 1 2 1 (1) 73%
	E – Tetanus	1	2	3	1 1 1 1 1 1 2 1 2 1 1 (1) 82%
D10 (Neurological system)	10.1 Explain the effects of neurotoxins and local anaesthetics on the electrical activity in the nervous system.	1	2	3	1 1 1 2 1 1 1 1 3 1 1 (1) 82%
	10.2 Describe how changes in the extra cellular potassium may affect neurological functioning.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.3 Identify the synaptic chemical mediators of the peripheral nervous system and the variety of suspected chemical mediators in the central nervous system.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.4 Describe the mechanism of release of chemical mediators at synapses.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.5 Explain the mechanism of action of neurotransmitters on the postsynaptic membrane.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.6 Briefly discuss diseases associated with deficiencies in synaptic transmission.	1	2	3	1 1 3 1 1 1 1 1 1 1 3 (1) 82%
	10.7 Explain what is meant by plasticity of synapses.	1	2	3	1 1 2 1 2 1 1 1 2 1 3 (1) 64%
	10.8 Explain the role of neurotropic factors in the regrowth of axons.	1	2	3	1 1 2 1 2 1 1 1 2 1 3 (1) 64%
Spinal chord	10.9 Describe the roles of the Golgi tendon organ and the muscle spindles in motor control.	1	2	3	1 1 3 1 1 1 1 1 1 1 3 (1) 82%
	10.10 Describe the stimulus, motor response, purpose and mechanism involved in the following reflexes:				
	A - stretch reflex	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	B - golgi tendon reflex	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	C - flexor reflex	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	D - crossed extensor reflex	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	E - posture and locomotion reflexes	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	F - spinal cord reflexes causing muscle spasm	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	G - autonomic reflexes	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	10.11 Explain the importance of reciprocal inhibition and innervations in the flexor reflex.	1	2	3	1 1 2 1 1 1 1 1 1 2 3 (1) 73%
	10.12 Trace the neuronal pathway in the three main sensory pathways, and say which stimuli are carried	1	2	3	1 1 2 1 1 1 1 1 1 2 3 (1) 73%

	by each.				
	10.13 Explain how we can distinguish between different types of sensations, and how we know where in the body they originated.	1	2	3	1 1 1 1 1 1 1 1 1 1 3 (1) 91%
Central Nervous system	10.14 Locate the primary, association, and integrative areas of the cerebral cortex, and discuss their functions in detail.	1	2	3	1 1 1 1 1 1 1 1 1 2 2 (1) 82%
	10.15 Explain the concept of cerebral lateralization	1	2	3	1 1 2 1 1 1 1 1 1 1 3 (1) 82%
	10.16 Know the locations and functions of the cerebral nuclei.	1	2	3	2 2 2 2 1 2 2 2 2 2 3 (2) 82%
	10.17 Describe the functions of the limbic system.	1	2	3	2 2 2 2 3 2 2 2 2 2 3 (2) 82%
	10.18 Give a brief anatomical description of the cerebellum.	1	2	3	1 1 1 1 3 1 2 1 1 1 1 (1) 82%
	10.19 Describe the functions of the cerebellum.	1	2	3	1 1 1 1 3 1 2 1 1 1 1 (1) 82%
	10.20 Identify the components of the mesencephalon, and describe the functions of each.	1	2	3	1 1 1 1 1 1 1 1 1 2 3 (1) 82%
	10.21 Identify the location of the pons, and briefly describe its functions.	1	2	3	1 1 1 1 3 1 2 1 1 1 1 (1) 82%
	10.22 List the components and functions of the medulla.	1	2	3	1 1 1 1 3 1 2 1 1 1 1 (1) 82%
States of arousal	10.23 Describe the principal waves in an electroencephalogram (EEG), and identify the behavioural state associated with each.	1	2	3	1 1 3 1 3 1 3 1 1 1 1 (1) 73%
	10.24 Explain the significance of the EEG in the diagnosis of certain disorders.	1	2	3	1 3 3 1 1 1 1 1 1 1 1 (1) 82%
	10.25 Explain the role of the reticular activating system in arousal.	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	10.26 Distinguish between the two different levels of sleep.	1	2	3	2 2 3 2 2 2 3 2 2 2 2 (2) 82%
Learning and memory	10.27 Distinguish between associative and non-associative learning.	1	2	3	2 2 3 2 2 2 3 2 2 2 2 (2) 82%
	10.28 Compare sensitization to habituation.	1	2	3	2 2 2 2 2 2 3 2 2 2 2 (2) 91%
	10.29 Describe memory processing.	1	2	3	2 2 2 2 2 2 3 2 2 2 2 (2) 91%
	10.30 List the different classes of memory.	1	2	3	2 2 2 2 2 2 3 2 2 2 2 (2) 91%
	10.31 Explain the cellular changes in memory consolidation, elaborating on synaptic facilitation.	1	2	3	2 2 3 2 2 2 2 2 2 2 3 (2) 82%
	10.32 Distinguish between declarative and reflexive memories.	1	2	3	2 2 3 2 2 2 3 2 2 2 2 (1) 82%
	10.33 Describe the different types of amnesia.	1	2	3	1 1 2 1 3 1 1 1 1 2 2 (1) 73%
Emotions and behavior	10.34 Relate emotions to physiological functions.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	10.35 Explain why motivation is defined as the internal signals that shape behaviour.	1	2	3	2 2 1 2 2 2 2 2 2 2 2 (2) 91%
Language	10.36 Explain the respective roles of Wernicke's area, Broca's area, and the motor cortex in language.	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	10.37 Describe cerebral processing for vocalising a written and spoken word.	1	2	3	2 2 2 2 2 2 3 2 2 2 2 (2) 91%

	10.38 Differentiate between receptive, expressive, mechanical, and global aphasia.	1	2	3	2 1 2 1 3 1 1 1 1 1 2 (1) 64%
Brain chemistry and behaviour	10.39 Describe chemically-related alterations in brain function.	1	2	3	1 1 2 1 1 1 1 1 1 1 2 (1) 82%
Ageing	10.40 Describe the age-related anatomical and functional changes to the nervous system.	1	2	3	1 1 1 1 1 1 2 1 1 1 2 (1) 91%
Pain	10.41 State the functional purpose of pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.42 Distinguish between the two major categories of pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.43 List types of painful stimuli and where possible, describe the mechanism whereby they elicit pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.44 Trace the dual transmission of pain signals into the CNS.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	10.45 Identify and describe surgical methods for interrupting pain Pathways.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.46 Define what is meant by the term analgesia and describe the three major components of the analgesia system.	1	2	3	1 1 1 1 1 2 1 1 1 3 1 (1) 91%
	10.47 Describe the role of endorphins and enkephalins in eliciting an analgesic response	1	2	3	1 1 1 1 1 1 1 1 1 3 2 (1) 91%
	10.48 Define what is meant by referred pain and describe the mechanisms that elicit referred pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.49 Identify the general causes and principle causes of visceral pain, and identify the structures that are relatively insensitive to pain	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.50 Contrast the characteristics of visceral and parietal pathways for transmission of abdominal and thoracic pain.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.51 Identify the types, causes and characteristics of headaches of intracranial and extracranial origin.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.52 Distinguish between thermal receptors and thermal pain receptors.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
Motor control of the cerebral cortex and the brain stem	10.53 Distinguish between the functions and components of the pyramidal and extrapyramidal systems.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	10.54 Identify the functions of the reticular formation and specific brainstem nuclei in controlling subconscious, stereotyped movements.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 1 (1) 82%
	10.55 Identify the primary motor cortex, its spatial representation of muscle groups and discuss its functional significance.	1	2	3	1 1 3 1 1 1 1 1 1 2 2 (1) 73%
	10.56 Identify the functional significance and location of the premotor cortex and associated Broca's area, voluntary eye movement area, head rotation area, and area for hand skills.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	10.57 Identify the consequences of damage to the motor and premotor cortical regions	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	10.58 Describe the components of the vestibular system and explain how this system functions to maintain equilibrium.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
Motor control of the cerebellum and basal ganglia	10.59 Distinguish between the functions and components of the pyramidal and extrapyramidal systems.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.60 Identify the functions of the reticular formation and specific brainstem nuclei in controlling subconscious, stereotyped movements	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.61 Identify the primary motor cortex, its spatial representation of muscle groups and discuss its	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%

	functional significance.				
	10.62 Identify the functional significance and location of the premotor cortex and associated Broca's area, voluntary eye movement area, head rotation area, and area for hand skills.	1	2	3	1 2 2 2 1 2 2 2 1 2 1 (2) 64%
	10.63 Identify the consequences of damage to the motor and premotor cortical regions	1	2	3	1 2 1 1 1 1 1 2 1 1 1 1 (1) 82%
	10.64 Describe the components of the vestibular system and explain how this system functions to maintain equilibrium.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 1 (1) 82%
	10.65 Identify the major subdivisions and general functions of the cerebellum.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	10.66 Identify the major afferent pathways to the cerebellum and their spatial projection within the cerebellum.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 1 (1) 91%
	10.67 Identify the functional roles of the cerebellum in voluntary movements and extramotor predictive functions.	1	2	3	1 2 2 2 2 2 2 2 2 1 2 (2) 82%
	10.68 Identify the functional roles of the cerebellum in involuntary movements and equilibrium.	1	2	3	2 2 2 2 2 2 2 2 2 1 1 (2) 82%
	10.69 Identify the major clinical symptoms resulting from cerebellar abnormalities.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 1 (1) 91%
	10.70 Identify the reticular activating system, its major pathways and their respective functions, as well as their mechanisms of activation.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	10.71 List the structures that make up the basal ganglia, and state their functions.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
D11 (Autonomic Nervous system)	11.1 List the physiological effects caused by sympathetic stimulation.	1	2	3	1 1 1 1 1 3 1 1 1 1 3 1 (1) 82%
	11.2 Give a detailed description of the locations and functions of the receptors (adrenergic) in the sympathetic division.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	11.3 List the physiological effects caused by parasympathetic stimulation.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	11.4 Give a detailed description of the locations and functions of the receptors (cholinergic) in the parasympathetic division.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	11.5 Compare the structures and functions of the sympathetic and parasympathetic divisions.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	11.6 Describe the mechanism of neurotransmitter release and removal in the autonomic nervous system.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	11.7 State the effect of sympathetic and parasympathetic blocking agents on the body.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	11.8 Explain the importance of autonomic tone.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	11.9 Explain the importance of dual innervation.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	11.10 Compare and contrast a visceral reflex arc to a somatic reflex arc.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 1 (1) 82%
	11.11 Explain the role of the brain in regulating autonomic functions.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	11.12 Briefly discuss disorders of the autonomic nervous system.	1	2	3	1 1 1 1 1 1 1 1 1 1 3 2 (1) 82%
Sensory receptors: Vision	11.13 Explain the following physiological processes:				
	Photoreception;	1	2	3	2 2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	Recovery after stimulation;	1	2	3	2 2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	Night blindness;	1	2	3	2 2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	Colour vision and colour blindness;	1	2	3	2 2 2 2 2 2 2 2 2 2 2 2

					(2) 100%
	11.14 Describe the visual pathway including retinal and central processing of visual information.	1	2	3	2 2 2 2 2 2 2 2 2 2 (2) 100%
Hearing and equilibrium	11.15 Describe how pitch and loudness are coded for respectively.	1	2	3	2 2 2 2 2 2 2 2 2 2 (2) 100%
D12 (Blood)	12.1 Define polycythemia and discuss the effect that it has on the body.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	12.2 Define anaemia, and describe the effect that it has on the body.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	12.3 List the different types of anaemia and the cause of each one.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	12.4 Define the terms leukopenia and leukocytosis and discuss the effect of each condition on the body.	1	2	3	1 1 1 1 2 1 1 1 1 1 1 (1) 91%
	12.5 Define the terms thrombocytopenia and thrombocytosis and list possible causes of each condition.	1	2	3	1 1 1 1 1 1 1 2 1 1 1 (1) 91%
	12.6 Discuss the condition, erythroblastosis fetalis, by describing how it develops, the effects that this condition has on the foetus and new-born, and possible therapeutic interventions.	1	2	3	1 1 2 1 1 1 1 1 1 1 2 (1) 82%
Haemostasis	12.7 Describe how hemostasis can be manipulated by anticoagulants such as EDTA, warfarin, and heparin.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	12.8 List the factors that exercise negative feedback control over coagulation and describe how they prevent coagulation in normal, intact blood vessels.	1	2	3	1 1 3 1 1 1 1 1 1 1 2 (1) 82%
	12.9 Describe the cause, specific effects on hemostasis and therapeutic interventions for each of the following conditions:				
	Vitamin K deficiency	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	Thrombocytopenia	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	Haemophilia1	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	Von Willebrands Disease	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
D13 (cardiovascular system)	13.1 Describe the nerve innervation of the heart wall.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.2 Describe the blood supply of the heart wall.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	13.3 Name the two types of cardiac muscles cells and compare them in terms of their function, structure, locations.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.4 Compare the action potentials of the two types of cardiac muscle cells on the basis on their appearance, duration, and ion movements that are responsible for each phase.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	13.5 List the components of the heart's conducting system and describe the function of each one.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.6 Describe the excitation-contraction coupling of the cardiac contractile cells and explain the role of calcium in this process.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
Describe the cardiodynamics and discuss how they are regulated	13.7 Define the terms cardiac cycle, diastole and systole.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	13.8 Name the stages of the cardiac cycle and describe the electrical, volume, and pressure	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%

	changes which occur in the heart during each stage.				
	13.9 Describe how the heart sounds are produced and explain what is meant by the term, heart murmur.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	13.10 Define the terms: cardiac output, stroke volume and heart rate, and indicate how these factors are related.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	13.11 Explain how the end-diastolic and end-systolic volumes affect the stroke volume, and discuss how each is regulated.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	13.12 Discuss the regulation of the heart rate by autonomic innervations and hormones.	1	2	3	1 1 1 1 1 3 1 1 1 1 3 (1) 82%
Mechanisms which regulate the activity of the cardiovascular system	13.13 List the three mechanisms by which the cardiovascular function is regulated.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	13.14 Explain how autoregulation maintains blood flow within specific tissues.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	13.15 Indicate the location of the cardiovascular control centre, list its various sub-divisions, and describe the functioning of each sub-division.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.16 Explain how vasomotor tone is maintained.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.17 Explain the baroreceptor reflex and describe how it affects the cardiovascular function.	1	2	3	1 1 1 1 1 3 1 1 1 1 3 (1) 82%
	13.18 Explain the chemoreceptor reflex and describe how it affects the cardiovascular function.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	13.19 List the hormones which regulate cardiovascular function and describe the specific effects of each one.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
The body's response to haemorrhaging	13.20 Define circulatory shock and list the causes thereof.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	13.21 Describe the three phases of hemorrhagic shock and the physiological mechanisms that characterise each phase.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	13.22 Account for the main signs and symptoms of hemorrhagic shock.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
D14. Integrated physiology (Exercise)					
Male vs female athlete	14.1 Describe the gender differences that affect athletic performance.	1	2	3	3 3 3 3 3 3 3 3 2 3 (3) 91%
Skeletal muscle in exercise	14.2 Describe the three muscle metabolic systems and explain their role during different types of exercise.	1	2	3	2 2 2 2 3 2 2 2 2 2 2 (2) 82%
	14.3 Explain the causes of muscle fatigue.	1	2	3	2 2 2 2 2 2 3 3 2 2 2 (2) 82%
	14.4 Describe the processes that aid muscle recovery following exercise.	1	2	3	2 2 2 2 2 3 3 2 2 2 (2) 82%
	14.5 Describe the factors that affect muscle performance.	1	2	3	2 2 3 2 3 2 2 2 2 2 2 (2) 82%
Hormonal regulation of metabolism	14.6 List the hormones that regulate metabolism during exercise and state their respective effects.	1	2	3	2 2 3 2 3 2 2 2 2 2 2 (2) 82%
Ventilatory responses to exercise	14.7 Explain how oxygen consumption changes during and after exercise.	1	2	3	1 2 3 2 3 2 2 2 2 2 2 (2) 73%
	14.8 Define VO ₂ max and explain its relevance to an athlete.	1	2	3	1 2 3 2 2 2 2 2 2 2 2 (2) 82%
	14.9 Describe how respiration changes before, during and after exercise.	1	2	3	1 3 3 3 3 2 3 3 2 3 2 (3) 64%
Cardiovascular response to exercise	14.10 Explain how blood pressure is affected by exercise.	1	2	3	1 2 3 2 2 2 2 2 2 2 2 (2) 82%

	14.11 Describe how and why blood is redistributed throughout the body during exercise.	1	2	3	1 2 3 2 2 2 2 2 2 2 2 (2) 82%
	14.12 Explain the long-term effects of exercise on the cardiovascular system.	1	2	3	1 1 3 3 1 1 2 2 2 2 2 (2) 45%
Fluid and electrolyte balance	14.13 Explain the effect of exercise on the urinary system activities.	1	2	3	2 3 3 3 1 2 2 2 2 2 2 (2) 64%
	14.14 Compare the effect of exercise intensity on perspiration rate and concentration in a sedentary individual and athlete.	1	2	3	3 3 3 3 3 3 3 3 2 3 3 (3) 91%
Exercise and health	14.15 How do drugs (e.g. caffeine, amphetamines) affect athletic performance?	1	2	3	1 1 3 2 2 2 2 2 2 2 2 (2) 73%
	14.16 Explain how regular exercise reduces the risk of cardiovascular disease.	1	2	3	2 2 3 3 3 3 3 3 3 3 3 (3) 82%
	14.17 Explain how regular exercise affects Non Insulin Dependent diabetes Mellitus.	1	2	3	1 1 2 1 2 1 1 1 1 1 1 2 (1) 73%
	14.18 Explain how regular exercise affects immunity.	1	2	3	2 2 3 2 2 2 2 2 2 2 2 (2) 82%
D15 (Thermoregulation)					
Mechanisms of heat transfer	15.1 Explain the importance of maintaining a relatively constant and high body temperature.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	15.2 Discuss what is meant by "normal" body temperature and the factors that are responsible for individual variations.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	15.3 Describe the mechanisms whereby heat is gained or lost from the body (i.e. conduction, convection, radiation and evaporation), and the primary sites of the body where these occur.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
Thermoregulatory reflex	15.4 Identify the components of a thermoregulatory reflex.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	15.5 Identify the names and locations of the body's thermoreceptors and the stimuli to which each responds.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	15.6 Describe the role of the hypothalamus in temperature regulation.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	15.7 Describe the effectors of heat loss.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	15.8 Describe the effectors of heat gain.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
Abnormalities of body temperature	15.9 Define the terms, hyperthermia and hypothermia.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	15.10 Explain the cause and effect of each of the following on normal body temperature:				
	Fever	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	Heat exhaustion	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Heat stroke	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Hot flushes	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	Malignant hyperthermia	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	Hypothermia	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
D16 (Respiratory System)					
	16.1 List the various indicators of respiratory performance and discuss their relevance	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	16.2 Define, calculate and interpret the following indicators of respiratory performance:				
	respiratory rate	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%

	lung volumes e.g. tidal volume, expiratory reserve volume, residual volume, inspiratory reserve volume	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	lung capacities e.g. inspiratory capacity, functional capacity, vital capacity and total lung capacity	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	dead space volume	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	minute ventilation	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	alveolar ventilation	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	FEV01/FVC.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
Transport of respiratory gases by the blood	16.3 Describe the manner in which carbon monoxide is transported in the blood and the effect that it has on blood oxygen transport.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	16.4 Describe how and why variations in pH, temperature and biphosphoglycerate levels and exercise alter the position of the O ₂ -Hb saturation curve.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	16.5 Compare the O ₂ -Hb saturation curve of adults to that of a foetus.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	16.6 Describe the manner in which carbon monoxide is transported in the blood and the effect that it has on blood oxygen transport.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
Control of respiration	16.7 Name the four respiratory centres, describe their locations and discuss the effect that each one has on the ventilation pattern.	1	2	3	1 1 1 2 1 1 1 1 1 3 1 (1) 82%
	16.8 Define the following terms:				
	Hypercapnia/hypocapnia	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Hypoxia	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Hyperventilation/hypoventilation	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.9 Describe how the following factors modify ventilation				
	Chemoreceptor reflex	1	2	3	1 1 1 1 1 3 1 1 1 2 1 (1) 82%
	Baroreceptor reflex	1	2	3	1 1 1 1 1 2 1 1 1 3 1 (1) 82%
	Hering-Breuer reflex	1	2	3	1 1 1 1 1 2 1 1 1 3 1 (1) 82%
	Protective reflexes	1	2	3	1 1 1 1 1 2 1 1 1 3 1 (1) 82%
	Voluntary control	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	Exercise	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
Effect that environmental changes such as high altitude and deep sea diving has on the body, particularly on the respiratory function	16.10 Describe the effect of (a) high altitude and (b) deep sea diving	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.11 Describe the changes in ambient pressure that the body is modulated to in each environmental condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.12 Explain how the specific environmental condition affects the ambient, alveolar, and blood carbon dioxide and	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 82%

