# DEVELOPING SKILLS FOR THE WORKPLACE:

# A COMPARISON OF STUDENTS' AND WORKPLACE SUPERVISORS' PERCEPTIONS ON THE DEVELOPMENT OF CRITICAL WORKPLACE SKILLS IN RADIOGRAPHY TRAINING

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DECLARATION OF ORIGINALITY

I declare that this dissertation is my own work and that all sources used or quoted have been indicated and acknowledged by means of complete references.

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# DEDICATION

I would like to dedicate this work to
my Mom and Dad
who I am so blessed to still have with me.
I DID IT!

# ABSTRACT

The motivation for this study was the comments by supervisors in the radiography workplace about the students' lack of critical skills when they went for experiential learning. Higher education institutions are required to teach all students the critical cross-field outcomes (CCFOs) so that they can apply them in the world of work. The purpose of the study was to understand the problems in the workplace so that training gaps could be identified. The training gaps were to be used to improve the current curriculum so as to prepare the students more adequately for the workplace.

The Durban Institute of Technology (DIT) prepares students to function as radiographers in hospitals and private practices where all the CCFOs are needed. This is done using the Outcomes Based Education (OBE) approach to teaching, where students work collaboratively in groups of various sizes ranging from two to six doing theory and practical activities. The training programme includes experiential learning that is done in accredited hospitals where students work under the supervision of qualified radiographers.

The study focussed on the first year student radiographers at DIT who had been placed in the Pietermaritzburg hospitals for their experiential learning. All the supervisors in these hospitals were included in the study as well. Students were interviewed at the end of their first experiential learning block, before they commenced with their second year programme. A qualitative research approach was used to explore the perceptions of the students and supervisors in terms of the development of workplace skills by students. Questionnaires were given to the supervisors and students were interviewed. All questions asked in both the questionnaires and the interviews related to the CCFOs.

The findings showed that the perceptions of the students and supervisors were not very different in terms of which skills had been developed and which ones had not. The results also showed that the teaching strategies used at DIT were effective in teaching the CCFOs. A number of issues emerged that affected the way students learnt these skills. These were related to teaching and learning, the institutions and the students themselves. These were found to have both negative and positive effects on the learning of CCFOs. The research also found that neither the DIT nor the hospitals were successful in teaching the art of reflective practice, possibly due to the type of assessment strategies currently used to assess experiential learning.

From the findings a number of training gaps were identified and recommendations have been made to address them. The current curriculum should be reviewed and it has been suggested that a shift towards the emancipatory paradigm would be more effective in producing a critical reflective radiographer who possessed all the CCFOs. The first year curriculum should be reduced so that only relevant subjects are taught. The assessment of experiential learning should be restructured to align it with the DIT experiential learning policy and clinical tutors should be trained to work with students in the hospitals.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AIR | Australian Institute of Radiography |
| CCFO | Critical Cross-Field Outcomes |
| CT | Computed Tomography |
| CTP | Committee of Technikon Principals |
| DIT | Durban Institute of Technology |
| HENQF | Higher Education National Qualification's Framework |
| HPCSA | Health Professions Council of South Africa |
| KZN | KwaZulu Natal |
| MRI | Magnetic Resonance Imaging |
| NATED | National Education Department |
| NQF | National Qualifications Framework |
| NSEE | National Society for Experiential Education |
| OBE | Outcomes Based Education |
| QCA | Qualifications and Curriculum Authority |
| SAQA | South African Qualifications Authority |
| WHO | World Health Organisation |
| ZPD | Zone of Proximal Development |