	oxygen levels.				
	16.13 Describe the effects that these blood gas levels have on the respiratory function.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.14 Identify other physiological effects that each environmental condition may have on the body.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
D17 (Kidney and body fluids)					
Integration of renal mechanisms for the control of extracellular fluid volumes	17.1 Describe the mechanisms that control sodium and water excretion.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.2 Discuss the importance of pressure natriuresis and pressure diuresis in maintaining sodium and fluid balance.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	17.3 Discuss the nervous and hormonal factors that increase the effectiveness of renal-body fluid feedback control.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	17.4 Briefly describe the abnormal conditions that can cause large increases in blood volume and/or Extra cellular Fluid volume.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	17.5 Explain the mechanisms involved in renal regulation of ions.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	17.6 Briefly describe the regulation and concentration in the ECF of the following ions: K ⁺ , Ca ²⁺ , PO ₄ ⁻ , and Mg ²⁺ .	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
Regulation of acid-base balance	17.7 Define what is meant by the following terms: pH, acid, base, salt and buffer, and list examples of each.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.8 Explain briefly why it is important that the hydrogen ion concentration is so precisely regulated, and list the defence mechanisms that combat changes in H ⁺ concentration.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.9 Describe in detail, the bicarbonate buffer system.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.10 Discuss the respiratory regulation of acid-base balance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.11 Discuss the renal regulation of acid-base balance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.12 Describe the secretion of hydrogen ions and the reabsorption of bicarbonate ions by the renal tubule.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.13 Explain how new bicarbonate ions are formed.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.14 Briefly describe the renal correction of acidosis and alkalosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.15 Explain the importance of proteins as buffers.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.16 Explain why it is important that the hydrogen ion concentration is so precisely regulated.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.17 List the defence mechanisms that combat changes in H ⁺ concentration.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.18 List the sources of acids and bases in the body.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.19 Explain what is meant by a buffer.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.20 Describe the protein, phosphate and bicarbonate buffer systems.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.21 Distinguish between respiratory acidosis, metabolic acidosis, respiratory alkalosis and	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%

	metabolic alkalosis.				
	17.22 Explain how the above acid-base disorders can be brought about.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.23 Explain how the respiratory and renal systems compensate for acid-base disorders.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
Urination and the micturition reflex	17.24 Describe the physiologic anatomy and the nervous connections of the bladder.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.25 Discuss the voluntary and involuntary regulation of urination.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.26 Describe the micturition reflex.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
D18 (Fertilisation, pregnancy, development)	18.1 Describe the events of fertilisation.	1	2	3	1 1 3 1 1 1 1 1 1 2 2 (1) 73%
	18.2 Describe the events of implantation and placental formation.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.3 Name the three embryonic germ layers, and state which organ systems each will form.	1	2	3	1 1 3 1 1 1 1 1 1 1 2 (1) 82%
	18.4 List the three prenatal periods, and describe the major events associated with each.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.5 Describe the effects of hormones on the development of male and female reproductive systems.	1	2	3	2 2 3 2 1 2 2 2 2 2 2 (1) 82%
	18.6 List the functions of the four extra-embryonic membranes.	1	2	3	2 1 3 1 1 1 2 1 1 1 2 (1) 74%
	18.7 Discuss the importance of the placenta as an endocrine organ.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.8 Explain the major changes that occur in maternal systems during pregnancy.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.9 Describe the hormonal regulation of pregnancy.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.10 Describe the structural and functional changes in the uterus during pregnancy.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.11 Describe the events in each of the three stages of labour.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.12 Explain the hormonal and nervous system factors responsible for lactation.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 82%
Birth control and infertility	18.13 Describe different methods of birth control.	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%
	18.14 Describe how technology is used in the treatment of infertility.	1	2	3	3 3 3 3 3 3 3 3 3 3 2 (3) 91%

Comment: Of the 275 possible learning outcomes there were 28 (9%) where consensus could not be reached after the three rounds. Of the 247 outcomes where consensus was reached 193 (78%) were seen to be essential, 46 (18%) useful and only 5 (2%) were deemed to be unnecessary.

5.10 RESPONSES TO SECTION E

Section E focused on the Knowledge, Skills and Values that participants felt should stem from completion of the **pathology** component of the bridging programme. Forty five different areas of general pathology were explored through the use of 559 possible learning outcomes.

		SECTION E CRUCIAL GENERAL PATHOLOGY LEARNING OUTCOMES FOR STUDENTS COMPLETING A BRIDGING PROGRAMME.			
		Essential	Useful	Unnecessary	Responses
E 1 (CELLULAR INJURY & DEATH)	1.1 Name and describe the modalities of cellular injury.	1	2	3	2 2 2 2 2 2 2 2 2 2 (2) 100%
	1.2 Discuss the concepts of biochemical and functional cellular injury.	1	2	3	2 2 2 2 2 2 2 2 2 2 (2) 100%
	1.3 Classify and give an outline of the various morphologic changes that may occur in sublethally injured cells, including hydropic and fatty changes and cellular atrophy.	1	2	3	2 2 2 2 2 2 2 2 2 2 (2) 100%
	1.4 Give an explanation of what constitutes cellular death.	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	1.5 Describe the morphologic changes of necrosis and refer to the various types of necrosis that may occur.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	1.6 Briefly describe the effects of necrosis (you may leave out the section on different types of pathologic calcification).	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
E2 (INFLAMMATION & REPAIR)	2.1 Name and describe the five gross features of inflammation.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	2.2 Discuss how fluid dynamics are altered by inflammation by referring to the process of exudates formation and how the lymphatic system is involved in the inflammatory process.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	2.3 Explain the cellular aspects of inflammation, margination, emigration and chemotaxis and relate these to changes occurring in the inflammatory response.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	2.4 Explain the role of histamine, plasma factors and arachidonic acid metabolites in the mediation of inflammation.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	2.5 Discuss the patterns of inflammation and give the causes and features of each pattern and its related sub-types of inflammation.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	2.6 Explain what happens to tissue affected by the inflammatory process.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	2.7 Give an overview of the stages that occur in wound	1	2	3	1 1 1 1 1 1 3 1 1 1

	healing, contrasting healing by first and second intention.				1 (1) 91%
	2.8 State factors that may affect inflammation and healing.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
E3 (BODY RESPONSE TO IMMUNOLOGIC CHALLENGE)	3.1 Give a basic explanation of the concept of "self" and "non-self" from an immunologic perspective and explain the role played by the Major Histocompatibility Complex antigen.	1	2	3	1 1 2 1 1 1 1 1 1 1 2 (1) 82%
	3.2 Define the terms "antigen" and "immunogen" and explain the various molecular features which affect/determine immune response potential. [I'm not sure I understand this sentence]	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	3.3 Explain the basic principles of cell-mediated immunity by referring to the roles of CD4 and CD8 cells.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	3.4 Describe the major functions of cell-mediated immunity.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	3.5 Explain the basic principles of humoral immunity and describe the types and roles of the various immunoglobulins.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	3.6 Describe the functions and activations of complement as part of humoral immunity.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	3.7 Give an overview of the immune response by describing its afferent and efferent limbs and by describing the concepts of primary and secondary immune responses.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	3.8 Name the four types of hypersensitivity reactions, explain the mechanisms of each and give a few examples of diseases caused by them.	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
E4 (DISTURBANCES IN CIRCULATION)	4.1 Distinguish between active and passive congestion by referring to causes and examples of each.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	4.2 Explain the etiology and pathogenesis of edema formation and differentiate between transudates and exudates.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	4.3 Briefly discuss some effects of edema on various organ systems.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	4.4 Define and identify different forms of haemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.5 Discuss the etiologies of the different types of haemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.6 Give an overview of the main types of pathophysiological effects related to different forms of hemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.7 Define thrombosis and discuss the etiology and pathogenesis of this disorder.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	4.8 Describe the composition of a typical thrombus and discuss the common locations for thrombosis formation.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.9 Give a brief explanation of the effects of venous and arterial thrombosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.10 Define the term "embolism" and name different types of embolus.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.11 Explain the Pathophysiological effects of various types (embolus and location) of embolism.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%

	4.12 Define the term atherosclerosis and differentiate this from the term arteriosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.13 List the anatomical locations most commonly involved in atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.14 Discuss the morphology of a typical atherosclerotic plaque.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.15 Explain the etiology and incidence of atherosclerosis.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	4.16 Give an overview of the consequences of atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.17 Define, and differentiate between the terms "ischemia" and "infarction".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	4.18 Give a broad overview of the effects of ischemia and infarction.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E5 (DISTURBANCES IN GROWTH, CELLULAR PROLIFERATION AND DIFFERENTIATION)	5.1 Differentiate between the different disorders causing abnormally small tissue or organ mass – agenesis, aplasia, hypoplasia and atrophy.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.2 Differentiate between the different disorders causing abnormally large tissue or organ mass – hypertrophy and hyperplasia.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.3 Define and explain the terms "metaplasia" and "dysplasia" with reference to disordered cellular differentiation.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.4 Define the term "neoplasm".	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.5 Differentiate between benign and malignant neoplasms by discussing and contrasting the features of each type.	1	2	3	1 1 1 1 1 1 1 1 1 2 1 (1) 82%
	5.6 Describe what is meant by the term "metastasis" and what the results of this may be in terms of disease progression.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.7 Explain the possible effects of neoplasms on a host and describe how the host response may influence the development of neoplasms.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	5.8 Give a basic overview of neoplasm structure, including explanation of the terms well-differentiated, poorly differentiated, undifferentiated and anaplastic.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.9 Describe how neoplasms are classified and give some examples of neoplasm names used in specific contexts (i.e. affecting specific organs).	1	2	3	1 2 2 2 1 2 2 2 2 2 2 (2) 82%
	5.10 Give a broad overview of the proposed mechanisms resulting in carcinogenesis.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	5.11 Discuss clinical aspects of neoplasia with regard to patient presentations, patient age and the need for definitive laboratory diagnosis.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	5.12 Briefly explain what is meant by "staging" of cancer and how this impacts on different forms of treatment available for cancer.	1	2	3	2 2 2 2 2 2 2 2 2 2 2 (2) 100%

E6 (ANAPHYLAXIS)	6.1 List the important mediators of inflammation and for each one, explain its effects in enhancing the inflammatory response.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	6.2 Explain the process of an anaphylactic reaction and the typical clinical response of the patient.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E7 (BRONCHIAL ASTHMA)	7.1 Define asthma by referring to the basic characteristics of the disease.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	7.2 Explain key aspects of the ventilatory dysfunction that occurs as a result of asthma.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	7.3 Name and discuss the various subsets or groupings of patients and related presentations commonly occurring within the larger group of asthma patients.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	7.4 List the differential diagnoses to be considered when confronted with a patient displaying asthma-like clinical features.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	7.5 Give an overview of the treatment considerations for acute severe asthma, especially status asthmaticus.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E8 (HIV/AIDS)	8.1 Explain what the acronyms "HIV" and "AIDS" stand for and what the relationship between the entities is.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 91%
	8.2 Identify the etiological factors associated with AIDS.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.3 Summarise the epidemiological profile of HIV/AIDS.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.4 Explain the pathophysiology of HIV/AIDS by referring to transmission and entry of HIV, viral attachment, viral replication and the immune response to HIV infection.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.5 Briefly discuss how monitoring of HIV positive patients is conducted using CD4+ cells as a marker.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.6 Give a detailed description of the clinical progression of the HIV positive patient by discussing phases of infection.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.7 Discuss the clinical manifestations of HIV positive patients at various stages in the clinical progression of the disease.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.8 Describe how an HIV test is performed, noting the time delay between infection and possibility of a positive test result.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.9 Review the important aspects of HIV/AIDS in the paediatric population.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	8.10 Give a broad overview of antiviral therapeutic options	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
E9 (HEMOPHILIA & VON WILLEBRAND'S DISEASE)	9.1 Define hemophilia and explain the causes and sub-types of this disease.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	9.2 Discuss the main pathophysiological features of both forms of the disease and state the classification system for	1	2	3	1 1 2 1 1 1 1 1 1 1 1

	hemophiliacs.				(1) 91%
	9.3 Briefly describe the secondary effects of hemophilia and give an overview of treatment approaches used for the disease.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	9.4 Define Von Willebrand's disease and list the causes and sub-types.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	9.5 Explain the pathophysiological features of the disease and relate these to secondary effects.	1	2	3	2 2 2 2 2 2 2 2 2 1 1 (2) 82%
	9.6 Outline the treatment approaches used for Von Willebrand's disease.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
E10 (DISSEMINATED INTRAVASCULAR COAGULATION (DIC)	10.1 Define DIC and identify the possible precursors of this disorder.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	10.2 Explain the pathophysiological processes responsible for DIC.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	10.3 Describe the clinical manifestations that may occur in a patient with DIC	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	10.4 Give a broad overview of the treatment approaches used for DIC.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
E11 (DISORDERS OF FLUID VOLUME, OSMOLALITY AND ELECTROLYTES – VOLUME IMBALANCES)	11.1 Define the term "extracellular fluid volume deficit" and differentiate it from the term "dehydration".	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	11.2 List the possible causes of Extra Cellular Fluid volume deficits under two general headings: renal and extrarenal losses.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	11.3 Explain the term "third space" and name the disorders which involve fluid loss into this space.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	11.4 Describe the hemodynamic responses to fluid volume deficits, including activation of the rennin-angiotensin-aldosterone system	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	11.5 Name the clinical features of an ECF fluid volume deficit and relate these to a form of physiological compensation, where applicable.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 91%
POTASSIUM IMBALANCES	11.6 Define the term "hypokalemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.7 List the possible causes of hypokalemia and briefly explain how each one results in a reduction of serum potassium concentration.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.8 Describe the clinical features of hypokalemia, including the ECG changes.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	11.9 Explain what effects hypokalemia has on the resting membrane potential of cardiac cells and how this leads to the clinically observed effects on cardiac functioning.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	11.10 Define the term "hyperkalemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.12 List the possible causes of hyperkalemia and briefly	1	2	3	1 1 1 1 1 3 1 1 1 1

	explain how each one results in a reduction of serum potassium concentration.				1 (1) 91%
	11.13 Describe the clinical features of hyperkalemia, including the ECG changes.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	11.14 Explain what effects hyperkalemia has on the resting membrane potential of cardiac cells and how this leads to the clinically observed effects on cardiac functioning.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
CALCIUM IMBALANCES	11.15 Give an overview of calcium homeostasis focusing on the processes of osteoclastic and osteoblastic activities aimed at regulating serum calcium levels under the influence of parathyroid hormone and calcitonin..	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	11.16 Explain the importance of ionised calcium in physiological processes.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	11.17 Briefly explain the role of vitamin D in the regulation of serum calcium levels.	1	2	3	1 1 1 1 1 2 2 2 1 1 1 (1) 82%
	11.18 Define the term "hypocalcemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.19 Discuss the possible causes of hypocalcemia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.20 Describe the clinical features of hypocalcemia including Chvostek's sign, Trousseau's sign and the ECG changes.	1	2	3	1 1 1 1 1 1 1 1 1 2 1 1 (1) 91%
	11.21 Define the term "hypercalcemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.22 Discuss the possible causes of hypercalcemia.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	11.23 Describe the clinical features of hypercalcemia, including the ECG changes.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
MAGNESIUM IMBALANCES	11.24 Give an overview of magnesium homeostasis.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	11.25 Define the term "hypomagnesemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	11.26 Name the possible causes of hypomagnesemia.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	11.27 Describe the clinical features of hypomagnesemia, including the ECG changes.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
E12 (ACID-BASE DISORDERS)	12.1 Define the terms "acidosis" and "alkalosis".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.2 Define the following acid-base disorders in terms of the Henderson-Hasselbach equation: 1. Respiratory acidosis; 2. Metabolic acidosis; 3. Respiratory alkalosis; 4. Metabolic alkalosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.3 For each of the acid-base disorders above, give a basic description of the contributory causes.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.4 Explain the idea that it is not the absolute amounts of acid and base that influence the short-term maintenance of a	1	2	3	1 1 1 1 1 3 1 1 1 1 1

	homeostatic pH, but rather the ratio of these components.				(1) 91%
	12.5 Discuss the process of compensation for primary acid-base disorders, both short- and long-term.	1	2	3	1 1 1 1 1 1 1 1 3 2 1 (1) 82%
	12.6 Describe the steps to be followed in the process of acid-base imbalance assessment.	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	12.7 List the causes of a metabolic acidosis and explain how each one causes this acid-base imbalance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.8 Explain the principle of the "anion gap" and the factors contributing to both a normal and increased anion gap metabolic acidosis.	1	2	3	1 1 1 1 1 1 1 1 3 2 1 (1) 82%
	12.9 Discuss the typical compensatory response to a metabolic acidosis and list the clinical features of this condition (give a full description of typical qualitative blood gas values).	1	2	3	1 1 1 1 1 1 1 1 3 2 1 (1) 82%
	12.10 Discuss the complications of administration of intravenous NaHCO ₃ .	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.11 List the causes of a metabolic alkalosis and explain how each one causes this acid-base imbalance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.12 List the clinical features of metabolic alkalosis (give a full description of typical qualitative blood gas values).	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	12.13 List the causes of a respiratory acidosis and explain how each one causes this acid-base imbalance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.14 List the clinical features of this respiratory acidosis (give a full description of typical qualitative blood gas values).	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	12.15 List the causes of a respiratory alkalosis and explain how each one causes this acid-base imbalance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	12.16 List the clinical features of this respiratory alkalosis (give a full description of typical qualitative blood gas values).	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	12.17 Distinguish between additive and offsetting mixed acid-base imbalances, give two examples of each along with one cause for each example.	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	12.18 Give diagnostic features and examples of causative factors for: 1. Metabolic acidosis + respiratory acidosis; 2. Metabolic alkalosis + respiratory alkalosis; 3. Metabolic acidosis + respiratory alkalosis; 4. Metabolic alkalosis + respiratory acidosis;	1	2	3	1 1 1 1 1 1 1 1 3 2 1 (1) 82%
E13 (DISORDERS OF THE STOMACH AND DUODENUM – PEPTIC ULCER DISEASE)	13.1 Define the terms "peptic ulcer" and "erosion".	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	13.2 Differentiate between duodenal, gastric and stress ulcers on the basis of incidence, pathogenesis, pathology, complications, haemorrhage, perforation, obstruction, malignancy and clinical features.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	13.3 Discuss the factors contributing to the gastric mucosal barrier.	1	2	3	1 1 3 1 1 1 1 1 1 2 1 (1) 82%
	13.4 Explain how destruction of the gastric mucosal barrier may come about.	1	2	3	1 1 3 2 1 1 2 2 1 2 1 (1) 45%
	13.5 Specifically, describe the effects of emotional stress, family history and other chronic diseases on peptic ulcer disease.	1	2	3	2 2 3 2 2 2 2 2 2 2 1 (2) 82%

	13.6 List the typical clinical features of peptic ulceration	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	13.7 Describe the complications of peptic ulceration under the headings of haemorrhage, perforation and obstruction.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	13.8 Explain what is meant by the term "stress ulcer" and list 22some causes.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 912%
	13.9 Differentiate between the two principal types of stress ulcer (Curling's ulcers and Cushing's ulcers) based on causes and pathogenesis.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
E14 (DISORDERS OF THE SMALL INTESTINE - APPENDICITIS)	14.1 Describe, in terms of surface anatomy, the location of the appendix.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	14.2 Explain the pathogenesis of appendicitis with reference to possible mechanical and infectious causes.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	14.3 List the clinical features of acute appendicitis	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
PERITONITIS	14.4 Define the term "peritonitis" and name some of the possible causes.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	14.5 Describe the pathophysiology of acute peritonitis and extend this explanation to generalised peritonitis.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	14.6 Explain why patients with acute peritonitis may experience hypovolaemic shock.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	14.7 List the clinical features of a patient with peritonitis.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
INTESTINAL OBSTRUCTION	14.8 Define the term "intestinal obstruction"	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	14.9 Differentiate between these types of obstruction:				
	A -Acute vs. chronic	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	B - Partial vs. complete	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	C- Non-mechanical vs. mechanical	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	D - Simple mechanical vs. closed-loop				1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	14.10 Explain the etiologies of common forms of non-mechanical obstruction (paralytic ileus) and all of the mechanical forms of obstruction, including volvulus and intussusception.	1	2	3	1 2 2 2 1 2 2 2 2 2 1 (2) 73%
	14.11 Discuss the difference in peristaltic activity between non-mechanical and mechanical intestinal obstruction.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	14.12 Describe the complications of intestinal obstruction causing peritonitis, septicaemia and hypovolaemic shock.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	14.13 Name the clinical features associated with intestinal	1	2	3	1 1 2 1 1 1 1 1 1 1

	obstruction.				1 (1) 91%
E15 (DISORDERS OF THE LARGE INTESTINE - DIVERTICULAR DISEASE)	15.1 Define the terms "diverticulosis" and "diverticulitis".	1	2	3	2 2 2 2 1 2 2 2 2 2 1 (2) 82%
	15.2 Explain the incidence, hypothesised etiology and pathophysiology of diverticular disease.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	15.3 Name the clinical features of diverticulosis. (NB: this outcome is also be covered in Diagnostics.)	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	15.4 List the clinical features of diverticulitis and diverticular rupture. (NB: this outcome is also be covered in Diagnostics.)	1	2	3	2 2 2 1 2 2 2 2 1 2 2 (2) 82%
	15.5 Describe how chronic diverticulitis may come about and relate the effects of this form of diverticular disease to the clinical features of mechanical bowel obstruction.	1	2	3	2 2 2 2 2 2 2 2 1 2 2 (2) 91%
ULCERATIVE COLITIS & CROHN'S DISEASE	15.6 Briefly explain the relationship between ulcerative colitis and Crohn's disease.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	15.7 Describe the main pathological features of ulcerative colitis and the incidence of the disease.	1	2	3	2 2 2 2 2 2 1 2 1 2 2 (2) 82%
	15.8 Describe the etiology and pathogenesis of ulcerative colitis.	1	2	3	2 2 2 2 2 2 1 2 1 2 2 (2) 82%
	15.9 List the clinical features of acute fulminating, chronic intermittent and chronic continuous ulcerative colitis.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	15.10 Discuss the most life-threatening complication of ulcerative colitis - toxic megacolon.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
E16 (DISORDERS OF THE LIVER, GALLBLADDER AND PANCREAS - BILIRUBIN METABOLISM & JAUNDICE)	16.1 Define the term "jaundice" and explain where jaundice is best detected.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	16.2 Describe the process of normal bilirubin metabolism.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	16.3 Explain the causes and pathophysiologies of the four general mechanisms causing hyperbilirubinemia and jaundice:				1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	A - Excess bilirubin production;	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	B - Impaired uptake of bilirubin;	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	C - Impaired conjugation of bilirubin;	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	D - Decreased excretion of conjugated bilirubin;	1	2	3	1 1 2 1 1 1 1 1 1 2

					1 (1) 82%
	16.4 Relate the four general mechanisms of jaundice to three clinical presentations of jaundice associated with intra- or extrahepatic jaundice:				
	A - Haemolytic jaundice	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	B - Hepatocellular jaundice	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	C - Obstructive jaundice	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
VIRAL HEPATITIS	16.5 Define the term "viral hepatitis" and name the five categories of viral agents identified.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	16.6 Briefly discuss each of the five categories of hepatitis virus (A-E) with reference to:	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	A - Mode of transmission	1	2	3	1 1 1 1 1 1 1 2 1 1 1 (1) 91%
	B - Epidemiology & endemic areas	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	C - Production of antibodies	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	D - Carrier status	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	16.7 Discuss the clinical features of typical HAV or HBV infection.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	16.8 Describe the complications of viral hepatitis, including fulminant hepatitis, chronic persistent hepatitis, relapses, chronic active (aggressive) hepatitis and the development of primary hepatocellular carcinoma.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
CIRRHOSIS	16.9 Define the term "cirrhosis" as it relates to liver disease.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	16.10 Identify and describe the etiologies, pathogenesis and pathologies of the three principal forms of liver cirrhosis:				
	A - Laennec's Cirrhosis	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	B - Postnecrotic Cirrhosis	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	C - Biliary Cirrhosis	1	2	3	2 1 2 1 2 1 1 1 1 2 1 (1) 64%
	16.11 Name the clinical features associated with liver cirrhosis and any of its secondary effects.	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	16.12 Discuss the clinical manifestations of liver (hepatocellular) failure and relate each one to a specific disorder of liver function, where these are known.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	16.13 Define the term "portal hypertension" and discuss the clinical manifestations of this condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.14 Discuss oesophageal variceal bleeding as a complication of liver cirrhosis by referring to incidence, effects on haemodynamic status and possible approaches to treatment.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%

	16.15 Define the term "hepatic encephalopathy" and explain how this condition may complicate the disease course of a patient with liver cirrhosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.16 Explain the pathogenesis of hepatic encephalopathy and relate this to the pathophysiology of liver cirrhosis.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	16.17 Categorise the clinical features of hepatic encephalopathy into those associated with stages I – IV.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
PANCREATITIS	16.18 Define the term "acute pancreatitis" and briefly discuss the incidence and mortality of this disease.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	16.19 Describe the etiology and pathogenesis of acute pancreatitis.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	16.20 List the clinical features of acute pancreatitis.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	16.21 Give a brief definition of chronic pancreatitis and a description of the pathologic features and etiology.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 91%
E17 (CARDIOVASCULAR DISORDERS) CORONARY ATHEROSCLEROTIC DISEASE	17.1 State the four major determinants of myocardial oxygen demand.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.2 Define the term "wall tension" and describe the relationship between this entity and its determinants.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.3 State the determinants of myocardial oxygen supply and explain how changes in each one will affect myocardial oxygen supply.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.4 Explain why the only means for increasing myocardial oxygen supply is to increase myocardial blood flow and compare this to oxygen/blood flow relationships in skeletal muscle.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.5 Define the following results of a myocardial oxygen supply/demand imbalance:				
	Ischemia	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 82%
	Necrosis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Myocardial Infarction	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.6 Explain why the left ventricle is the chamber most susceptible to myocardial ischemia and infarction.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.7 Give an overview of the changes to coronary arteries that occur with atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.8 Give a more detailed description of atherosclerotic lesions by categorising them into fatty streaks, fibrous plaques and advanced lesions and describing each of these.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.9 Explain what the pre-clinical phase of atherosclerosis is.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	17.10 Describe various (5) options for the final step in the pathological process of atherosclerosis (i.e. the step that results in atherosclerosis causing ischemia or even infarction).	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%

17.11 Describe where atherosclerotic lesions usually develop (with respect to coronary artery anatomy).	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.12 Explain what is meant by a "risk-factor" for atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.13 State the three non-modifiable risk factors for atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.14 Briefly explain the impact of race as a risk factor for atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.15 Define the term "hyperlipidemia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.16 Distinguish the specific lipid abnormalities that constitute increased risk for atherosclerosis (you do not have to elaborate on types of hyperlipoproteinemias).	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.17 Give a categorical definition of the term "hypertension".	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.18 List other modifiable risk factors for atherosclerosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.19 Describe the 'response-to-injury' hypothesis for the pathogenesis of atherosclerosis and give a step-by-step account of the progression of an atherosclerotic plaque.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.20 Describe the effects of ischemia on myocardial function.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.21 Specify the hemodynamic effects of myocardial ischemia and describe their origins.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.22 Describe the cause of angina pectoris and the typical distribution and duration of pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.23 Describe Prinzmetal's angina in terms of cause and how this may be differentiated from stable angina.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
17.24 Briefly explain the time-frame of ischemia before infarction sets in and the importance of the zone of ischemia surrounding any necrosed myocardium.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.25 Differentiate between transmural and subendocardial infarctions.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.26 Relate the coronary artery supply (the most common form) to infarctions in various areas of the heart and explain why the left ventricle is mainly affected as a whole.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 82%
17.27 Explain why disorders on the conduction system, specifically AV blocks, are more common with some anatomical locations of myocardial infarction.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
17.28 Give an outline of the changes occurring within the infarcted muscle during the healing process after a myocardial infarction.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.29 Name three cardiac enzymes that may be released during a myocardial infarction, explain their origins and emphasize the limitations of cardiac enzymes as diagnostic aids (especially pre-hospital).	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
17.30 Describe the factors responsible for depressed ventricular function both during and after a myocardial	1	2	3	1 1 1 1 1 3 2 1 1 1 1

	infarction.				(1) 82%
	17.31 Discuss the variables that may affect the <u>degree</u> of ventricular impairment during or after a myocardial infarction.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	17.32 Explain the compensatory responses that may occur in order to offset the hemodynamic consequences of ventricular impairment during or after myocardial infarction.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.33 Describe the clinical features of a typical myocardial infarction.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.34 Briefly explain the main features and effects of the following complications of myocardial infarction:	1	2	3	
	A - Cardiogenic shock	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	B - Papillary muscle dysfunction	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	C - Ventricular septal defect	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	D - Cardiac rupture	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	E - Ventricular aneurysm	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	F - Thromboembolism	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	G - Pericarditis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
VALVULAR HEART DISEASE	17.35 Differentiate between the two general types of functional valvular abnormalities:				
	A - Regurgitation	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	B - Stenosis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.36 Describe the cause, hypothesised mechanism, pathophysiology and effects of acute rheumatic fever as a cause of valvular disease.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	17.37 Briefly describe the other major causes of valvular dysfunction:				
	A - Infective endocarditis	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	B - Papillary muscle dysfunction/rupture	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	C - Congenital malformations	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	17.38 Discuss the pathophysiology and clinical features of:				
	A - Mitral stenosis	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	B - Mitral regurgitation	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	C - Aortic stenosis	1	2	3	1 1 1 1 1 2 1 1 1 1

					1 (1) 91%
	D - Aortic regurgitation	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
CARDIAC FAILURE	17.29 Define preload and explain the impact that it has on cardiac output in the normal and failing heart by sketching and referring to the ventricular function curve.	1	2	3	1 1 1 1 1 3 1 1 1 2 1 (1) 82%
	17.40 Describe the effects of ventricular hypertrophy and compliance on the ventricular function curve.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	17.41 Define contractility and name some factors which can negatively or positively affect it.	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	17.42 Define afterload and relate this to the concept of wall tension and its formula.	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	17.43 Describe the factors affecting afterload and explain why increases in afterload are particularly damaging in heart failure.	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	17.44 Describe the effects of ventricular hypertrophy on afterload.	1	2	3	1 1 1 1 1 3 1 1 1 3 1 (1) 82%
	17.45 Define the terms "heart failure" and "congestive heart failure".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.46 Name the common causes of heart failure and differentiate between underlying factors and those which may acutely precipitate heart failure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.47 Explain the pathophysiology of cardiac failure by referring to changes in left ventricular end-diastolic pressure and the effect that this has on pulmonary capillary hydrostatic pressure.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.48 Summarise the compensatory response to cardiac failure by explaining the workings of increased sympathetic activity, the rennin-angiotensin-aldosterone mechanism and ventricular hypertrophy in this context.	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	17.49 Differentiate between concentric and eccentric ventricular hypertrophy and explain the situations in which each would occur and the effects of each on cardiac function.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.50 Describe the negative effects of the abovementioned compensatory responses, particularly over a long period of time.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.51 Describe the main features of the three dominant conceptual frameworks for cardiac failure:				
	A - The "forward failure-backward failure" framework	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	B - The "systolic dysfunction-diastolic dysfunction" framework	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	C - The "right heart failure-left heart failure" frameworks	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.52 Name the clinical features of cardiac failure and congestive cardiac failure and relate these two types of failure in any of the conceptual frameworks listed above.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
SHOCK	17.53 Define the term "shock".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.54 Explain what is meant by the "progressive nature" of shock and classify shock by referring to its three stages.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.55 State and interpret the formula for mean arterial	1	2	3	1 1 1 1 1 3 1 1 1 1

	pressure.				1 (1) 91%
	17.56 Classify etiological aspects of shock according to the four main groupings of (i) cardiogenic, (ii) obstructive, (iii) oligemic and (iv) distributive shock.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.57 Explain the systemic effects of shock, specifically the effects of this disorder causing:				
	A - Respiratory compromise	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	B - Reduced renal perfusion	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	C - Hepatic cellular dysfunction	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	D - Neurological deficit	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	E - Ischemia of the GI tract	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
VASCULAR DISEASE	17.58 Describe the role of atherosclerosis as an etiological factor in vascular disease.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.59 Briefly discuss the clinical manifestations of atherosclerotic vascular disease.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.60 Define and briefly describe cystic medial necrosis as a form of non-atherosclerotic vascular disease.	1	2	3	2 1 2 1 1 1 2 1 1 2 1 (1) 64%
	17.61 Define the term 'aneurysm' and differentiate between true, false, fusiform and saccular aneurysms.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	17.62 Describe the pathophysiology of aneurysm formation.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	17.63 Discuss the common sites for aortic aneurysms and the related differential etiologies.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	17.64 Name the clinical features of both thoracic and abdominal aortic aneurysms.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.65 Briefly discuss the clinical features and implications of rupture of an abdominal or thoracic aortic aneurysm.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.66 Define the term 'aortic dissection' and describe the causes of this condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.67 Differentiate between acute and chronic aortic dissections.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.68 List the clinical features of both proximal and distal aortic dissection.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	17.69 Describe the origins and causes of deep venous thrombosis (DVT).	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	17.70 Name the clinical features of DVT.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E18 (OBSTRUCTIVE	18.1 Define the terms "chronic obstructive pulmonary disease", "chronic bronchitis" and "pulmonary emphysema".	1	2	3	1 1 1 1 1 3 1 1 1 1 1

PATTERNS OF RESPIRATORY DISEASE) – CHRONIC BRONCHITIS AND EMPHYSEMA					(1) 91%
	18.2 Describe the main pathologic findings and etiological factors associated with chronic bronchitis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.3 Discuss the classification of emphysema into centrilobular and panlobular types and describe the features of each type.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	18.4 Name the etiological factors associated with both types of pulmonary emphysema.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.5 Define the term "primary emphysema" and discuss the role of alpha ₁ -antiprotease as a causative factor.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.6 Differentiate between blebs and bullae and explain why they occur in COPD patients.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.7 Explain the possible consequences of bleb rupture.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.8 Briefly discuss other changes that are frequently found in the lungs of COPD patients.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.9 Compare the clinical course and pathophysiology (particularly with regard to gas exchange and pulmonary mechanics) of the predominantly chronic bronchitis patient (the so-called "blue bloater") and the predominantly panlobular emphysema patient (the so-called "pink puffer").	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.10 Give an overview of the general progressive nature of COPD and its typical clinical course, from onset to end-stage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
BRONCHIECTASIS	18.11 Define the term "bronchiectasis".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.12 Name the two types of bronchiectasis and pathological features of each.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.13 Discuss the etiology and pathophysiology of bronchiectasis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.14 Name the clinical features of bronchiectasis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.15 Define the term "pleural effusion" and differentiate between transudates and exudates as causative factors.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.16 Briefly discuss the following:				
	A - Empyema	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	B - Fibrothorax	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	C - Chylothorax	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	18.17 Define the term "spontaneous pneumothorax" and briefly discuss the causes of this condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1

					(1) 91%
	18.18 Discuss the pulmonary effects of both pleural effusion and pneumothorax.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
LUNG PARENCHYMAL DISORDERS	18.19 Define the term "atelectasis".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.20 Explain the causes and pathophysiology of absorption atelectasis and compression atelectasis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.21 Discuss the role of lung expansion and the pores of Kohn/Kuhn in preventing and limiting atelectasis in susceptible patients.	1	2	3	1 1 1 1 1 3 1 1 2 1 1 1 (1) 82%
	18.22 Briefly discuss mechanisms which protect against atelectasis and, for each of these, name some interfering factors.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.23 Explain what microatelectasis is and what causes it.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.24 Define the term "pneumonia".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.25 Explain the types of patients, or setting in which pneumonia is most likely to occur (i.e. risk factors for pneumonia).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.26 Name the general types of organisms that can cause pneumonia and list their modes of transmission.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.27 Discuss the typical pathological features of bacterial pneumonia and classify this process anatomically.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.28 Compare the above with that found in cases of viral pneumonia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.29 Differentiate between community- and hospital-acquired pneumonias and give at least two examples of common organisms causing pneumonia in each group.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.30 Discuss the mode of infection and response typically associated with pneumococcal pneumonia (including the four stages typically occurring).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.31 Name the typical clinical features associated with a bacterial pneumonia (such as pneumococcal pneumonia).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.32 Compare the above with clinical features typical of a viral or mycobacterial pneumonia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.33 Discuss the causative organism, association and clinical features of pneumocystis carinii pneumonia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.34 Explain the causes and clinical features of aspiration pneumonia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.35 Explain what Mendelson's syndrome is, what causes it and the clinical features typically associated with it.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
PULMONARY EMBOLISM	18.36 Define the terms "pulmonary embolism" and "pulmonary infarction".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.37 Name the three major risk factors for pulmonary embolism (Virchow's triad) and briefly discuss examples of problems, disorders or diseases that would exemplify each of these.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	18.38 Explain the pathophysiology of both small and large	1	2	3	1 1 1 1 1 2 1 1 1 1 1

	embolisations clarify why pulmonary infarction is a relatively uncommon occurrence, particularly with small embolisations.				1 (1) 91%
	18.39 Name the clinical features of pulmonary embolism (caused by both small and large emboli) and comment on why up to 70% of embolisations are not diagnosed in patients with autopsy evidence of the disease.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
PULMONARY EDEMA	18.40 Define the term "pulmonary edema".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.41 Describe three mechanisms by which pulmonary edema may occur and give examples of diseases or disorders with which they may be associated.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.42 Briefly discuss the two stages of pulmonary edema.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.43 Describe the pathophysiology of pulmonary edema with regard to gas exchange in the lung.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.44 Name the clinical features of pulmonary edema.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
COR PULMONALE	18.45 Define the term "cor pulmonale".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.46 Discuss the etiology of cor pulmonale.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.47 Explain the pathophysiology of cor pulmonale by discussing the effects of increased pulmonary vascular resistance and the mechanisms that cause this.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.48 Name the clinical features of cor pulmonale and refer to two diagnostic criteria commonly applied to detection of this disease.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
ACUTE RESPIRATORY FAILURE AND ARDS	18.49 Define the term "acute respiratory failure" (ARF) both generally and in terms of arterial blood gas values.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.50 Name the two categories of acute respiratory failure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.51 Briefly discuss the causes of ARF as well as the factors which may precipitate acute respiratory failure in patients with chronic lung disease.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.52 Differentiate between hypoxemic respiratory failure and ventilatory failure and describe causes that may involve both of these or only hypoxemic respiratory failure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.53 Explain how V/Q mismatch and hypoventilation as primary abnormalities affect the PaO ₂ and the PaCO ₂ .	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.54 Discuss four important principles to be taken into account when assessing the impact of specific types of gas exchange abnormalities on arterial blood gas changes.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.55 Explain what high output ventilatory failure is.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.56 Summarise the mechanisms of hypoxemia and hypercapnia that are responsible for hypoxemic respiratory failure and ventilatory failure.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.57 Name the clinical features of ARF.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	18.58 Define the term "acute respiratory distress syndrome" (ARDS).	1	2	3	1 1 3 1 3 1 1 1 1 1 1

					(1) 82%
	18.59 Discuss the causes of ARDS.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	18.60 Describe the pathophysiology of ARDS, as it is currently hypothesised.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.61 List the clinical features of ARDS.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
PULMONARY TUBERCULOSIS	18.62 Define tuberculosis and identify the causative organism.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.63 Describe the possible routes and circumstances of infection, including the effect of HIV on tuberculosis prevalence.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.64 Explain the pathogenesis and pathophysiologic effects of tuberculosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	18.65 Briefly discuss the two types of drug-resistant tuberculosis and the scope of the problem of drug-resistance.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.66 Discuss the clinical features of tuberculosis and give an overview of intradermal tuberculin test interpretation.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	18.67 Briefly discuss the BCG vaccine with regard to effectiveness and effect on the intradermal tuberculin test.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	18.68 Tabulate the CDC classification system for tuberculosis.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
E19 (UREMIC SYNDROME)	19.1 Define the term "uremic syndrome" and describe its possible causes.	1	2	3	2 2 2 2 1 2 1 2 2 2 2 (2) 82%
	19.2 Discuss the causes, pathophysiology and clinical features of the following biochemical disturbances associated with uremic syndrome:				
	A - Metabolic acidosis	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	B - Potassium Imbalance	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	C - Sodium Imbalance	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	D - Hypermagnesemia	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	E - Azotemia	1	2	3	1 1 1 1 1 2 1 1 2 1 1 (1) 82%
	19.3 Describe the causes, pathophysiology and clinical features of the following physiological disturbances associated with uremic syndrome:				
	A - Genitourinary disturbances	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	B - Cardiovascular abnormalities	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	C - Respiratory changes	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	D - Hematologic problems	1	2	3	1 1 2 1 1 1 1 1 1 1

					1 (1) 91%
	E - Cutaneous changes	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	F - Gastrointestinal signs and symptoms	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
	G - Neuromuscular abnormalities	1	2	3	1 1 2 1 1 1 1 1 1 1 1 (1) 91%
E20 (ACUTE RENAL FAILURE)	20.1 Define the term "acute renal failure" (ARF) and refer to applicable biochemical or other criteria used in this definition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	20.2 Define the term "high-output ARF".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	20.3 Briefly discuss at least three causes (including the most common causes) of ARF that fall into each of the following categories:				
	A - Pre-renal ARF	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	B - Intrinsic ARF	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	C - Post-renal ARF	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	20.4 Define the term "acute tubular necrosis" and briefly discuss its causes and pathophysiology.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	20.5 Describe the pathophysiology of ARF renal failure by briefly referring to the following suggested pathological processes:				
	A - Tubular obstruction	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	B - Backleak of tubular fluid	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	C - Decreased glomerular permeability	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	D - Vasomotor dysfunction	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	E - Tubuloglomerular feedback	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	20.6 Explain the clinical course of ARF by referring to features of the oliguric stage, the diuretic stage and the recovery stage.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	20.7 Briefly discuss the relationship between pre-renal oliguria and acute tubular necrosis.	1	2	3	1 1 1 1 1 3 2 2 1 1 1 (1) 73%
E21 (PAIN)	21.1 Define pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	21.2 Describe the four processes which are involved between the stimulus of tissue injury and the subjective experience of pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	21.3 Discuss the three levels at which neural information can be modified in response to chronic pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%