## EXPLANATION OF TERMINOLOGY

| | |
|---|---|
| Clinical Practice | : Compulsory registered subject. It is the experiential learning done in the workplace by radiography students |
| Employers | : This includes radiographers, managers and Department of Health |
| Entry Rank Posts | : Post occupied by a newly qualified radiographer |
| Film | : The hard copy of the x-ray image. Same as Radiograph (see below) |
| Film Viewing | : When films are placed on light boxes and evaluated by inspection |
| Generic Skills | : This term is the same as key skills (see below) and CCFOs – skills required by the workplace |
| Key skills | : Skills required by the workplace – "soft", non-technical skills |
| Professional Board | : The statutory body for radiography |
| Psychodynamics | : One of the radiography subjects – deals mainly with patient care |
| Radiographer | : A qualified and registered professional who takes x-rays |
| Radiograph | : A film containing a x-ray image. (See above – Film) |
| Rad Prac | : One of the radiography subjects – deals with x-ray techniques |
| Supervisors | : Any qualified radiographer who works with students in hospitals |

# CHAPTER ONE

# PURPOSE AND RATIONALE FOR THE STUDY

## 1.1 INTRODUCTION

This study has come about as a result of a perceived problem in the training of radiography students in KwaZulu Natal (KZN). It is this perceived problem that has been the focus of this study. This chapter will introduce the background to the study and place it within a certain context, delimit the problem and issues surrounding this problem and then clarify the purpose and aims of the study.

## 1.2 BACKGROUND

Up until the late 1980s/early 1990s radiography training was conducted in approved and accredited hospitals, but fell under the authority of the National Education Department (NATED) of South Africa. There was a national curriculum (syllabus) that was used by all training centres in the country. All radiography students wrote external three-hour examinations that were set by NATED who also issued the Diplomas. In the early 1990s radiography training was moved to the technikons. This resulted in a national restructuring of the curriculum. Institutions, employers and the profession all took part. The new national curriculum did not appear to change very much. It is still being used today and is very brief. Subject names changed, but the content being taught is still much the same as the old curriculum.

Radiography training in South Africa adopts a co-operative education philosophy and is based on a national curriculum that includes an experiential component called Clinical Radiographic Practice. The term co-operative education is defined by the Committee of Technikon Principals (CTP) as the "... philosophy of learning that promotes the concept of enhanced learning based on co-operation between educational institutions and industry,

commerce and the public" (CTP, 2003: 2). All radiography training now falls under the National Department of Education, but is monitored by the Professional Board for Radiography who are part of the Health Professions Council of South Africa (HPCSA). Experiential learning (clinical training) is carried out in hospitals accredited by the HPCSA. In South Africa there are nine provinces each of which provides radiography training. Some provinces have drawn up co-operative agreements between their Departments of Health and the academic institutions, allowing academic staff and students legal access to hospitals. This is the case in KZN where radiography training is provided by DIT.

At DIT the experiential component is a formal, structured programme that provides students with the opportunity to integrate theory and practice and achieve outcomes that cannot be obtained in the classroom. Students are assessed in the workplace and need to achieve competence in order to pass the experiential component of the course. The method of assessment is by observation and questioning, and using a checklist of tasks that need to be performed competently. The practical component of the programme is carried out in the radiography clinic on campus where a "real-life" situation has been created and the theory is taught in the classroom on campus. Skills learnt on campus are put into practice in the workplace.

Recently South Africa has undergone policy changes that have impacted on higher education in the country. In 1994 the most significant policy change in the history of South Africa was the establishment of a new constitution that abolished the old apartheid system and provided for a democratic government. This brought about other policy changes, one of them being in higher education. The South African Qualifications Authority (SAQA) and a National Qualifications Framework (NQF) were established in 1995 through the SAQA Act (South Africa, 1995). SAQA is responsible for registering all qualifications and unit standards on the NQF.

The Higher Education Act of 1997 (South Africa, 1997) called for the unification and re-structuring of the entire higher education system in South Africa. Institutions are now required to address issues such as equity, accessibility, preparation of learners (students) for the workplace, meeting the needs of the workplace, providing lifelong learning and remaining internationally comparable. The focus of higher education is now on satisfying the customer (student and employer). In July 2004 the Ministry of Education put forward a discussion document for a proposed new Higher Education National Qualifications Framework (HENQF). In this document changes have been made to the levels at which diplomas and degrees are to be placed, making them more comparable internationally.

At a national level, the introduction of the new Higher Education Act (Department of Education, 1997) and the SAQA Act (South Africa, 1995) resulted in a need to change curricula. According to the latter act all learning programmes had to be registered with SAQA on a single NQF in an outcomes format (South Africa. 1995). Radiography implemented this nationally in the late 1990s, and an interim qualification was approved. At DIT we amended our study guides and changed the "aims and objectives" to "outcomes and assessment criteria", and some teaching strategies did change, but not all.

The government has now placed a strong emphasis on key workplace skills. In South Africa these are called CCFOs (South Africa, 1995). The CCFOs, known in other countries as key skills, generic transferable skills or tacit skills (Evans & Kersh, 2004), include skills such as communication, working in a team, solving problems, using technology, managing oneself, being culturally sensitive and thinking critically. A list of the CCFOs can be seen in Appendix A (page1, first column). It has become widely recognised that these skills are needed in the workplace and should be taught in higher education programmes (Davies, 1998).

In South Africa the CCFOs need to be embedded in the learning outcomes at all levels of higher education because employers need workers who have these skills. One of the

national goals of higher education is to produce "...graduates with skills and competencies that build foundations for lifelong learning, including critical, analytical, problem-solving and communication skills..." (Department of Education, 1997: 6). It also states that higher education must produce good citizens. These skills are included in the CCFOs, and are in line with international trends.

The White Paper on higher education (Department of Education, 1997) refers to the national need for skills and human resource development. Radiographers are a scarce resource and skilled people are required for this profession. It also states that students must be prepared for the workplace and should be employable (Department of Education, 1997). The DIT radiography programme incorporates the experiential component in an attempt to achieve this (Groenewald & Baird, undated).

## 1.3 THE PROBLEM / ISSUES

The KZN workplace needs radiographers who possess certain key skills in addition to technical competence in the profession. These key skills are some of the CCFOs listed by the White Paper (Department of Education, 1997). In KZN the advertisements for qualified radiographers include a list of skills such as: the ability to solve problems, work as a team member, communicate with others and manage oneself and one's activities, as requirements for employment. These skills need to be learnt by the student and assessed in the context of the workplace to make them relevant. Currently the key skills are not included as outcomes to be assessed due to the structure of the curriculum. The national radiography qualifications currently registered with the SAQA (2003) are written in outcomes format, with no specific mention of experiential learning or its assessment. The CCFOs are listed at the end of the curriculum document with a statement that they are integrated into the learning outcomes. There are no associated assessment criteria listed in the current national radiography qualifications for these CCFOs.

In recent years there have been complaints made by workplace supervisors that after completing their first year of study at DIT, the students are not adequately prepared for working in the clinical situation (workplace). These complaints indicate that students lack skills such as the ability to communicate with patients, solve problems, manage themselves in the workplace (self-discipline) and work as team members. I know from my experience as an ex-hospital tutor that students are able to acquire these skills in the workplace, but the current expectation appears to be that they should already have these skills when they enter the workplace for the first time.

In the mid/late 1990s the concept of OBE was introduced into the DIT where I am currently employed as a lecturer in the radiography department. All departments were required to adopt this approach to teaching. A number of OBE workshops were held for staff and we were asked to change our study guides and methods of teaching and assessment, but at the same time we still had to work within the NATED requirements i.e. keep our subjects. At DIT the radiography department has attempted to introduce OBE into its programmes while still remaining within the constraints of the "old" system.

Classrooms have become more learner-centred (Stage, Muller, Kinzie & Simmons, 1998) where students are actively engaged in their learning (Bugg, 1998). Teaching strategies used include: group work, group assignments, reflective reports, film viewing practicals, practical demonstrations, workplace learning and oral presentations. A description of these strategies can be seen on pages 1 and 2 of Appendix B. They enable students to interact with each other and learn in a social environment (Stage et al, 1998). The skills they learn in the classroom are contextualised so that they may be transferred into the workplace (Grayson, 1993). This encourages a situated learning approach (Lave & Wenger, 1991) that is more meaningful and significant (Fink, 2003) and a deeper approach to learning is experienced (Biggs, 1999).