	21.4 Define the term "nociceptor" and discuss the general characteristics and distribution of nociceptors in the body.	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	21.5 Identify which kind of peripheral nerve fibres convey nociceptive stimuli optimally and differentiate between fast and slow pain.	1	2	3	1 1 1 1 1 3 1 1 2 1 1 (1) 82%
	21.6 Explain the process of transduction by describing the pain-producing chemicals which may be released at the site of tissue injury.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	21.7 Outline the main aspects of the gate control theory of pain.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	21.8 Discuss the endorphin-enkephalin theory of pain and describe the three major families of endogenous opioid peptides.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	21.9 Differentiate between pain threshold and pain tolerance and discuss the factors affecting each.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	21.10 Describe the characteristics and clinical importance of acute and chronic pain, superficial pain, deep somatic pain, visceral pain, referred pain and neuropathic pain.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E22 (CEREBROVASCULAR DISEASE)	22.1 Define the term "stroke".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.2 Categorise stroke by referring to causes and other features.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.3 Explain the factors associated with increased risk for stroke.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.4 List the general pathophysiologic mechanisms resulting in stroke.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.5 Define the term "transient ischaemic attack" (TIA).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.6 Discuss the importance in correctly identifying a TIA and relate this to information on the association of TIA and stroke.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.7 Define the term "ischemic stroke" and identify possible causes of this condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.8 Describe the pathophysiology of ischaemic stroke and discuss the occurrence of pain as part of this condition.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.9 Explain the characteristics and pathophysiology of lacunar, large vessel thrombotic and embolic strokes.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.10 Explain the pathophysiological mechanisms of cell injury that occur as a result of stroke by referring to the roles played by lack of ATP, neuronal swelling, high levels of intracellular calcium, excitotoxicity and nitric oxide in the ischemic cascade.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 91%
	22.11 Briefly discuss the four factors causing secondary neuronal damage after the initial ischemic episode.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	22.12 Describe how loss of cerebral autoregulation may aggravate the secondary neuronal damage occurring after the initial ischemic episode.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	22.13 List the clinical features associated with internal carotid, middle cerebral, anterior cerebral, vertebro-basilar and	1	2	3	1 1 1 1 1 3 2 1 1 1 1

	posterior cerebral artery neurovascular syndromes.				(1) 82%
	22.14 Discuss the causes of hemorrhagic strokes and the mechanisms by which hemorrhagic strokes can cause secondary ischemia.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.15 Describe the causes, differential clinical features, pathophysiology and mortalities of intracerebral hemorrhage and subarachnoid hemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.16 List the complications of subarachnoid hemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	22.17 Explain the causative role played by arterio-venous malformations in subarachnoid hemorrhage.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E23 (SEIZURE DISORDERS)	23.1 Define the terms "seizure", "epilepsy", "convulsion" and "status epilepticus".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.2 Name the peaks of seizure incidence in terms of patient age.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	23.3 Differentiate between primary and secondary epilepsy and list some of the important causes of secondary epilepsy.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.4 Describe the pathophysiology of seizure activity at the cellular level by referring to four major biochemical phenomena characterising a seizure focus.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.5 Briefly describe the metabolic changes occurring during and immediately after a seizure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.6 Differentiate between partial and generalised seizures.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.7 Classify seizures by describing the typical characteristics of each type.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.8 Give a detailed description of the phases and progression of a tonic-clonic seizure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.9 Describe the early, late and prolonged physiological effects of a tonic-clonic seizure.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.10 Briefly discuss the cause and significance of febrile seizures.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.11 Discuss the complications of status epilepticus and the associated mortality.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	23.12 Differentiate between convulsive and non-convulsive status epilepticus.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E24 (DISORDERS OF VASOPRESSIN SECRETION)	24.1 Name the two disorders of vasopressin secretion and give a brief definition for each.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	24.2 Name the causes of diabetes insipidus (DI) and differentiate between central and nephrogenic DI with regard to causative conditions.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	24.3 Describe the pathophysiology of DI and its effects on water balance and ECF and urine osmolarity.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	24.4 Name the clinical features of DI	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	24.5 Name the causes of the syndrome of inappropriate ADH secretion (SIADH).	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	24.6 Describe the pathophysiology of SIADH and its effects on	1	2	3	1 1 3 1 1 1 1 1 1 1

	water balance, Extra cellular Fluid and urine osmolarity and ECF sodium concentration.				1 (1) 91%
	24.7 Name the clinical features SIADH.	1	2	3	1 1 2 1 3 1 1 1 1 1 1 (1) 82%
E25 (THYROID GLAND DISORDERS)	25.1 Define the term "hyperthyroidism".	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	25.2 List the most common types of hyperthyroidism.	1	2	3	1 1 3 1 3 1 1 1 1 1 1 (1) 82%
	25.3 Describe the cause of Grave's disease and explain the role of thyroid-stimulating immunoglobulin.	1	2	3	1 1 3 1 3 1 1 1 1 1 1 (1) 82%
	25.4 Name the thyroidal and extrathyroidal effects of Grave's disease.	1	2	3	2 2 2 2 1 2 1 2 2 2 1 (2) 73%
	25.5 Discuss the metabolic and cardiovascular effects of hyperthyroidism.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	25.6 Discuss the cause of toxic nodular goitre as a cause of hyperthyroidism and compare the clinical features of this condition with those of Grave's disease.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	25.7 Define the term "thyroid storm/crisis" and briefly discuss the causes and manifestations of this condition.	1	2	3	1 1 3 1 2 1 1 1 1 2 1 (1) 73%
	25.8 Name the common types of hypothyroidism.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	25.9 Discuss the causes of hypothyroidism.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	25.10 List the clinical features of myxedema.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
E26 (ADRENAL HYPERSECRETION DISORDERS)	26.1 Define Cushing's syndrome.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	26.2 Differentiate between iatrogenic and spontaneous Cushing's syndrome and list the causes of each.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	26.3 Differentiate between ACTH dependent and ACTH independent Cushing's syndrome and specify to which of these the term Cushing's disease relates.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	26.4 Explain the role of neoplasms in causing some forms of Cushing's syndrome.	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	26.5 Discuss the causes of ACTH independent Cushing's syndrome.	1	2	3	2 1 2 1 2 1 1 1 1 1 1 (1) 73%
	26.6 Give an overview of the metabolic effects of glucocorticoids and relate this information to the clinical features of Cushing's syndrome.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	26.7 Define the term "pheochromocytoma".	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	26.8 Briefly discuss the anatomical locations of these catecholamine secreting tumours.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	26.9 Name the clinical features associated with pheochromocytoma.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
E27 ADRENAL INSUFFICIENCY	27.1 Discuss the causes adrenocortical insufficiency and differentiate between primary and secondary forms of this condition.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%

	27.2 Briefly discuss some of the causes of secondary adrenal insufficiency.	1	2	3	2 1 3 1 1 1 1 1 1 1 1 (1) 82%
	27.3 Define the term "Addison's disease" and briefly describe the main characteristics of it.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	27.4 Briefly discuss the causes of Addison's disease.	1	2	3	1 1 1 1 1 2 1 2 1 1 1 (1) 82%
	27.5 Explain the metabolic effects occurring as a result of cortisol and aldosterone deficiencies caused by Addison's disease.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
E28 (DIABETES MELLITUS)	28.1 Define the term "diabetes mellitus" (DM).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.2 Discuss the etiology of DM, differentiating between causes of type 1 and type 2 DM.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.3 Classify DM (and give a brief description of each type) according to the American Diabetes Association (ADA) classification	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.4 State the three ADA criteria the diagnosis of DM in non-pregnant adults.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.5 Briefly describe the clinical features of DM.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.6 Explain the causes, pathophysiology and clinical manifestations of diabetic ketoacidosis (DKA) and hyperglycaemic, hyperosmolar, non-ketotic coma.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.7 Discuss the causes and clinical features of hypoglycaemia in DM patients.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	28.8 Give an overview of the effects of DM on the retina, the kidney, peripheral nerves, progression of atherosclerosis and pregnancy and list pathological conditions associated with these effects.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E29 (MENSTRUAL DISORDERS)	29.1 Define the term "amenorrhea".	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	29.2 Differentiate between primary and secondary amenorrhea by briefly describing the causes of each.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	29.3 Define the term "dysmenorrhea".	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	29.4 Differentiate between primary and secondary dysmenorrhea by briefly describing the causes of each.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	29.5 Define the terms "dysfunctional uterine bleeding" and "abnormal uterine bleeding".	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	29.6 Describe the causes of both dysfunctional and abnormal uterine bleeding.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
E30 (TESTICULAR TORSION)	30.1 Give an anatomical description of testicular torsion and describe the anatomical abnormality responsible for the possible development of this disorder.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	30.2 Describe the patient populations most at risk for testicular torsion.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
	30.3 Explain the events commonly precipitating testicular torsion.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%

	30.4 Name the clinical features of testicular torsion and state the time intervals associated with expected complete and partial salvage of a testis after torsion.	1	2	3	1 1 1 1 1 3 1 2 1 1 1 (1) 82%
E31 (VIRAL HEMORRHAGIC FEVERS)	31.1 Define the term "viral hemorrhagic fever" and name the diseases commonly grouped under this term.	1	2	3	1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	31.2 Name the general clinical features characterising hemorrhagic fevers as a group and any clinical features specific to a given pathogen in this group.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.3 Describe the pathophysiology of viral hemorrhagic fevers as a group and briefly discuss causes and differential rates of mortality associated with various pathogens in this group.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.4 Discuss the background, geographic risk area, reservoir, transmission and clinical features of:				
	Ebola viral hemorrhagic fever	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	Marburg viral hemorrhagic fever	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	Lassa fever	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	Yellow fever	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
MALARIA	31.5 Define the term "malaria".	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.6 Describe the cause, vector and transmission of malaria.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.7 Name the species of <i>Plasmodium</i> responsible for disease in humans and identify which of these is responsible for most deaths caused by malaria.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.8 Describe the malaria parasite's life-cycle in a human and the pathophysiological effects of this.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.9 Briefly describe the malaria parasite's life-cycle in the Anopheles mosquito leading to reinfection of humans.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.10 Discuss the reasons for the malaria parasite's generally effective evasion of a human host's immune system.	1	2	3	2 1 1 1 1 3 1 1 1 1 1 (1) 82%
	31.11 Name the clinical features of malaria.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.12 Discuss severe malaria by briefly referring to its effects on pregnancy, cerebral perfusion, pulmonary function, renal function, hematology and blood glucose balance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	31.13 Briefly discuss the geographic distribution of malaria and describe the areas of South Africa where a high risk malaria occurrence exists.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E32 (HEAD AND FACIAL INJURIES)	32.1 Describe the common mechanisms of head injuries, including scalp, skull and brain injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.2 Discuss the biomechanical aspects of skull and brain injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.3 Describe the pathology, pathophysiology, complications and clinical features of:				
	Scalp lacerations;	1	2	3	1 1 1 1 1 3 1 1 1 1

					1 (1) 91%
	Skull fractures;	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Intracranial haemorrhages;	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Brain injuries	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.4 Describe the common mechanisms of facial injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.5 Discuss the biomechanical aspects of facial injuries:	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.6 Describe the types, pathophysiology and clinical features of:				1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Le Fort fractures	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Trimalar and blow-out fractures	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Mandibular fractures	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.7 Describe the common mechanisms of vertebral and spinal cord injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.8 Discuss the biomechanical aspects of vertebral and spinal cord injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	32.9 Explain the pathology, pathophysiology, complications and clinical features of vertebral and spinal cord injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E33 (CHEST INJURIES)	33.1 Describe the biomechanics, common mechanisms and pathophysiology of:				
	Chest wall injuries	1	2	3	1 1 1 1 1 1 3 1 1 1 1 (1) 91%
	Tracheobronchial injuries	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Lung Injuries	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Injuries of the aorta and large vessels	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Diaphragmatic injuries	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	33.2 Relate prior understanding of respiratory failure to the context of patients with severe chest wall, tracheobronchial injuries and lung injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	33.3 Name the clinical features of aortic, diaphragmatic and oesophageal injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E34 (ABDOMINAL INJURIES)	34.1 Describe the following mechanisms of injury as they relate to abdominal organs:				
	Crushing	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%

	Shearing	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Bursting	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	34.2 Discuss the mechanisms, pathological and clinical features of injuries to the:				
	Spleen	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Liver	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Pancreas	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Stomach	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Duodenum	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Small & large bowel	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	34.3 Describe mechanisms of injury associated with urologic and obstetric injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E35 (VEHICLE-RELATED INJURIES)	35.1 Describe the protective effects of restraint systems and their ability to decrease mortality in motor vehicle accidents.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	35.2 Discuss the intended method of injury prevention with normal airbag deployment.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	35.3 Explain how in certain circumstances, airbag deployment may lead to severe injury and discuss the two types of injury patterns caused.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
E36 (OTHER INJURIES)	36.1 Identify common sources of blasts and blast injuries.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.2 Explain the damaging effects of blasts including shock waves, air pressure-related phenomena, heat transfer and secondary missiles.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.3 Identify common types of injuries associated with blasts and list their clinical features.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.4 Identify commonly encountered types of firearm and categorise these in terms of calibre and projectile velocity.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.5 Explain the effects of projectile velocity, projectile movement, projectile structure and range on energy transfer to human tissue.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.6 Explain the typical injury patterns associated with high- and low-velocity projectiles in various anatomical regions.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.7 Identify clinical features associated with gunshot wounds, caused by both high- and low-velocity projectiles.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
BURNS	36.8 Give a logical and well-founded general definition of a burn and state the different types of burns (thermal; radiation; electrical; chemical and inhalation).	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	36.9 Recognise and differentiate between superficial, partial	1	2	3	1 1 1 1 1 3 1 1 1 1

	thickness and full thickness burns on the basis of clinical features.				1 (1) 91%
	36.10 Identify the factors influencing the severity of a burn.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	36.11 Use the "rule of nines" to estimate the surface area of a burn injury in adults and children.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 1 1 (1) 82%
	36.12 Define a critical burn and explain the special care necessary for critical burns.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	36.13 Explain the causes and pathological basis of hypovolaemia and other complications of burns.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	36.14 Recognise and understand the implications and possible complications of inhalation and electrical burns.	1	2	3	1 1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
CRUSH SYNDROME	36.15 Define the term 'crush syndrome'.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	36.16 Name the common mechanisms of injury leading to crush syndrome.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	36.17 Explain the pathophysiology of crush syndrome and relate the effects of crush injury to disturbances of acid-base balance and renal function.	1	2	3	1 1 1 2 1 1 1 1 1 1 3 1 (1) 82%
	36.18 Name the clinical features related to both a direct crush-type injury and to the complications of crush syndrome.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 1 1 (1) 100%

Comment: Of the 559 possible learning outcomes there were only eight (1%) where consensus could not be reached after three rounds. Of the 551 outcomes where consensus was reached 510 (92%) were seen to be essential, 42 (8%) useful and none were deemed to be unnecessary.

5.11 RESPONSES TO SECTION F

Section F focused on the Knowledge, Skills and Values that participants felt should stem from completion of the **diagnostics** component of the bridging programme. Sixteen different areas of diagnostics were explored through the use of 168 possible learning outcomes.

		SECTION F CRUCIAL DIAGNOSTIC LEARNING OUTCOMES FOR STUDENTS COMPLETING A BRIDGING PROGRAMME.			
		Essential	Useful	Unnecessa ry	Responses
F1 (PATIENT INTERACTION AND HISTORY TAKING)	1.1 Discuss the importance of physical examination and history taking from the perspective of the pre-hospital emergency care professional and that of the patient.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.2 Describe the elements making up a comprehensive health history.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.3 List the components of the health history.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.4 Differentiate between subjective and objective data.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.5 Explain the importance of enquiring about personal and social histories.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.6 What is meant by the term "review of systems" and what significance does this have for you as a pre-hospital practitioner?	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	1.7 Describe the correct sequence for the comprehensive examination.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.8 Explain the importance of comprehensive and accurate record keeping.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.9 Describe the format for eliciting a comprehensive health history.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.10 Explain how you would prepare for a patient interview.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	1.11 List the sequence for an interview and explain why it is important to keep to a set sequence.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.12 List and describe the various techniques a skilled interviewer may apply in order to obtain a full and accurate history from different groups/types of patients.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	1.13 Fully discuss the issue of language barriers and the importance of cultural competence.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
F2 (GENERAL SURVEY & VITAL SIGNS)	2.1 Discuss the importance of assessing the patient's Body Mass and demonstrate how to calculate the BMI for a patient.	1	2	3	1 1 2 1 2 1 1 1 1 2 2 (1) 64%
	2.2 List and discuss the important topics related to health promotion and counselling.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%

	2.3 Explain how you as a practitioner would go about preparing to examine a patient.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	2.4 List the components making up a general survey.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	2.5 List and discuss the measurement of vital signs.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
F3 (THE SKIN)	3.1 Discuss and/or describe the anatomy and physiology of the skin; mention the changes that are normally associated with aging.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	3.2 Describe the common skin lesions that are associated with aging.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	3.3 List the common causes for generalised itching without an obvious reason.	1	2	3	1 1 1 1 1 3 1 3 1 1 1 (1) 82%
	3.4 Explain the Sun Protection Factor (SPF) system for grading protective sunscreens.	1	2	3	3 1 1 1 3 1 1 1 1 2 1 (1) 73%
	3.5 Explain the "ABCDE" method of differentiating melanoma from malignant melanoma.	1	2	3	2 1 3 1 1 1 1 1 1 2 2 (1) 64%
	3.6 Discuss the causes of central cyanosis vs. peripheral cyanosis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	3.7 Explain how you would go about evaluating a bed-bound patient for pressure sores.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	3.8 List the risk factors for the development of pressure ulcers; mention the stages of a pressure ulcer.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	3.9 Explain what the characteristics are you would check for when assessing a lesion.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	3.10 Explain how a macule, papule and vesicle differ from each other.	1	2	3	1 1 1 1 1 3 1 1 1 1 2 (1) 82%
	3.11 Explain the appearance and cause of the following skin disorders associated with melanin:				
	Tinea Versicolor	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	Café-Au-Lait Spots	1	3	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	Vitiligo	1	2	3	2 2 2 2 2 2 2 2 2 2 1 (2) 91%
	3.12 List the criteria you would use to assess vascular and purpuric lesions.	1	2	3	2 1 3 1 1 1 1 1 1 1 1 (1) 82%
	3.13 Describe the appearance and significance of Actinic Keratosis.	1	2	3	2 1 3 1 1 1 1 1 1 1 1 (1) 82%
	3.14 Name the types of skin lesions which occur with AIDS; describe their appearance.	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	3.15 Describe what the following disorders look like as well as their clinical significance:				
	Mee's lines	1	2	3	2 1 2 1 2 1 2 1 1 2 1 (1) 55%
	Beau's lines	1	2	3	2 1 2 1 2 1 2 1 1 2 1 (1) 55%
	Terry's nails	1	2	3	2 1 2 1 2 1 2 1 1 2 1 (1) 55%
	Clubbing	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	3.16 Explain how you would go about assessing a patient's skin and specifically what you would assess.	1	2	3	1 1 3 1 2 1 1 1 1 2 1 (1) 73%
F4 (HEAD AND NECK)	4.1 Describe and discuss the relevant anatomy and physiology relating to the head and neck.	1	2	3	1 1 1 1 3 3 1 1 1 1 1 (1) 82%
	4.2 Describe how you would examine the structures in the head and neck region.	1	2	3	1 1 1 1 3 1 1 1 1 1 1 (1) 91%
	4.3 Describe and discuss the anatomical and physiological effects aging may have on the mouth, eyes and the ears.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
	4.4 Explain what type of questions you could ask to try and establish a possible cause for headaches.	1	2	3	1 1 1 2 1 1 1 1 1 3 1 (1) 82%
	4.5 Explain what is meant by the term "a leading question".	1	2	3	1 1 1 1 3 3 1 1 1 1 1 (1) 82%