The CCFOs have been adapted for radiography (see column 2, page 1, Appendix A) and underpin the learning activities that students perform in the classroom and the practical laboratory. The CCFOs are aligned to what students will do in the workplace (Biggs, 1999) e.g working as a team member is one of the CCFOs and is also a skill required by the workplace. Learning activities are realistic and relate to the workplace situation so students can see the relevance of what they are learning and how it relates to work and their own life. This allows learning outcomes, learning activities and the needs of the workplace to be aligned. However, in spite of this new approach to teaching and learning, supervisors still claim that students are not adequately prepared for the workplace. It appears that students are not able to transfer these skills from the classroom to the clinical situation. In my class I have tried to integrate OBE, and the critical cross-field outcomes into the students' learning to produce the best possible holistic form of training. The dilemma surrounding this problem in the field of radiography is - to what extent can these skills be taught in the classroom and to what extent must they be acquired through observation and practice in the workplace?

The students are not asked to reflect on their workplace experiences and no feedback is ever obtained from them when they return to the DIT. This means that only the opinions of the workplace supervisors are ever heard, thus the full picture is difficult to ascertain. This study has allowed the students' voices to be heard, as they are the ones being criticised. A more rounded picture needs to be painted and cannot be done from one perspective only. Students can provide very valuable insights into the classroom and workplace learning through reflection on their own experiences. Reflective practice is now being encouraged in radiographers and Marilyn Baird of the Royal Melbourne Institute of Technology, Australia, states that this reflective practice needs to be taught to students through their educational programmes (Baird, 1997). This has not been happening in the experiential component of our radiography programme. Students have not been asked to respond in any way to their workplace experiences. This has resulted in a one-sided assessment of the students' skills. The students' opinions remain an untapped source of data. For this reason

their opinions have been investigated in this study in an attempt to identify any critical skills that they perceive to be lacking – based on their own experiences.

At DIT the CCFOs have not been formally incorporated into the radiography curriculum learning outcomes and their assessment criteria, so they remain an "add-on" item at the end of the curriculum document. They are not formally assessed in the workplace so it has, therefore, not been possible to authenticate the achievement of these outcomes in terms of the skills required by the workplace. This raised a number of questions that needed to be answered.

The main question was:

- What curriculum measures are required to ensure that the radiography training at DIT fully prepares the first year students for their workplace learning in terms of the CCFOs?

In order to answer this question two other issues needed to be addressed first:

- To what extent do students believe that they have been adequately prepared for the workplace in terms of the CCFO and
- To what extent do the supervisors believe that the students have been adequately prepared?

Only then could the training gaps be identified and further curriculum development recommendations be made to address the gaps.

## 1.4 PURPOSE / AIM OF THE STUDY

This study was done to elicit the views of students and supervisors on the development of workplace skills of student radiographers in terms of the South African CCFOs, in order to compare their responses. This was done in an attempt to understand the problems that exist

in the workplace learning experience and identify the gaps in the preparatory curriculum so that suggestions for curriculum improvement could be made. Through a change in curriculum student preparation for workplace learning at the end of the first year of study in Radiography will be improved. Supervisors have claimed that when students first enter the workplace they lack certain critical skills that are important in the workplace. The skills identified appear to have been similar year after year - the students' ability to: care for and communicate with the patients, solve problems, work as team members and manage themselves in a work situation. These are only the apparent competence gaps identified by the supervisors. The "missing skills" appear to be aligned with those emphasised by government and required by the employers. Advertisements for radiography entry rank posts in KZN include these skills as requirements for employment. The aim of this study was to distinguish between "apparent" and "real" training gaps.

The findings of this study will be used to develop the radiography curriculum as part of the re-structuring of qualifications in higher education institutions. This will involve more emphasis on the teaching and assessment of CCFOs as well as the role of the student as a reflective practitioner with professional competence as opposed to just technical competence. The radiography curriculum is presently being reviewed and changed so now is an appropriate time to give input for changes, but this input needs to be based on sound research and not just a lecturer's opinion. There is very little in literature on South African radiography training so a study in this area seems long overdue.

It should be noted that experiential learning (clinical practice) is already an integral part of the radiography curriculum and is assessed as a subject so changes will need to be made in both classroom as well the workplace. This study has also indirectly evaluated the effectiveness of the integrated type of learning now being used in radiography at DIT although this was not the purpose of the study. For the purposes of this study the term "experiential learning" is used to mean clinical practice in the workplace and "supervisor" is a qualified radiographer.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 INTRODUCTION

The review of literature on the topic of developing workplace skills and preparing students for their workplace experiences has been divided into four categories. The first category is experiential learning where this term will be defined and its role in higher education discussed. The second category involves key skills, generic skills, transferable skills, workplace skills and critical cross-field outcomes (CCFOs). These terms all relate to the same skills and are used synonymously in this review. The third category is a small section on professional competence and the reflective practitioner. These two terms have been reviewed separately as they relate to all the other categories, but need some discussion on their own. The fourth section is a review of the curriculum theories relevant to this study. A brief conclusion will also be included to integrate these four categories and show their relevance to this study.

In this study the term "workplace learning" refers to the time that students spend working in the workplace as part of the learning programme. Some literature uses the term "experiential learning" to mean the same thing. Both these terms will be used in this chapter.

## 2.2 EXPERIENTIAL LEARNING

Experiential learning is an important component of many higher educational programmes. There are many definitions being used for this term. In this section some of these will be discussed as well as Kolb's experiential learning cycle and key skills.

### 2.2.1 Definitions and Types.

Experiential learning is viewed from two different perspectives. The one refers to learning that takes place when students are given opportunities by a training institution to acquire skills in a relevant setting such as a workplace. The other one is personal learning that takes place as a result of participating in the everyday events of life (Smith, 2001). This personal learning cannot be excluded from experiential learning that takes place in higher education because it takes place at all times in the learners' life, even at work.

Kolb states that experiential learning is "...the process that links education, work and personal development" (Kolb, 1984: 46). He also sees the workplace as a learning environment that can "... enhance and supplement formal education and can foster personal development through meaningful work and career-development opportunities" (Kolb, 1984: 46). Rogers (1969) and the Committee of Technikon Principals (CTP, 2003) also place emphasis on the fact that experiential learning promotes personal growth and change as well as work skills. For the purpose of this study these two types of experiential learning will not be separated. Personal development takes place alongside formal learning. The CTP has described experiential learning as being a mode of learning, as opposed to a mode of teaching, that produces personal and work skills (CTP, 2003).

### 2.2.2 Kolb's Model of Experiential Learning

One of the most popular and widely used models of experiential learning is Kolb's learning cycle (Kolb, 1984). Most literature on experiential learning refers to this cycle that consists of four steps: concrete experience (the action or situation), observation and reflection (about the experience), forming abstract concepts (generalising about the experiences and observations) and then active experimentation (testing the generalisations in new situations). The new situation then becomes the first step again. (University of Cape Town, 2000). Although this cycle is seen as a circle it is in fact a spiral where the last step leads to the first step in a new situation (Smith, 2001). Kolb's cycle places some emphasis on reflection of an experience as part of the learning process.

In Radiography students in the workplace are applying basic knowledge and skills to new situations and experiences all the time. They are continuously learning from one experience and applying their new learning to deal with new or different situations e.g. patients who have been in accidents are not dealt with in the same way as those who walk in. Some reflection is thus taking place, but it could be said that it is subconsciously done.