4.6 Give an example of a leading question; why should one try to avoid such questions?	1	2	3	1 1 1 1 3 3 1 1 1 1 1 1 (1) 82%
4.7 Provide a simple explanation of what the following terms mean:				
Tinnitus	1	2	3	1 1 3 1 3 1 1 1 1 1 1 1 (1) 82%
Diplopia	1	2	3	1 1 3 1 2 1 1 1 1 1 1 1 (1) 82%
Scotomas	1	2	3	1 1 2 1 2 1 1 1 1 1 2 1 (1) 73%
Vitreous floaters	1	2	3	1 1 2 1 2 1 1 1 1 1 2 1 (1) 73%
Myopia	1	2	3	1 1 2 1 1 1 1 1 1 1 1 1 (1) 91%
Presbyopia	1	2	3	1 1 2 1 1 1 1 1 1 1 2 1 (1) 82%
Graves' disease	1	2	3	1 1 2 1 1 1 1 1 1 1 1 1 (1) 91%
Mydriasis	1	2	3	1 1 1 1 3 2 1 1 1 1 1 1 (1) 82%
Tonic pupils	1	2	3	1 1 2 1 1 1 1 1 1 1 1 1 (1) 91%
Lid lag	1	2	3	1 1 2 1 1 1 1 1 1 1 2 1 (1) 82%
Nystagmus	1	2	3	1 1 1 1 3 2 1 1 1 1 1 1 (1) 82%
"Tug test"	1	2	3	1 1 1 1 3 2 1 1 1 1 1 1 (1) 82%
4.8 Explain how you would go about examining the optic disc and retina.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 2 (1) 82%
4.9 Explain how you would go about assessing and recording visual acuity using a Snellen chart.	1	2	3	1 1 1 1 1 1 1 2 1 1 2 (1) 82%
4.10 Describe the effect that hypertension and diabetes may have on the normal retinal structures.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%
4.11 Explain normal "near reaction".	1	2	3	1 1 3 1 1 1 1 1 1 1 1 1 (1) 91%
4.12 Explain in a logical sequence how you would go about using an ophthalmoscope to examine the eye of a seated patient.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 1 (1) 100%
4.13 Explain the difference between a sensory neural hearing loss and a conductive hearing loss.	1	2	3	1 2 1 1 1 1 1 1 3 1 1 1 (1) 82%
4.14 Discuss abnormalities you may note in the head and neck region which may be associated with thyroid disorders.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 1 (1) 91%
4.15 Explain how you could clinically differentiate between a right nerve VI, IV and III paralysis.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 2 (1) 82%
4.16 Describe and explain the clinical significance of a tophus.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
4.17 Explain the pathophysiologies behind a serous effusion seen when examining the eardrum.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
4.18 Differentiate between otitis media and otitis externa.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 1 (1) 82%
4.19 Discuss how a patient with tonsillitis could present.	1	2	3	1 2 1 1 1 1 1 1 1 3 1 1 (1) 82%
4.20 Discuss the significance of detecting a retina detachment.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 1 (1) 91%
4.21 List the common forms of cancer which are	1	2	3	1 1 3 1 1 1 1 1 1 1 1 1

	associated with the head and neck region and structures.				(1) 91%
F5 (THORAX AND LUNGS)	5.1 List the common concerning symptoms that you may elicit during a health history of the thorax and lungs.	1	2	3	1 1 1 3 1 1 1 1 3 1 1 (1) 82%
	5.2 Discuss the likely causes of chest pain and how investigating the type of pain may allow you to diagnose the possible cause.	1	2	3	1 1 1 2 1 1 1 1 3 1 1 (1) 82%
	5.3 Explain how you would go about investigating a complaint of dyspnoea, coughing and haemoptysis.	1	2	3	1 1 1 3 1 1 1 1 1 1 1 (1) 92%
	5.4 Explain how you would differentiate between the following disorders all of which may result in a complaint of pain in the chest:				
	Angina pectoris	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Myocardial infarction	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Pericarditis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Dissecting aortic aneurysm	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Tracheo bronchitis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Pleural pain	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Reflex oesophagitis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Diffuse oesophageal spasm	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Chest wall pain	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Anxiety	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	5.5 Explain how you would differentiate between the following disorders all of which may result in a complaint of dyspnoea:				
	Laryngitis	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	Tracheobronchitis	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Mycoplasma and viral pneumonias	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Bacterial pneumonias	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Post nasal drip	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	Chronic bronchitis	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Bronchiectasis	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Pulmonary tuberculosis	1	2	3	1 1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Lung abscess	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%

	Asthma	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Gastric reflux	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Neoplasm/cancer of the lung	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	LVF/mitral stenosis	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Pulmonary emboli	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	Inhaled irritants	1	2	3	1 1 1 1 1 1 1 1 3 3 1 (1) 82%
	5.6 Discuss the various lung sounds and their causes.	1	2	3	1 1 1 1 1 1 1 1 3 1 1 (1) 92%
F6 (CARDIOVASCULAR SYSTEM)	6.1 Discuss events in the cardiac cycle with reference to the heart sounds heard on auscultation.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	6.2 Explain the phenomenon of splitting of the heart sounds.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	6.3 Explain how you would measure jugular venous pressure as well as its significance.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	6.4 Diagnose a 12 lead ECG printout.	1	2	3	1 2 1 1 1 1 1 1 1 1 1 (1) 92%
	6.5 Mention the common cardiovascular changes that are associated with aging.	1	2	3	1 1 1 3 1 1 1 1 1 3 1 (1) 82%
	6.6 Discuss the common symptoms that patients will complain of and which relate to cardiovascular disorders.	1	2	3	1 1 1 2 1 1 1 1 1 3 1 (1) 82%
	6.7 Discuss the important topics you would cover in health promotion and counselling for patients with a family history of cardiovascular disease.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	6.8 Explain in a chronological sequence how you would go about assessing the cardiovascular status of a patient.	1	2	3	1 1 1 1 1 1 1 1 1 3 1 (1) 92%
F7 (BREAST AND AXILLA)	7.1 Explain the common or concerning symptoms patients may complain of and which are associated with the breast.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	7.2 Discuss the issue of breast cancer and the importance of screening.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	7.3 Perform a breast examination.	1	2	3	1 1 3 1 1 1 2 1 1 3 1 (1) 73%
F8 (THE ABDOMEN)	8.1 List the common or concerning symptoms that patients may complain about which relate to the gastrointestinal, urinary and/or renal systems.	1	2	3	1 1 1 1 2 1 1 1 1 2 1 (1) 82%
	8.2 Apply knowledge of the pathophysiology, signs and symptoms of the following common disorder in order to differentiate between them:				
	Peptic Ulcers and dyspepsia	1	2	3	2 1 1 1 1 1 1 1 1 1 1 (1) 91%
	Cancer of the stomach	1	2	3	1 1 2 1 2 1 1 1 1 1 1 (1) 82%
	Acute Pancreatitis	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	Chronic Pancreatitis	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	Cancer of the Pancreas	1	2	3	2 1 1 1 1 2 2 1 1 1 2 (1) 64%

	Biliary Colic	1	2	3	1 1 1 1 1 2 1 1 1 1 2 (1) 82%
	Acute Cholecystitis	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	Acute Diverticulitis	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	Acute appendicitis	1	2	3	2 1 1 1 1 1 1 1 1 1 1 (1) 91%
	Intestinal obstruction	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	Mesenteric Ischemia	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	8.3 Apply knowledge of the pathophysiology, signs and symptoms of common disorder resulting in dysphagia in order to differentiate between them.	1	2	3	2 1 1 1 1 3 1 1 1 1 1 (1) 82%
	8.4 Discuss the pathophysiologies of diarrhoea, their corresponding symptoms and explain the common modalities of treatment the possible causes for diarrhoea as well as their initial treatment.	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	8.5 Discuss the possible causes for black or bloody stools, the corresponding pathophysiologies, signs and symptoms as well as the common modalities of treatment.	1	2	3	1 2 1 1 2 1 1 1 1 1 2 1 (1) 82%
F9 (THE MALE GENITALIA AND HERNIAS)	9.1 Discuss the common concerning symptoms patient may present with relating to the male genitalia.	1	2	3	1 1 2 1 2 1 1 1 1 2 1 (1) 73%
	9.2 Describe the technique for examining the penis.	1	2	3	1 1 3 1 2 1 1 1 1 2 1 (1) 73%
	9.3 Explain how a hernia may form.	1	2	3	1 1 2 1 1 1 1 1 1 2 1 (1) 82%
	9.4 Detect a hernia.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
F10 (THE FEMALE GENITALIA)	10.1 Describe the normal female anatomy of this region.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.2 List the common and concerning symptoms a patient may present with relating to the female genitalia.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	10.3 Discuss health promotion and counselling relating to the female genitalia.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	10.4 List and describe the important areas that should be examined.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	10.5 Examine the female genitalia.	1	2	3	1 1 3 1 1 1 1 1 1 2 1 (1) 82%
F11 (THE PREGNANT WOMAN)	11.1 Explain the changes that occur within a woman's body due to pregnancy.	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	11.2 Discuss the health promotion and counselling advice you would give to a pregnant woman.	1	2	3	2 1 1 1 1 2 1 1 1 1 1 (1) 82%
	11.3 Perform an internal examination during labour to determine dilation of the cervix and imminence of delivery.	1	2	3	2 1 1 1 1 3 1 1 1 1 1 (1) 82%
F12 (THE ANUS RECTUM AND PROSTATE)	12.1 Describe the changes that may occur with aging.	1	2	3	1 1 3 1 3 1 1 1 1 2 1 (1) 73%
	12.2 List and explain the common or concerning symptoms patients may present with.	1	2	3	1 1 3 1 3 1 1 1 1 1 1 (1) 82%

	12.3 Discuss the issue of prostate cancer with reference to the pathophysiology as well as screening.	1	2	3	2 2 2 2 2 2 2 2 2 1 (2) 91%
F13 (THE PERIPHERAL VASCULAR SYSTEM)	13.1 List and discuss the common concerning symptoms patients may present with relating to the peripheral vascular system.	1	2	3	2 1 1 1 1 3 1 1 1 1 1 (1) 82%
	13.2 Discuss the issue of peripheral artery disease.	1	2	3	1 1 3 1 2 1 1 1 1 1 1 (1) 82%
	13.3 Explain methods of recording and documenting findings relating to a peripheral vascular examination.	1	2	3	2 1 1 1 1 1 1 1 1 3 1 (1) 82%
	13.4 Diagnose and differentiate between the various peripheral vascular disorders, specifically those that may create pain.	1	2	3	1 1 1 1 1 1 2 1 1 1 1 (1) 91%
F14 (THE MUSCULAR SKELETAL SYSTEM)	14.1 Discuss the common concerning symptoms that patients may present with relating to muscular skeletal disorders.	1	2	3	1 1 1 3 1 1 1 1 1 3 1 (1) 82%
	14.2 Discuss health promotion and counselling for the musculo-skeletal system.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	14.3 Explain the changes typically associated with aging.	1	2	3	1 1 3 1 1 1 1 1 1 1 1 (1) 91%
	14.4 Explain what signs and symptoms are associated with the common disorders that create pain in and around the spine and joints.	1	2	3	2 1 1 1 1 1 2 1 1 1 1 (1) 82%
	14.5 Briefly explain the common musculo-skeletal injuries related to sport.	1	2	3	1 1 1 2 1 1 1 1 1 3 1 (1) 82%
	14.6 Assess the major joints and muscles.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
F15 (THE NERVOUS SYSTEM)	15.1 Discuss the anatomy and physiology of the nervous system.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	15.2 Explain the changes you may expect associated with aging.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%
	15.3 List and discuss the common concerning symptoms patients may present with that are associated with the nervous system.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 (1) 91%
	15.4 Discuss and describe dementia, depression and suicide and its relevance to you as a pre-hospital practitioner.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	15.5 List and discuss important areas of the nervous system assessment.	1	2	3	1 1 1 1 1 1 1 1 1 1 1 (1) 100%
	15.6 Discuss and differentiate between the disorders of mood, speech and anxiety.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	15.7 Explain how to differentiate between delirium and dementia.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	15.8 Discuss and differentiate between various syncope, seizure and similar disorders.	1	2	3	1 1 1 1 1 2 1 1 1 1 1 (1) 91%
	15.9 Describe and name the common disorders of movement.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	15.10 Describe and name the common disorders of muscle tone, gait and posture.	1	2	3	1 1 1 1 1 2 2 1 1 1 1 (1) 82%
	15.11 Differentiate between structural and metabolic coma.	1	2	3	1 1 1 1 1 1 1 1 1 3 1 (1) 92%

Comment: Of the 168 possible learning outcomes in section F consensus was reached in all but 15 (9 %) during the three rounds. Of the 153 outcomes where consensus was reached 149 (97%) were seen to be essential, 4 (3%) useful and none were deemed to be unnecessary.

5.12 RESPONSES TO SECTION G

Section G focused on the Knowledge, Skills and Values that participants felt should stem from completion of the **Basic Sciences** component of the bridging programme. Two different areas (physics and chemistry) were explored through the use of 12 possible learning outcomes and responses are tabled below.

SECTION G CRUCIAL BASIC SCIENCES LEARNING OUTCOMES FOR STUDENTS COMPLETING A BRIDGING PROGRAMME.					
		Essential	Useful	Unnecessary	Responses
G1 (PHYSICS)	1.1 Use scientific notation and the decimal system to manipulate SI-units	1	2	3	2 1 1 1 1 2 1 1 1 1 1 1 (1) 82%
	1.2 Apply a knowledge of vector theory in mechanical problems.	1	2	3	1 1 2 1 2 1 1 1 1 1 1 1 (1) 82%
	1.3 Formulate and explain the laws and definitions in kinetics and dynamics and apply these to solving problems in those fields.	1	2	3	1 1 2 1 2 1 1 1 1 1 1 1 (1) 82%
	1.4 State the laws and define the physical quantities used in hydrostatics and apply these to solving problems in stationary fluids.	1	2	3	1 1 2 1 2 1 1 1 1 1 1 1 (1) 82%
	1.5 Explain the processes whereby heat is transferred.	1	2	3	1 1 2 1 2 1 1 1 1 1 1 1 (1) 82%
G2 (CHEMISTRY)	2.1 List the different classes of elements in the periodic table and describe how they are likely to react.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	2.2 Give the physical and chemical properties of the elements and compounds and use the conventions to name inorganic compounds.				1 1 1 1 1 3 2 1 1 1 1 1 (1) 82%
	2.3 Perform various chemical calculations using the formulas of compounds and balanced equations.	1	2	3	1 1 1 1 1 3 1 1 1 1 1 1 (1) 91%

	2.4 Predict how gases behave under certain conditions.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	2.5 Classify different types of solutions, explain their properties and calculate their acidity.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
□	2.6 Identify the physical properties of the most common organic compounds and predict how they will react.	1	2	3	1 1 1 1 1 3 3 1 1 1 1 (1) 82%
	2.7 Explain the different types of radiation; know their medical applications and the dangers associated with exposure to each type.	1	2	3	1 1 1 1 1 3 2 1 1 1 1 (1) 82%

Comment: Consensus was reached on all of the learning outcomes in this section by the end of round three. Of these all were seen as essential.

5.13 CONCLUSION

This chapter presented and discussed the Delphi questionnaire together with the associated results and findings that were used by the researcher to construct, inform and refine the framework for articulation. Sections D to G provide support for the essential physiology, general pathology, diagnostic and basic sciences learning outcomes that may inform the curriculum of a bridging programme. Sections A to C provide insight into the critical components of the framework for articulation; the proposed framework is presented, unpacked and discussed in the following chapter.

CHAPTER 6

A FRAMEWORK FOR ARTICULATION

6.1 INTRODUCTION

As already mentioned in the previous chapters, the main aim of this study was to design a framework that could guide and facilitate articulation between the two-year Emergency Care Technician (ECT) qualification and the four-year Professional Bachelor of Health Sciences Degree in Emergency Medical Care (BHS EMC also (previously) known as B EMC).

The preceding chapters explain how the researcher gathered, analysed and interpreted data from published literature and documents as well as educators and academic managers associated with the offering of the ECT and BHS EMC programmes. By combining the outcomes and findings of the above research processes with his own knowledge and experience as an educator in the field, the researcher was able to design and validate a framework for articulation between the two programmes and in so doing accomplish the aim of the study.

This chapter begins by providing a description of suggested access pathways for school leavers and in-service personnel into the ECT and BHS EMC programmes. The researcher argues that a discussion on primary entry and access routes into the ECT and BHS EMC qualifications provides important background and context to the framework for articulation between them.

Following on from the discussion of entry and access pathways into the ECT and BHS EMC qualifications, the researcher presents, unpacks and describes the framework for articulation and its various components. The chapter concludes by presenting a proposed model that shows how articulation and upgrading of existing staff qualifications may be managed without affecting service delivery.

6.2 ROUTES OF ENTRY INTO EMERGENCY CARE QUALIFICATIONS

6.2.1 Entry for school-leavers

Figure 6.1 below shows two different educational access points for persons entering the emergency care profession. Applicants who have a National Senior Certificate (NSC) with a subject combination and Academic Points Score (APS) that allows for direct entry into a health sciences bachelor degree may apply directly for the four-year BHS EMC offered by the Universities. Applicants who do not have bachelor degree entrance or those who (due to oversubscription) were not selected for the BHS EMC are re-rerouted toward the two-year ECT mid-level worker qualification.

Figure 6.1 shows a schematic diagram of the access pathways for school-leavers.

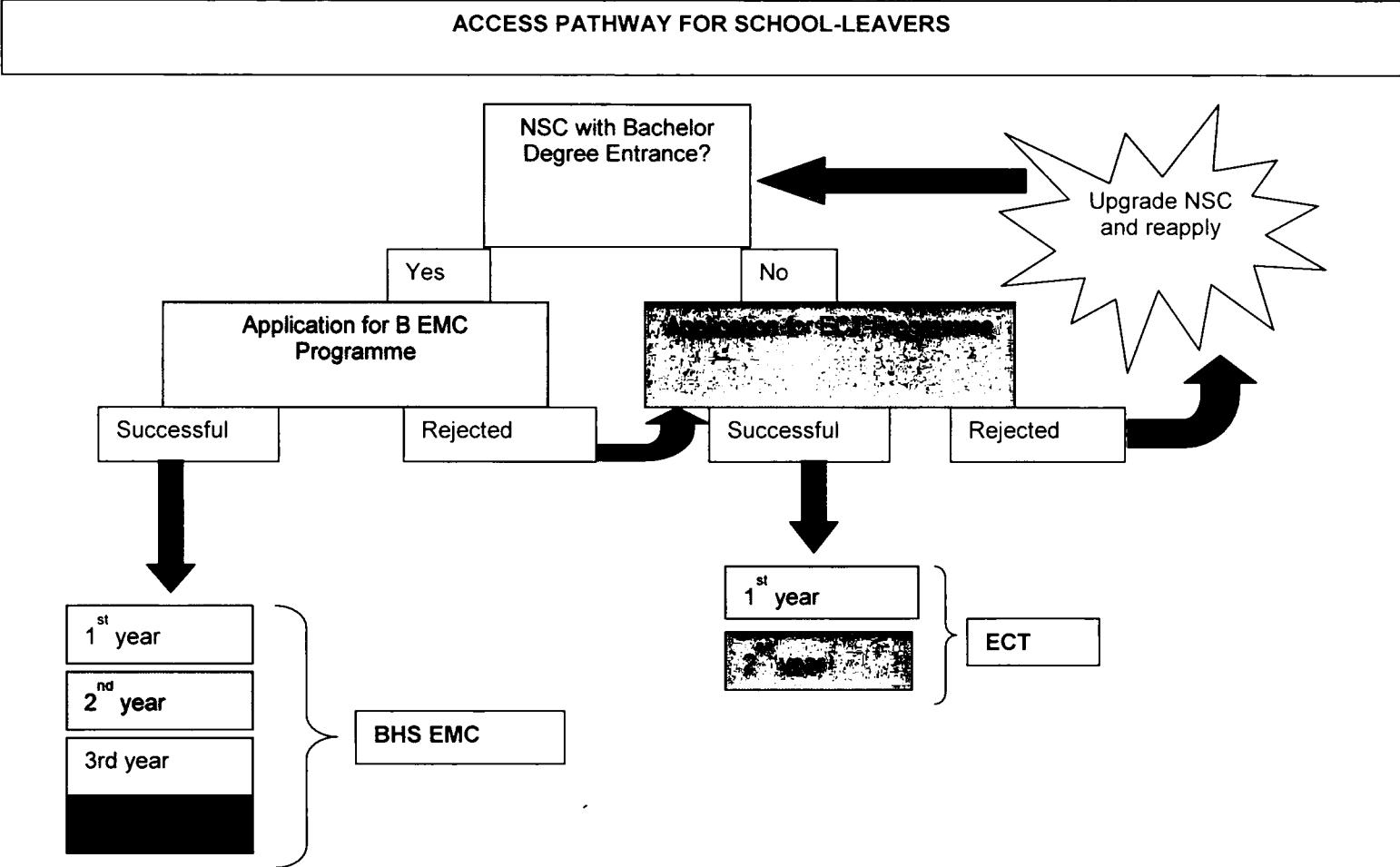


FIGURE 6.1 Academic access pathways for school-leavers entering the emergency care qualifications

6.2.2 Entry into emergency care qualifications for existing in-service staff

Both the literature reviewed and the focus group interview highlighted a need for in-service staff to gain access to the higher education qualifications. Figure 6.2 provides a schematic outline of how in-service staff may gain entry into and/or advanced placement within the ECT and BHS EMC programmes.

Staff who hold short-course qualifications but who also have a National Senior Certificate (NSC) with a subject combination and Academic Points Score (APS) that allows for direct entry into a health sciences bachelor degree may apply directly for the four-year BHS EMC offered by the Universities.

Applicants who have an NSC but who do not have bachelor degree entrance are re-routed toward the two-year ECT Mid-Level worker qualification.

Those applicants who do not have an NSC may complete the "Mvume" programme. The Mvume programme is an initiative of the National department of Health. This form of adult-based education and training aims to uplift the levels of education of existing staff within the emergency services and encourage and empower them with the required foundational knowledge to engage in further studies (RSA NDoH 2011).

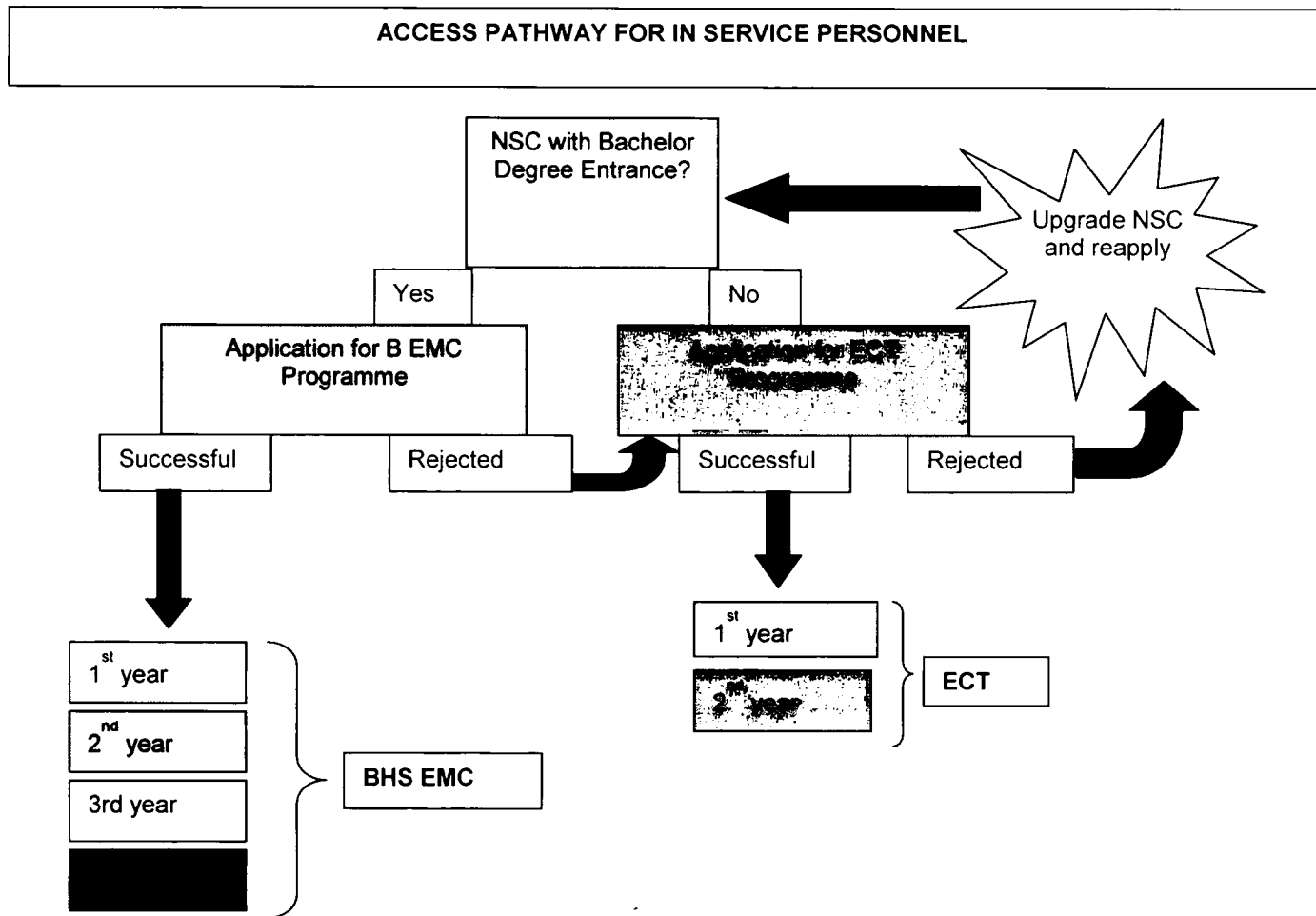


FIGURE 6.2 Academic access pathways for in-service personnel who wish to obtain higher education qualifications

6.3 THE PROPOSED FRAMEWORK FOR ARTICULATION

Figure 6.3 on the following page provides a schematic outline of the framework that has been designed and proposed by the researcher to facilitate articulation between the ECT and BHS EMC qualifications.

The framework was designed through careful consideration of the outcomes and findings stemming from the preceding research processes, namely the literature review / documentary analysis and critical comparison (c.f. Chapter 2), the focus group interview (c.f. Chapter 4) and Delphi process (c.f. Chapter 5).

In the sections that follow each of the components in the framework will be unpacked and discussed.

A FRAMEWORK FOR ARTICULATION BETWEEN THE ECT AND THE BHS EMC QUALIFICATIONS

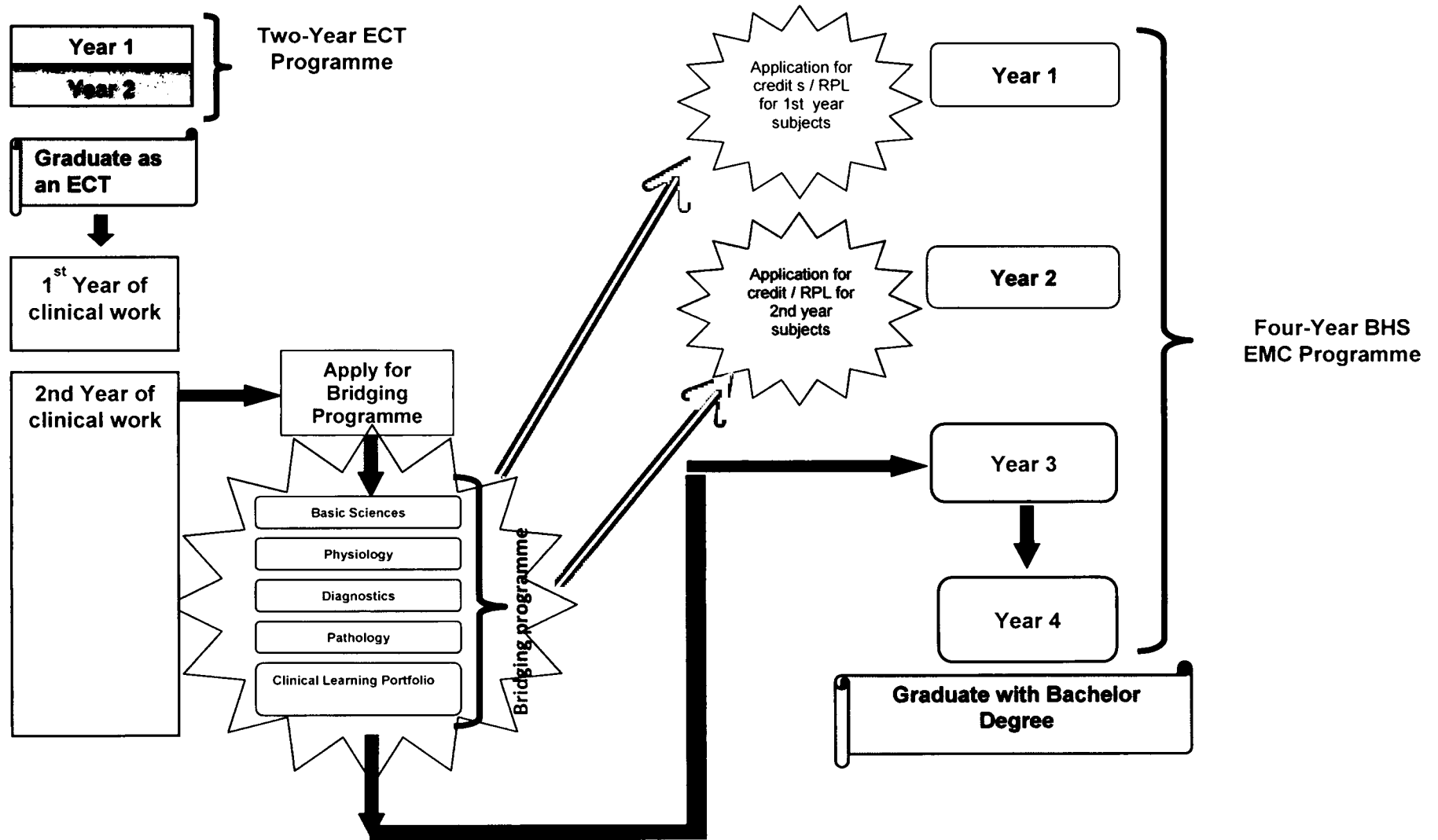


FIGURE 6.3 Framework for articulation between the emergency care technician certificate and the professional degree in emergency medical care

6.3.1 The starting point for articulation

The process of articulation is not possible without completion of the Emergency Care Technician Qualification. Figure 6.4 below indicates depicts the obvious and logical starting point for articulation, which is graduation as an Emergency Care Technician (ECT). The ECT programme is a two-year, 240-credit qualification. The structure and content of the ECT programme was discussed thoroughly in Chapter 2. The pathways to gain access to this qualification were explained above (c.f. 6.2.1 & 6.2.2).

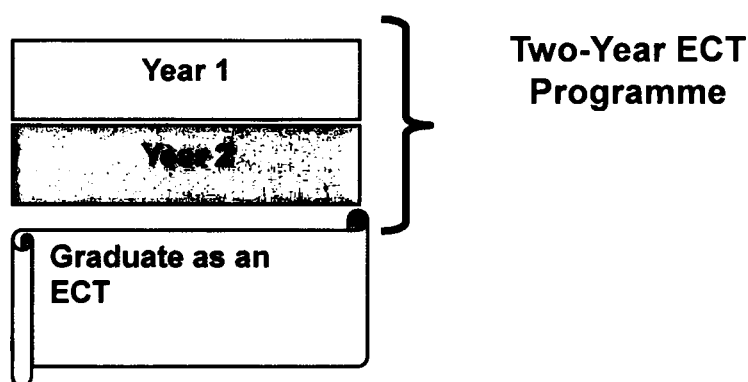


FIGURE 6.4 The two-year ECT qualification

6.3.2 A period of clinical experience prior to further study

The framework proposes a two-year period of clinical work post-qualification for ECTs as MLWs prior to engaging in further study. The following figure will illustrate the process.

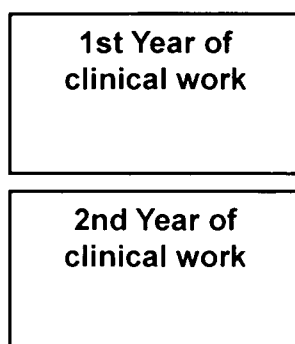


FIGURE 6.5: Period of clinical work post-graduation prior to further study

Whilst certain members of the focus-group interview did not feel that a period of work post qualification was necessary for ECT graduates wishing to continue into the BHS EMC degree, the majority consensus was that a period of clinical practice as an ECT/Mid-Level worker was indeed desirable.

Proponents for the suggested two-year work period argue that this will provide the ECT graduate with an opportunity to gain valuable experience within the field of emergency care and in so doing consolidate and apply the knowledge and clinical skills they have learnt during their studies.

Whilst recognising the right to life-long learning and further study it was seen as important by a number of role players, including the National Department of Health that ECT graduates do in fact make a contribution to the workforce as Mid-Level Workers before moving into the degree programmes.

The researcher is in agreement with the concept of a mandatory period of work prior to articulation into the Professional Degree, for it is argued that to allow for, and/or encourage direct entry into the degree programmes without any period of work would in fact defeat the objective of the ECT programme, which is to produce additional numbers of qualified staff for the local emergency services.

6.3.3 Selection of ECT graduates for articulation and further study

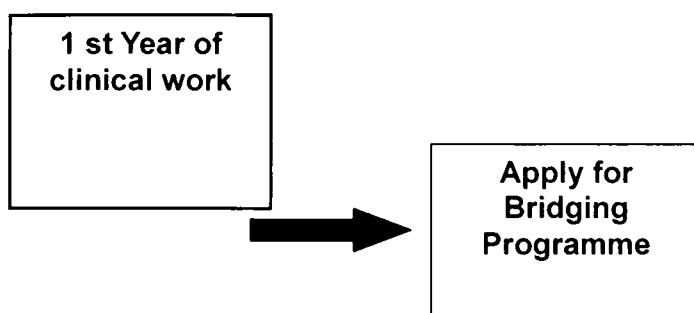


FIGURE 6.6: Point at which ECT graduates may apply to enter the bridging programme

Responses from the focus-group interview as well as consensus views expressed by the Delphi panellists support the view that it is neither desirable nor possible to have every single ECT graduate move on to enter the University Professional Degree Programmes. However, having said this, it is anticipated that there will be a sustained demand from many MLWs to study further and obtain the Bachelor degree and in so doing become Emergency Care Practitioners.

The researcher therefore suggests that the selection and identification of ECTs who are suited to further study is informed not only of their academic performance on the ECT programme itself, but also of their performance as MLWs within their first year in the workplace.

In order to do this it is proposed that at the end of their first year of practice those ECT students who wish to study further make formal application to engage (during their second year of clinical practice) in a structured bridging programme. The aim of this programme would be to prepare them for advanced placement into the degree programme.

Their application may also include the submission of a portfolio of evidence documenting their clinical work and prior learning as well as the continued

professional development activities they have engaged in post-qualification as an ECT. The portfolio may be further developed and expanded during their engagement with the bridging programme (as discussed below).

6.3.4 A bridging programme to assist ECT graduates to gain advanced placement in the professional degree programme.

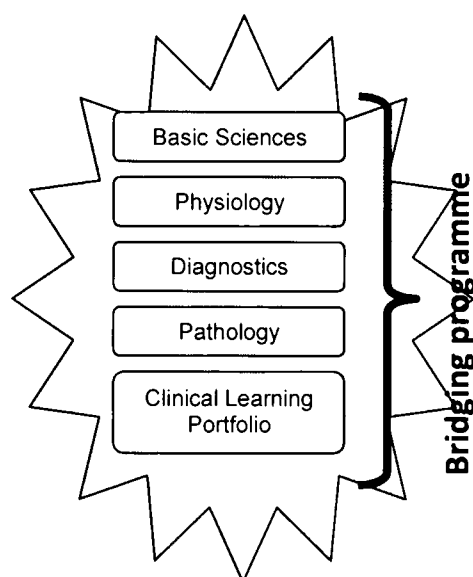


FIGURE 6.7 Bridging programme

Outcomes of the focus group interview (cf. Chapter 4) and Delphi questionnaire (cf. Chapter 5) support the fact, that, although a number of similarities do exist between the two-year ECT MLW programme and the academic content of the first two years of the university four-year professional degree programmes, there remain a number of shortfalls in a number of areas in terms of the academic level and depth of knowledge.

It follows from this study that shortfalls exist in the following knowledge areas namely:

- Basic Sciences (Physics & Chemistry)
- Physiology
- General Pathology
- Diagnostics
- Selected areas of clinical exposure

The framework has therefore been designed so as to include a bridging programme focusing on the above knowledge areas.

The suggested bridging programme should include similar modules at the same academic level as those covered by students on the degree programme during their first and second years of study.

In summary, the main aim of the bridging programme would be to ensure that the foundational and core knowledge of the ECT graduate having completed the bridging programme should now be the same as that of the Degree student at the end of their second year of study. This will allow for ECT graduates who have completed the bridging programme to join the Bachelor degree students who are entering their 3rd year study of the Bachelor Degree.

Although it was not the original intention of this study to move beyond the designing of a framework for articulation and determine the detailed learning outcomes of the bridging programme, the additional sections **(D to G)** added to the Delphi questionnaire have provided useful consensus views on the possible learning outcomes of the suggested bridging programme.

The design of the actual modules, content and curriculum to support the learning outcomes in the bridging programme falls beyond the scope of this study. It should also be stressed that the current Universities' degree programmes do differ somewhat in terms of academic architecture, depth and content. For this reason each Institution would be required to consider the consensus views relating to the content of the bridging programme against the

content of their own physiology, diagnostics, general pathology and basic science modules.

In order to minimise the amount of time spent away from the workplace and to limit the operational impact that further studies would have on the workforce, it is suggested that the bridging programme is offered in a limited contact format and possibly through cooperative educational partnerships and agreements between the provincial colleges offering the ECT MLW programme and the Universities offering the four-year professional degrees.

6.3.5 Granting of academic credit and /or Recognition of Prior Learning for modules in the professional degree programme

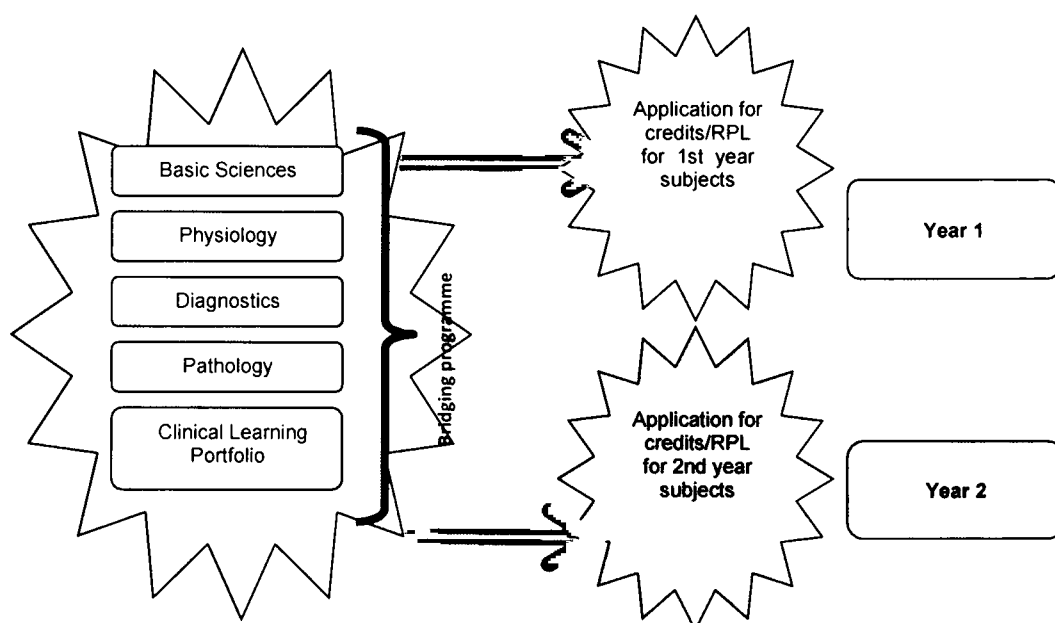


FIGURE 6.8 RPL and credit awarded for modules within the first and second years of the B EMC degree

The framework moves to suggest that on completion of the bridging programme, ECTs make application to the Universities to be granted academic credits for those modules in the professional degree programme that have sufficiently similar learning outcomes to the modules they would have

completed during the two-year ECT programme and/ or through completion of the bridging programme.

At this point it must be acknowledged that, whilst the researcher uses the outcomes of the documentary analysis, focus group interview and Delphi questionnaire to make suggestions regarding the allocation of credits, the academic structure and subjects within the professional degree programmes will differ between the different Universities offering the four-year degree programmes.

This means that each university will have to approach the allocation of credits based on the academic architecture applicable to their own professional degree programme. Having said this, the results of the critical comparison, focus group interview and Delphi questionnaire appear to support the awarding of the majority of credits in the first year of study aside from the basic sciences (physics and chemistry).

Consensus opinions also indicate that fewer credits could be awarded toward the second year of study of the professional degree and that prior to completion of the bridging programme the total number of credits awarded would not come close to the maximum permissible threshold of 50% as stipulated by the DoE. (The DoE does not allow for universities in South Africa to grant more than 50% of the credits towards any qualification.).