### 2.2.3 Purpose of Experiential Learning

According to the National Society for Experiential Education (NSEE) in America, experiential learning is used to provide students with experience in the "real world" or with the "real thing". It teaches them to become equally aware of the world and themselves and how these two interact with each other (NSEE, 1998). It is a term that has been defined in many different ways depending on the needs of the user. The NSEE has defined it as learning to "... transform experience into knowledge, and we use this knowledge for our individual and collective development" (NSEE, 1998: 3). This is based on their studies of the philosophies of Dewey, Lewin, Freire and Kolb. This definition implies that it is not only the student who must benefit from experiential learning, but the society as well, which is very much in keeping with Dewey's philosophy that education should "...facilitate face-to-face communication" (in Hatcher, 1997: 26) that will be mutually beneficial to both. These face-to-face communications need to be structured by the educators as an essential part of the student's learning development and this is done outside the classroom. Dewey believes that the quality of the experience will determine the quality of the learning that takes place. The factors that contribute to the quality are called the "principles of good practice". These include the elements of Intention, Authenticity, Planning, Clarity, Orientation and Training, Monitoring and Assessment, Reflection, Continuous Improvement, Evaluation and Acknowledgement. If these elements are all done well then there will be a quality experience that will lead to quality learning (NSEE, 1997).

The planning aspect of experiential learning is particularly important as is mentioned in the draft policy document on assessment of experiential learning by the CTP (2003). The

document emphasises the need to plan all aspects in collaboration with the employers and the students beforehand as part of the programme curriculum. According to draft 2 of the DIT co-operative education policy, experiential learning should start in first year and must be incorporated into the curriculum (DIT, 2005).

Students, institutions and employers benefit from experiential learning in some way. According to Kerka (1989) students benefit by seeing the relevance of their learning and become motivated to study. They experience an improved self-reliance, self-confidence and responsibility, are able to practice human relations skills and they gain marketable skills. Employers are able to participate in the curriculum design and content while institutions benefit from being able to test the curriculum in the workplace (Kerka, 1989). After graduating, the learner will join a long queue of prospective job hunters, but according to Cantor (1996) those who have done experiential learning will already be known to the employers and will possibly be given preference. Experiential learning is essential in occupations that require competencies that cannot be gained in the classroom, but are essential for the job (Cantor, 1996). This seems to provide a win-win situation for all.

Another purpose of experiential learning is that of enabling the student to pay back to society what the government has given in terms of funding for their education (Bawden, 2000). This "hidden" funding is something that is not brought to the attention of students in many institutions. Rogers (1969) lists some qualities of experiential learning: there is personal involvement, it is learner initiated, evaluated by the learner and has pervasive effects on the learner.

### 2.2.4 Workplace Learning in the Medical Field

Much has been written about workplace learning (experiential learning) in the medical field, with a limited amount on radiography and very little on South African radiography. A study done by Kember and McKay (1996) shows that radiography students' learning was

improved when the academic and clinical components of training were integrated through changing the curriculum, making the experiential learning a part of it.

The concept of problem based learning (Spencer, 2003) is being widely used in the medical profession to give student doctors early exposure to the "real world" (Walker et al, 2001) and so give them the required skills for doing the actual job. A study done by Walker et al. (2001) shows that experiential learning should commence from the first year of study and be integrated into small modules of learning that are assessed and receive credits. Their study supports the Kolb learning cycle as does that of Spencer (2003) who says that learning is an active process. He says that, for student doctors, learning in practice is the only way to acquire such skills as clinical reasoning, decision making, empathy and professionalism. He also mentions that students can learn from patients by obtaining feedback from them where the patient is the text (Spencer, 2003).

The nursing profession makes extensive use of experiential learning where service is combined with learning and "... the whole is greater than the sum of the parts because both are transformed and the value of both increases" (Canales & French, 2003: 1). A study done by Barr et al. (2002) suggests that experiential learning is an effective way to develop students professionally in terms of knowledge, skills, competency, ability and confidence. The majority of the participants in this study, who were qualified dieticians, felt that they were adequately prepared for their first job after having completed their experiential learning.

Experiential learning is needed by students the world over. As already discussed, different fields of study have identified that experiential learning is an important part of a learning programme and plays a role in preparing the student for the world of work, teaching them skills they cannot learn in the classroom. Many of the theorists cited above claim that students learn by experience and that learning becomes more meaningful if it is experienced in the context of the real world. The studies reviewed show that some fields of

study have prepared their students well and others have not. No South African studies were found pertaining to the preparation of first year radiography students for the workplace in terms of the CCFOs.