6.3.6 Successful completion of the bringing programme allows ECT graduates to register for and enter directly into the third year of the B EMC degree

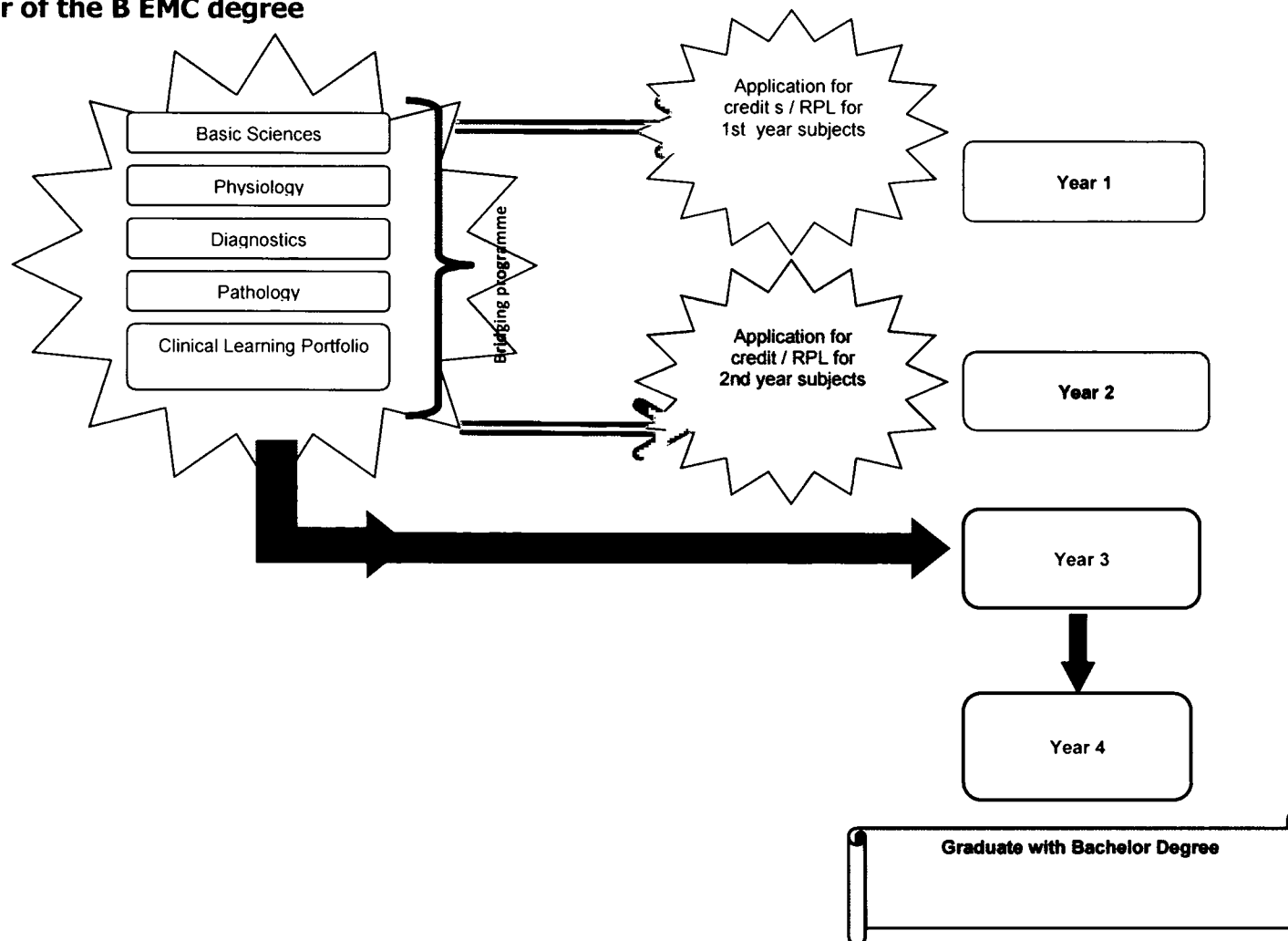


FIGURE 6.9: Registration and entry into the B EMC degree

6.3.6 The researcher proposes two possibilities for registration

A first scenario exists where the ECT graduates do not formally register for the professional degree programme until such time as they have successfully completed the bridging programme.

This means that they will first register for the degree programme at the start of the third year of study. It is at the point in time that they will apply for all of the credits for the first- and second- year subjects (i.e. 240 credits which constitute 50% of the 480 credits of the professional degree programme).

An advantage of this first option is that academic performance in the bridging programme can serve as a form of filter or selection tool, thus preventing students from entering the system who do not have the academic potential to cope with NQF level 7 and 8 degree studies at a university.

In the second scenario ECTs applying to complete the four-year degree programme at the end of their first year of clinical work are registered for the professional degree in the beginning of their second year of work, which they complete as registered University students whilst they engage in the bridging programme.

An advantage of the above scenario is that the universities can claim the input and teaching subsidy at this earlier point to offset the academic costs related to the limited- contact bridging programme.

This second scenario is also advantageous in terms of the fact that first-year and second-year credits could be immediately awarded at that point when students are registered. (One cannot formally award credit for modules in a programme unless the student is in fact registered for the programme).

A potential disadvantage of the second scenario is the fact that those ECTs who either drop out of the bridging programme or who fail to complete the bridging programme successfully will negatively affect throughput statistics and graduation subsidies. Academic managers at the universities will have to consider carefully which of these above options would work best in their institutional environments.

6.4 ENROLMENT PLANNING

The Universities engaged articulation and bridging programmes between the ECT and BHS EMC programmes are advised to enter into discussions with their local emergency service providers and colleges offering the ECT regarding the expected number of ECT MLWs who will be funded and supported for further studies. This will allow for proper enrolment planning and resource allocation to cater for the additional intake of students into the third year of their degree programmes that will join the students moving up from the second year.

6.5 SUPPORT FOR ECTs TO STUDY FULL TIME

Although not included in the schematic outline of the framework the importance of creating training positions and funding for such positions is important for articulation to be sustainable.

It is not expected that ECTs would resign from the service to pursue further study, but rather that they would be paid during study leave to complete the two outstanding years for their degree programme whilst still earning their MLW salary. This is due to the fact that once one starts working it becomes difficult to resign and support oneself and cope with full-time study.

Research has shown that financial constraints have a negative impact on Academic performance. Therefore, the creation of training posts over and above shift strength will assist the emergency services in career planning and

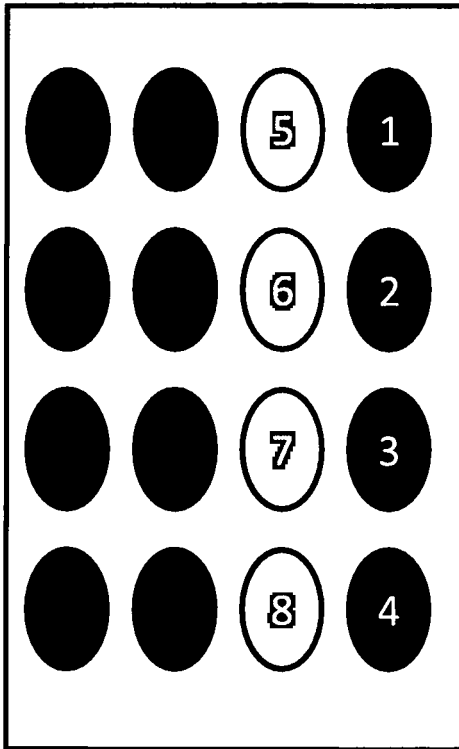
furthering the qualifications of their staff without compromising on service delivery.

In addition, it is also advised that ECT MLWs employed in the services and who have been moved into training posts should be required to sign an agreement to work back the time post-qualification. Such a system will ensure the service a steady supply of ECPs and ECTs for the future.

6.6 POTENTIAL ROLL-OUT PLAN

The way in which in-service ECTs may be afforded an opportunity to upgrade their qualifications without having a negative impact on service delivery becomes an important consideration for emergency service managers. The researcher, having worked within the emergency services and as an educator in the field and having applied his mind to this problem, wishes to propose a potential roll-out plan for consideration.

The diagrams and narrative below shall attempt to show how services may systematically support their mid-level ECT staff members to upgrade their qualifications and obtain the BHS Professional Degree without affecting service delivery.

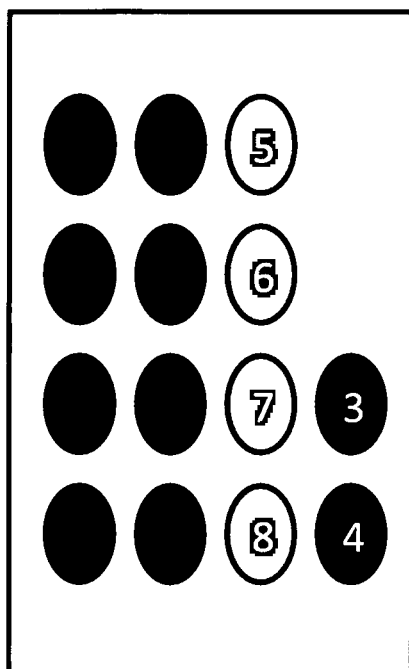


Depicts a shift where normal shift strength is 12 staff members. Staff numbered 1 to 4 coloured red are training posts

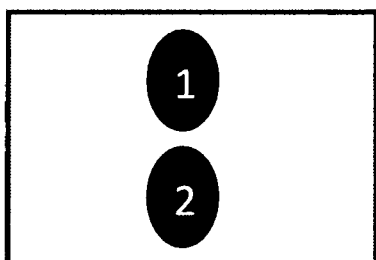
The example above shows shift strength of 12 staff with four training positions (coloured red and numbered 1 to 4) created over and above shift strength.

In year one of the roll-out, the first two staff members from the four training posts (colour coded red and marked as 1 and 2) leave the service and enter the third year of the BHS degree as full-time students.

Year 1



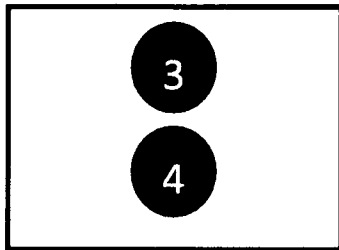
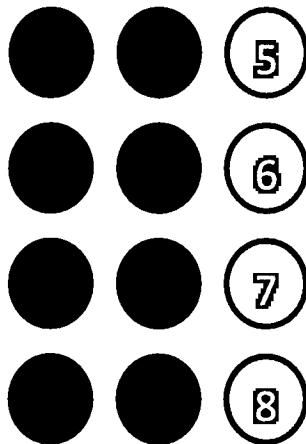
In year one staff members 1 and 2 leave the service and enter the third year of the BHS Degree at the University



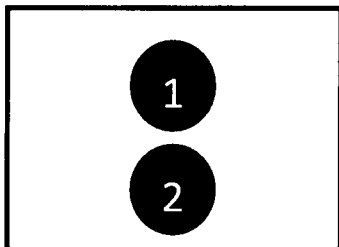
Third year
BHS EMC

In year two of the roll-out staff members 1 and 2 have completed their third year and are now in the fourth and final year of the degree programme. The remaining two staff members in the training positions numbered (3 & 4) leave the service and begin year three. All four staff in the training posts are now away from the service and engaged in full-time study at the university. The service now runs on the minimum shift strength of 12 staff members. Staff members 5 to 8 (coloured green) are identified as future candidates for further study and may engage in the bridging programme preparing them for entry into year three.

Year 2



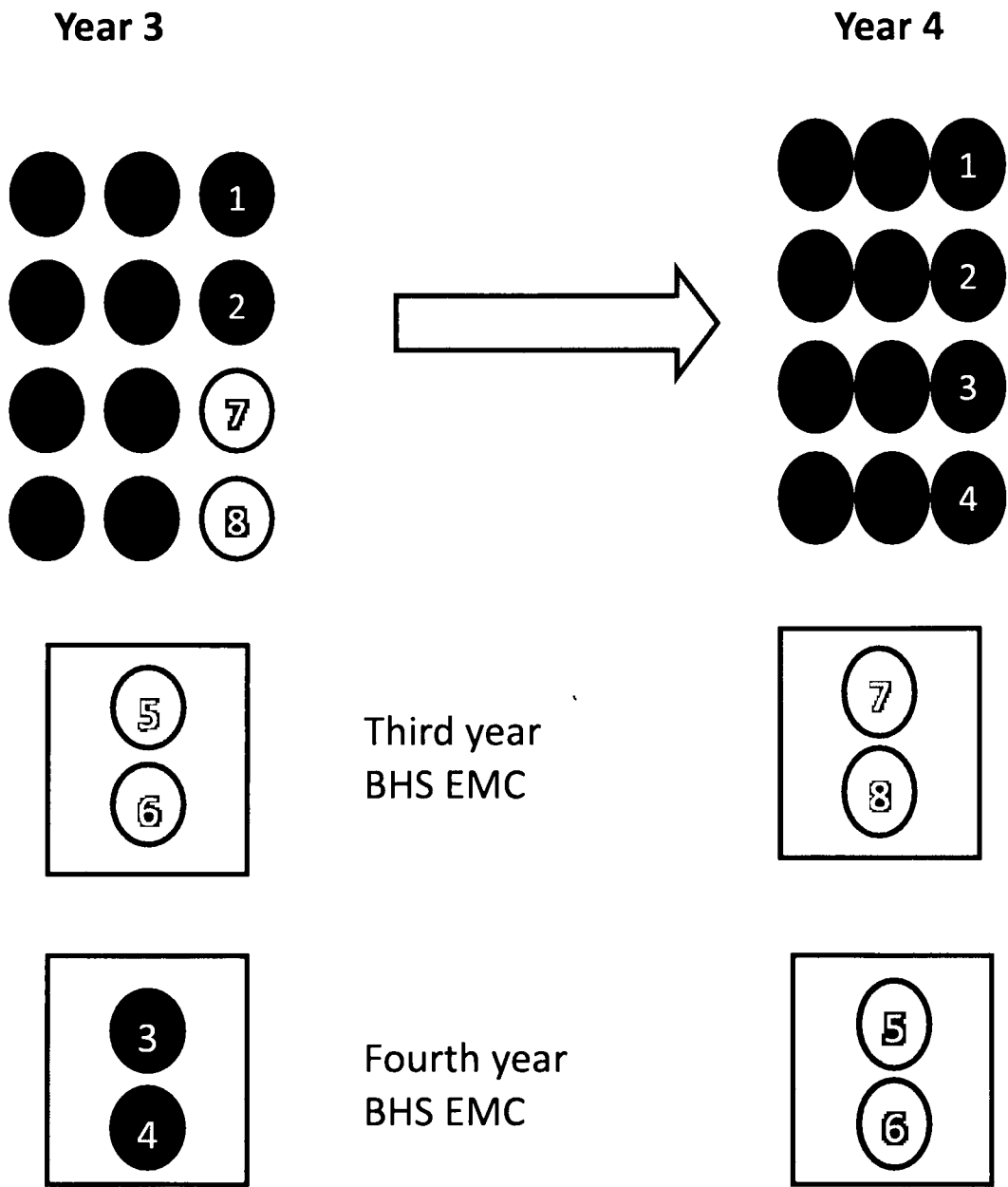
Third year BHS EMC



Fourth year BHS EMC

Year three sees the return to operational duty of the first two staff members (1 & 2) who have now obtained the BHS EMC degree. Also indicated in year three is the movement of operational staff marked (5 & 6) into the vacant training positions created when staff members one and two returned to operational duties after completing the degree.

Finally by year four all four staff member sent to the university to upgrade their qualifications have returned to the service and the next four members are busy with full-time study.



Numbers in relation to shift strength and training positions may be adjusted according to the size of the service, operational requirements and budget allocations for training.

It should be noted that the theoretical model outlined above does not take into account failure or dropout. In the case of poor performance and/or lack of progression, services may recall members into operational positions and new members are then moved into the vacant training position created.

6.7 CONCLUSION

This chapter provided a description of access pathways for school-leavers and in-service personnel into the ECT and BHS EMC programmes. The researcher continued by presenting, unpacking and describing the framework that was designed to facilitate articulation between the ECT and BHS EMS programmes including a potential roll-out plan that may allow in-service staff to upgrade their qualifications without negatively affecting service delivery.

The next and final chapter of this thesis serves to conclude and summarise the study.

CHAPTER 7

SUMMARY, RECOMMENDATIONS AND CONCLUSION

7.1 INTRODUCTION

In this final chapter the researcher summarises and concludes the study. The potential value and contribution of the study are discussed, together with possible limitations and recommendations for implementation.

7.2 SUMMARY

In this study the researcher designed a framework for articulation between two qualifications within the Emergency Care Profession. The first qualification was the two-year Emergency Care Technician (ECT) and the second the four-year Bachelor Degree in Emergency Medical Care. The rationale, importance and benefit of designing such a framework was argued and discussed in Chapter 1.

The design of the framework for articulation was informed and validated by the application of a carefully selected mixed-method design with associated research methods. The research methods included a literature review, documentary analysis, focus group interview and Delphi questionnaire each of which has been described and discussed in detail in Chapter 3.

The results of the literature review and documentary analysis were presented in Chapter 2.

In Chapter 4 the researcher provided a description of the focus-group interview and associated findings.

Chapter 5 described and discussed the result and findings of the Delphi questionnaire.

In Chapter 6 the researcher presented potential access pathways for school leavers and in-service staff into each of the two qualifications before unpacking and describing the proposed framework that was designed to guide and facilitate articulation between the two qualifications. Chapter 6 also includes a description of a potential roll-out strategy for the upgrading of qualifications for in-service ECT personnel.

Through completion of this study the researcher argues that the central aim and objectives of the study have indeed been adequately addressed. Furthermore, the structure and design of the proposed framework developed and described by the researcher has been sufficiently linked to, validated, and supported by findings stemming from the documentary analysis, focus group interview, and Delphi questionnaire.

7.3 VALUE AND UNIQUE CONTRIBUTION

There remains a serious shortage of properly qualified emergency care workers within South Africa, more specially within the Advanced Life Support band. With the majority of current staff within the services lacking formal qualifications, the newly introduced Mid-Level Worker Emergency Care Technician programme looks set to remain and even expand with additional training providers being accredited each year.

The subsequent demand from the growing masses of ECTs being produced and working within the service for further development and learning opportunities may in part be addressed by creating opportunities for articulation into the professional bachelor degree programme.

Taking the above into consideration, the researcher postulates that this study has the ability to make a unique and important contribution to emergency care education and training in South Africa, for, prior to this study, there was limited

empirical information available comparing the ECT and BHS EMC qualifications. Nor was there a well-described framework that could have guided and informed the process of academic articulation between the two qualifications.

At the time of writing negotiations were underway between the University of Johannesburg (UJ), (the institution from which the researcher hails) and the North West Provincial Emergency Care and Rescue Services College as well as the City of Johannesburg Emergency Management Training Academy regard the piloting and roll-out of the ECT bridging programme and subsequent articulation and advanced placement into the BHS Degree programme offered by the UJ.

By designing the proposed framework for articulation, the researcher has created new opportunities for further growth and development of staff within the emergency medical services as well as school-leavers entering the emergency care profession. It is argued that the opportunity created for further academic development may also have a positive impact on staff morale, retention and most importantly patient care.

Finally, moving beyond the emergency care profession, the outcomes of this study may also provide additional generic information and insight that could be of use to the wider health community in South Africa. As discussed in Chapter 2 mid-level worker programmes are in the process of being implemented by a number of other health professions. This study may therefore be of use to clinicians and educators alike when it comes to shedding light on mid-level health workers such as ECTs and how one may create opportunities for their continued growth development within each of the various professions.

7.4 CHALLENGES AND LIMITATIONS

Whilst every effort was made by the researcher to enhance the validity and reliability of the research processes, as with any study, there remained certain challenges and limitations.

In this regard the researcher would like to acknowledge the following potential limitations associated with this study:

7.4.1 Limited published literature in the area of investigation

From the very onset of this study and during defence of the study proposal the researcher was cautioned about the limited existing literature on EMS Education and Training in South Africa. Finding sufficient texts and references to provide adequate background and frame the research proved to be a major challenge for the researcher. Many of the statements made in the literature review on EMS training, although generally accepted as true, proved quite difficult to reference. In certain instances, the researcher was forced to support a number of statements through references to personal conversations with key role players.

7.4.2 Ongoing developments during the research period

During the period of this study a number of developments occurred with regard to EMS education and training in South Africa and the Higher Education Qualifications Framework. The name of the four-year professional degree was adjusted from Bachelor of Emergency Medical Care (B EMC) to Bachelor of Health Sciences in Emergency Medical Care (BHS EMC). In addition the researcher was privileged enough to be included on a task team constituted by the National Department of Health to produce the first draft of a National Policy on Emergency Care Education and Training for South Africa.

As pointed out in the introduction there appears to be a potential move away from the initially accepted and discussed two tiered system of ECTs as Mid-Level workers and BHS EMC Degree Professionals toward a three tiered system which includes a one-year 120 credit Basic Life Support access qualification below the level of the ECT. This naturally has a potential impact on the background to this study.

Therefore whilst exciting, researching something that is in the process of changing and evolving during the research process can create a challenge in that elements of information included in the write-up rapidly seemed to become dated. The researcher had to revisit and review sections of the literature review and background information regularly in an attempt to accurately as far as possible reflect current practices as they have emerged.

7.4.3 Limited pool of experts for the focus group and Delphi

The newness of the ECT programme and academic immaturity of the emergency care profession limited the pool of persons who could be considered experts in the field of EMS Education and Training. Despite identifying criteria that could guide the selection of members for both the focus group interview as well as the Delphi process, the researcher found very few participants who met every single one of the criteria. All of the participants had good knowledge of either the ECT or the BHS EMC programmes, but only a few appeared to have in-depth of both.

7.4.4 The length of the Delphi questionnaire

On reflection the researcher believes that, although useful for future research and design of a curriculum for the bridging programme, the inclusion of sections D to G fell beyond the scope of this study. The hundreds of additional statements were not required for the primary aim of this study (which was to

design the framework, and not the curriculum, for the bridging programme). On reflection, the addition of the extra sections made the Delphi questionnaire very long. Subsequently, the turnaround time for each of the rounds was extended and although none of the panel members dropped out, numerous complaints were received regarding the length of the questionnaire. However, in the light of the urgent need of training programmes in emergency care and services in South Africa, it is valuable and not in vain as it could be used to inform the curriculum for the bridging programme.

7.5 RECOMMENDATIONS

7.5.1 Introduction

By conducting this study the researcher has developed a unique and deeper understanding of the many challenges facing emergency care education and training within South Africa. Whilst each of the research processes were focused on eliciting data useful to the design of a framework for articulation between the ECT and BHS EMC qualifications, additional collateral findings also emerged. In this final section of the dissertation the researcher wishes to share some of these findings and make selected recommendations regarding future practices as well as focus areas for additional research.

7.5.2 Implementation of the framework

The framework and suggested roll-out plan described in Chapter 6 should be interrogated, discussed and debated by academic managers at Universities and Colleges offering the ECT and BHS EMC programmes in order to see how best articulation may be facilitated in their specific region.

A curriculum (guided by the learning outcomes on which consensus were reached in sections D to G of the Delphi) needs to be developed for the bridging programme.

Cooperative education partnerships and agreements need to be established between Universities and Colleges in the various provinces for the offering of the bridging programme.

Providers wishing to facilitate articulation between the two programmes should be required to submit their bridging programmes to the HPCSA for approval by the professional board.

7.5.3 Enrolment planning

The HPCSA and National Department of Health need to take a strategic leadership role in defining and articulating their short-, medium- and long-term strategy on ECT and B EMC training. Ratios between ECTs as mid-level workers and Degree Professionals need to be debated and defined. Without this type of information it becomes difficult to establish how many ECTs should be taken into the bridging programmes each year.

7.5.4 Funding for the Framework

Future research needs to be conducted into establishing the budgetary and funding implications associated with the framework. This is with specific reference to the effect the bridging programme and advanced placement will have on the teaching input and gradation subsidies for universities engaging in such activities.

7.5.5 A pilot study

Whilst the researcher considers the proposed framework for articulation to be both simple and pragmatic, implementation in the real world setting remains the acid test. For this reason the researcher suggests that prior to adopting the framework and enrolling large numbers of ECTs into bridging programmes,

universities wishing to facilitate articulation should firstly conduct a pilot study with a small number (around 10) in-service ECTs to iron out any unforeseen problems before fully implementing the framework.

7.5.6 Information-sharing and marketing

As mentioned previously, mid-level worker programmes are in the process of being developed for many other health professions in South Africa. Examples include physiotherapy, podiatry, medicine, dentistry and radiography to name just a few. It seems logical to assume that, just as the ECTs in the emergency care profession desire to have an opportunity to upgrade their mid-level worker qualification and obtain the professional degree, so would mid-level workers from the other professions.

For this reason the researcher recommends that the information regarding articulation and the framework is marketed not only within the emergency care professions, but that the findings of this study should also be disseminated to the wider health community.

7.5.7 Support for ECTs within the Emergency Medical Services

As mentioned above, during the course of the study certain collateral findings emerged that were not linked to the primary aim and objectives. The researcher, however, believes that certain of these findings are worthy of brief discussion as they have an impact on the desire for ECTs to remain in the service and/or to study further.

7.5.7.1 Provision of suitable equipment

The ECT scope of practice falls within the Advanced Life Support Band and the clinical skills and procedures they are able to perform require associated clinical equipment. It does not make sense committing valuable time and resources to

training and education of ECT graduates only to have them recalled back to their services and ending up on an ambulance without the necessary equipment required for their new scope.

7.5.7.2 Clinical Governance and Mentoring

As newly qualified technicians, ECT graduates are designed to function within an organised system which supports them from a clinical governance and mentorship point of view. Services need to dedicate suitably qualified degree practitioners to support, guide and mentor the mid-level workers within the service.

7.5.7.3 Continuing Professional Development

Employers need to ensure that ECTs are afforded regular and ongoing opportunities to engage in continuing professional development in addition to the minimum obligatory points that must be achieved in order to remain registered. Academic stimulation and opportunities to reflect on their practices should be encouraged through formally structured events.

7.5.7.4 Introduction and integration with existing staff

ECT students have reported that during their studies they have often been shunned by the existing staff within the services. It would appear as if the new ECT tertiary qualification is being perceived as a potential threat to existing staff within the service. For this reason the induction, integration and placement of mid-level workers as ECT graduates within the service must be properly managed. If this issue is not addressed, the end result will be unnecessary staff conflict and frustration on the part of the ECT graduates. A major concern should this be allowed to occur, is that with the tertiary qualification and as ALS qualified technicians, ECTs will simply elect to leave the services concerned and

enter the private sector and international market where there is known to be huge demand for such skills.

In order to prepare heads of services and their operational managers for arrival and integration of mid-level workers, and to ensure that once in place they are properly managed and cared for within the service, the following recommendations are made:

- a) That a detailed information package be prepared and formal workshop convened for senior management (Fire Chiefs, Directors, CEOs) associated with the provision of emergency services at provincial, local authority and national level. The main aim of these workshops would be to formally introduce the mid-level worker programmes to these managers and allude to the importance of a managed integration of graduates.
- b) Similar workshops are held for operations managers focusing more on the logistical support required to properly manage and care for mid-level workers within the service.
- c) That a qualitative study be commissioned to engage with ECTs and managers from the services six months post-graduation to identify and explore issues around the integration of mid-level workers within the emergency services.

7.6 CONCLUSION

This study predicts that a sustained demand will be experienced from ECT graduates as Mid-Level workers to further their studies and obtain the professional degree. Articulation is indeed possible if guided by a framework that includes a bridging programme to provide ECT graduates with the additional knowledge, skills and insights required to enter directly into the BHS Emergency Medical Care Degree for the improvement and sustainability of health care services in South Africa.

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Appendix 1

Agenda for the Focus Group Discussion

1. Welcome and introduction (5 min)

Thank the participants for agreeing to participate in the discussion group. Allow each participant to introduce themselves to the group. Remind them of the main purpose of the study as well as the role of the focus group discussion within the study. Reconfirm confidentiality and anonymity as well as the fact that the discussion will be audio recorded.

2. Focus area one- The need for articulation (5 min)

- Do you feel that there will be a sustainable demand for mid level ECTs to upgrade their qualification to Bachelor degrees?
- What you feel are the factors and forces that would drive the demand for articulation.

(Those that may feel there is no need will be requested to clarify why they feel that demand for articulation will not be great)

3. Focus area two- How well does the ECT programme prepare the graduate for further study (10 min)

Prompt: The ECT programme is a new qualification falling into the Higher Education Band (HE) and as such it primarily has to produce competent technicians for the profession, however it should also provide a springboard for further learning.

- How well, in your opinion does the ECT programme prepare graduates in the area of general academic development ?
- The DoE stipulates minimum academic entry requirements in order to gain access into a Bachelors degree. The ECT programme currently only requires a grade 12 or equivalent NQF 4 qualification. Do you feel that all graduates who have completed the ECT programme would be able to cope with the academic content and learning expectations associated with a University degree studies?

4. Focus Area three - Structure of the ECT and B EMC programmes (25 min)

- The ECT is a two year 240 credit NQF 5 qualification. The new HEQF does not feature such an exit level. What possibly impact do you foresee this having in relation to recognition and articulation of the ECT qualification?

*Prompt: The ECT and the Professional Degree programmes are both vocationally focused and are designed to produce workers for the emergency services health sector. Therefore, it is logical to assume that a number of the learning outcomes achieved by students on these two programmes would be similar. **A simplistic view on placement and articulation would therefore be to say that as the ECT programme is 240 credits completed over two academic years and the Professional degree programme is 480 credits completed over four academic years, the ECT graduates should simply enter directly into the third year of the degree programme.***

With reference to this statement, please provide you opinion on the following.

- To what extent do you feel that the ECT programme sufficiently addresses the basic health sciences (physics and chemistry) that appear in the first year of the University degree programmes?
- How do you feel the ECT graduates knowledge and skills in Emergency Medical Care would compare to those obtained by University students after two years of study. Would the learning achieved be similar enough to support an application to faculty boards for a direct credit or rather should the route of RPL be explored? Should the ECTs simply be required to challenge a final EMC EMC II paper and I?
- Do you feel as if the ECT graduate and the University student after two years would have a similar understanding of professional practice? Would they have both been exposed to a similar number of patients and hours of operational duty? Do you feel that the credit or RPL routes should be followed relating to foundations of professional practice?
- In your opinion to what extent is the anatomy and physiology covered during the ECT equivalent to the anatomy and physiology, which would have been covered on the degree programme during the first two years? How much credit and / or RPL do you feel could be awarded?
- As the ECT programme is focused at producing Technicians and not Clinicians how would you compare the diagnostic and clinical assessment knowledge, insights and skills of the ECT to the University student after two years?
- In your opinion would the knowledge of general pathology and disease processes covered during the ECT programme be sufficient to support additional learning required in the third and fourth year of the degree programme?
- Should and could the medical rescue training covered on the ECT programme and by the ambulance training colleges generate a direct credit towards similar rescue modules offered as part of the University Programme?
- Current Higher education legislation currently stipulates that not more than 50% of credits obtained in one qualification may be transferred to another.

Do you in any way see this as creating a problem when it comes to articulating the ECT programme with the Professional Degree?

5. Short interval (Tea, Coffee) 15 min

5. Focus area four (The possible need for a bridging programme)

(10 min)

- Do you feel that it is necessary to have some form of bridging programme for the ECT graduate before advanced placement into the degree programme is considered?
- What do you think the main focus of the bridging programme should be?

6. Conclusion (10 min)

Are there any other potential challenges that you are aware of that you have not yet mentioned and which you feel should be addressed relating to articulation of ECTs into the degree programmes at the Universities?

Thank participants for their participation.

Appendix 2

INFORMATION FOR DELPHI PARTICIPANTS

Dear xxxxxx

I would like to begin by thanking you very much for agreeing to participate in this important study. You are one of eleven carefully selected panellists. This brief will provide you with the background to the Delphi process and also indicate to you how your feedback will be utilised.

As indicated in the attached consent form, the aim of this study is to develop a framework for articulation between the newly established "Mid-level worker" ECT programme and the Universities four-year degrees in Emergency Medical Care. Three main methods have been selected to gather data for this study. The first process (already completed) consisted of literature review and critical in-depth analysis and comparison of the academic structure and content of the two-year ECT and four-year Bachelor Degree programmes. Findings stemming from this analysis were used to create an agenda and questions that were introduced to fellow academics, members of the professional board, industry and the National Department of Health during a focus group discussion. Themes, ideas and findings emerging from the critical comparison and focus group discussion were then used to compile this Delphi questionnaire which forms an important third and final data gathering process for this study.

Using the Delphi method I aim to obtain "expert" opinion and consensus from yourself and the other participants regarding a framework and bridging programme that may guide and facilitate articulation between the ECT and B EMC programmes. You will notice the questionnaire is divided into sections. The first sections consist of statements that require you to indicate if you agree, disagree, or are undecided. To do this please place an x in the corresponding block.

Both the critical analysis and the findings of the focus group discussion supported the need for a form of bridging programme. These processes also identified main areas of similarity and difference between the two-year ECT qualification and the first and second years of the Universities' degree programmes. Using this information together with learning materials provided by Universities and colleges offering the ECT and degree programmes I critically compared the learning outcomes that would theoretically have been achieved by the end of the second year of the University degree programme to those theoretically achieved after completion of the two year ECT programme. The identified areas of shortfall have been captured as outcome statements in the final sections of the Delphi questionnaire. In these sections you are requested to indicate if you feel the learning outcomes I have identified are indeed essential, useful or unnecessary inclusions in a bridging programme. Please make your selections based on the assumption that successful completion of the bridging programme would allow an ECT graduate to enter directly into the third year of the four-year Bachelor Degree programme.

The Delphi process

As indicated above the aim of the Delphi is to achieve consensus (80%). This may take one, two, or occasionally, three rounds. In round one all participants return their complete questionnaires. The responses are then analysed to see if and where consensus is reached. If 80% consensus is reached on all statements there is no need for any further rounds. Round two and three (if required) will involve sending back to you and the other participants only those statements where there was not 80% consensus. Although you will be blinded as to the identities of the other panellists, you will be able to see a breakdown of the responses from the previous rounds indicating where the majority of the consensus lay. Using this information you will have an opportunity to again reflect and consider adjusting your initial responses in an attempt to achieve 80% consensus.

In the event that there remain statements where consensus cannot be achieved even after three rounds I will record it as such.

Thank you once again for agreeing to assist me in this study. Should you require any additional information or clarification please feel free to contact me On 082 6532125 or 011 559 6257 or email: clambert@uj.ac.za

Regards

Craig Lambert

APPENDIX 3

FORM OF CONSENT TO BE COMPLETED BY FOCUS GROUP INTERVIEW PARTICIPANTS

Date:.....

Hereby, I the undersigned, consent to participate in the **Focus Group Interview Process** which is scheduled to take place from in Room 7220 of the Faculty of Health Sciences at University of Johannesburg on Wednesday 3 March 2010 from 09h00 to 10h30.

Please type in your particulars as follows:

Title:.....

Surname:.....

First Name:.....

Postal Address:.....

.....

.....

E-mail address:.....

Telephone number:.....

Cellular number:.....

Signature.....

Please return this form (electronically if possible) **on or before 25 February 2010**. My particulars are as follows:

PO Box 183

Strubensvalley

ROODEPOORT

1735

Email: clambert@uj.ac.za

Tel: 011 559 6257 or 082 653 2125

Lastly I wish to assure you that your own anonymity as well as that of your responses and those of the other members of the discussion group will be ensured. All audio and written information gathered will be managed in professional and strictly confidential manner and no names or personal information linked to this study will be divulged. Please take note that the results coming from this Ph. D. study may be published.

Thank you for giving up your valuable time to assist me in completing this study.

Yours faithfully



C. LAMBERT

(STUDENT NO.: 2007147123)

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE FREE STATE

BLOEMFONTEIN

9301

REGISTERED PROJECT

(ETOVS NO.: 145/09)

APPENDIX 4

FORM OF CONSENT TO BE COMPLETED BY DELPHI PANELLISTS

Date 25 June 2010

Hereby I, the undersigned, consent to participate in the **Delphi process** which is scheduled to take place from July to August 2010. My fill particulars are as follows:

Title:.....

Surname:.....

First Name:.....

Postal Address:.....

.....

.....

E-mail address:.....

Telephone number:.....

Cellular number:.....

Signature.....

Please return this form (preferably electronically if possibly) **on** or **before 20 July 2010**. My particulars are as follows:

PO Box 183

Strubensvalley

ROODEPOORT

1735

Email: clambert@uj.ac.za

Tel: 011 559 6257 or 082 653 2125

Lastly I wish to assure you that your own anonymity as well as that of your responses will be ensured. All information gathered will be managed in strictly confidential manner and no names or personal information linked to this study will be divulged.

Thank you for giving up your valuable time to assist me in completing this study.

Yours faithfully



C. LAMBERT

(STUDENT NO.: 2007147123)

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE FREE STATE

BLOEMFONTEIN

9301

REGISTERED PROJECT

(ETOVs NO.: 145/09)

Appendix 5

REQUEST TO PARTICIPATE IN FOCUS GROUP INTERVIEW

Date: xxx

Dear Colleague

Request to participate in a Ph.D. study entitled: *A framework for articulation between the emergency care technician certificate and the emergency medical care professional degree*

I am currently occupying the position of Head of Department for Emergency Medical Care at the University of Johannesburg.

At the moment I am writing a thesis to obtain the Ph.D. degree in Health Professions Education in the Faculty of Health Sciences at the University of the Free State. (Student number: 2007147123). The title of my research is: ***A framework for articulation between the emergency care technician certificate and the emergency medical care professional degree.*** My supervisors are:

Internal Supervisor:

External Supervisor

Dr. J. Bezuidenhout

Prof. M.van Vuuren

Division Health Sciences Education
Faculty of Health Sciences
University of the Free State
9301

Introduction

As indicated by the title purpose of this study is to design a framework for articulation between the Emergency Care Technician Certificate and the Emergency Medical Care Professional Degree.

In pursuit of this the following three different empirical research methods will be used:

1. Review of literature

I have begun this study by making use of a review of existing educational literature to critically compare the two-year 240 Credit NQF 5 National Certificate Emergency Care Technology Qualification to the 480 Credit NQF 8 Professional Bachelors Degree in Emergency Medical Care. This comparison has provided insight and a deeper understanding of the similarities and differences between the two qualifications. The insights gained have constituted the necessary foundational knowledge and starting point for the subsequent research processes.

2. Focus group interview

By making use of the data obtained from the literature review and critical comparison, an agenda for a focus group interview / discussion has been compiled. The Focus Group Interview will assist me to design, clarify and or add additional Delphi statements to the questionnaire (see below) that may not originally have emerged from the literature review and comparison of the two qualifications.

3. The Delphi Technique

Using the knowledge and insights gained from the literature review and critical comparison together with data from the focus group discussion described above, I will formulate and finalize the specific questions aimed at identifying and describing potential obstacles and challenges which educational managers such as yourself are likely to face when trying to articulate the mid-level worker ECT Certificate with the Professional B EMC Degree qualification. The finalised questionnaire will be administered to additional experts in the field Emergency Care and Health Professions Education using the Delphi technique. The Delphi remains a recognised method for structuring a group communication process to facilitate group problem- solving and to structure models (Linstone & Turloff, 1997). The Delphi method can also be used when there is incomplete knowledge about a problem or phenomenon and can be effectively modified to meet the needs of a given study (Adler & Ziglio, 1996; Delbeq et al., 1975).

Responses to the Delphi Questionnaire will then be analysed and commented on by the researcher and supervisors to determine if they are in line with the data required for this study (three to four rounds aiming at 80% consensus).

Having explained these processes to you, and having identified you as an important role player within this field I would respectfully request your cooperation in completing this study. The focus group interview will take place in Room 7220 of the Faculty of Health Sciences at University of Johannesburg on Wednesday 3 March 2010 from 09h00 to 10h30. Should you be able to participate in the process described above, please fill in the accompanying consent form electronically and return it to me as soon as possible.

I look forward to hearing from you.

Yours faithfully

A handwritten signature in black ink, appearing to be 'C. Lambert', written in a cursive style.

C. LAMBERT

(STUDENT NO.: 2007147123)

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE FREE STATE

BLOEMFONTEIN

9301

REGISTERED PROJECT (ETOVS NO.: 145/09)

APPENDIX 6

Dear Applicant,

Etovs nr 145/09
Mr CV Lambert
Dept of Emergency Medical Care (UJ)

Project title: A framework for articulation between the Emergency Care Technician Certificate and the Emergency Medical Care Professional Degree.

The above protocol was approved by the Ethics Committee at the meeting on 8 September 2009. An official letter will follow.

Kind regards

HENRIETTE STRAUSS

Ms Henriette Strauss
Research Division (Ethics Committee)
Block D, Dean's Division, Room D115
Faculty of Health Sciences
P O Box 339 (Internal Post Box G40)
Nelson Mandela Drive
University of the Free State
BLOEMFONTEIN
9300
Tel. (051) 4052812
Fax (051) 4444359
E-mail gndkhs.md@mail.uovs.ac.za

APPENDIX 7**WORDSPICE**

Mr Christo Fourie

Cell: 082 043 0052

Address: 16 Dot Serfontein Street

Langenhovenpark

9330

Date: 20 September 2011

TO WHOM IT MAY CONCERN

I hereby declare that this thesis as named below has been language edited and checked for language correctness, grammatical errors and sentence construction.

Name of the thesis

**A FRAMEWORK FOR ARTICULATION BETWEEN THE EMERGENCY CARE
TECHNICIAN CERTIFICATE AND THE EMERGENCY MEDICAL CARE
PROFESSIONAL DEGREE**

Section of thesis edited:

Chapter 1 to Chapter 7

.....
Mr C. Fourie

APPENDIX 8**BIBLIOGRAPHY & IN-TEXT CITATION**

Ms Michele de Klerk

Cell: 0767447228

Address: 41 Besselsen Street

Universitas

Bloemfontein

9310

Date: 13 October 2011

TO WHOM IT MAY CONCERN

I hereby declare that the bibliography (references) in this thesis as named below has been checked, corrected in text and compared with the bibliography (references).

Name of the thesis

**A FRAMEWORK FOR ARTICULATION BETWEEN THE EMERGENCY CARE
TECHNICIAN CERTIFICATE AND THE EMERGENCY MEDICAL CARE
PROFESSIONAL DEGREE**

Section of thesis edited:

Chapter 1 to Chapter 7.