## 2.3 KEY SKILLS / GENERIC SKILLS

It seems to have now become accepted the world over that all students as well as graduates should possess certain generic or key skills regardless of their field of study or discipline (van Schalkwyk, 2002) because employers are wanting graduates who have more than just technical skills and knowledge.

### 2.3.1 South Africa and Other Countries

According to the South African Department of Education in their White Paper (1997) and SAQA (1997), a series of generic skills must now be incorporated into the design of all learning programmes in Higher Education. SAQA (1997) has called these the CCFOs (see Appendix A). These outcomes are meant to contribute to the personal development of the student as well as the economic development of the country (SAQA, 1997).

In America there is a need for students to be more socially responsible and aware of "the role of higher education in social and economic development..." (Bawden, 2000: 5). Students are required to learn not only practical competencies and skills in the workplace, but also to gain other skills such as interacting with others, becoming good citizens, working as a team, communication, solving problems and understanding how the workplace functions (Bawden, 2000). Moore (1990) refers to these as personal development, affective growth and social interaction.

In Britain, Dearing conducted a review of qualifications for the 16 – 19 year olds (Qualifications and Curriculum Authority [QCA], 2000). As a result of this review he made recommendations that key skills such as communication, application of numbers and information technology be incorporated into all post-16 school education in England,

Wales and Northern Ireland where they must be assessed and certificated. This was done and many universities in the United Kingdom are now also including these three skills as admission criteria (Department of Education and Skills, 2002). Skills such as working with others, improving one's own learning and problem solving are present in the curriculum, but are not assessed and certificated. Following a pilot study by the British QCA (2000), it was decided that all six key skills needed to be applied within the learning context, especially in occupation-specific programmes, and not just learnt in theory. It was also decided that the skills needed to be assessed using a combination of external tests and a portfolio.

The Australian Institute of Radiography (AIR) has listed generic skills such as: self-directed learning, self responsibility, skills to manage, problem solving, communication, reflection, intellectual curiosity and commitment to continuous self improvement as requirements for any graduate entering the profession of radiography in that country (AIR, 2002). These skills apply not only to the Australian graduates, but also to any radiographer from a foreign country wishing to work in Australia.

A survey done in Leeds University, United Kingdom, (O' Halloran, 2001) showed that employers need certain generic skills in a newly qualified radiographer: communication, teamwork, team leadership, problem solving, initiative, planning and organising, adaptability and flexibility, computer literacy and numeracy. These are a combination of some of the South African CCFOs and the British key skills and are also identified by the AIR (2002) as necessary for qualified radiographers in their country. Vander Hoek (2001) identifies skills that could be improved or enhanced by experiential learning in a radiography programme: communication, teamwork, critical thinking, lifelong learning, empathy and interpersonal skills. These also align with the South African CCFOs. Hyland and Johnson (1998) argue that there are no clear or common definitions of the so-called key skills. They argue that these have not been identified and named in education. These statements were made seven years ago and from more recent literature it can be seen

that globally there appears to be some kind of informal consensus regarding the naming of the key skills.

It would seem, from the literature that an emphasis on employability of graduates is now widely accepted. It is believed that higher education learning should prepare all students for the workplace in terms of key skills (Davies, 1998), generic transferable skills and competencies (Nabi & Bagley, 1999). The skills identified in various literature are similar, in fact almost the same, as the South African CCFOs listed by SAQA (1997). Students need to be encouraged not only to acquire a skill, but the knowledge that is relevant to that skill as well (Shepherd, undated). All skills involve knowledge and cannot be separated from it.

### 2.3.2 Teaching and Transfer of Workplace Skills.

With this global acceptance of the need for all students and graduates to possess generic workplace skills has also come a need to change teaching and learning strategies to accommodate this need. Firstly, if these skills are taught in the classroom the students must be able to transfer them into the workplace. Secondly, in order to accommodate both learning and transfer of skills, classroom learning outcomes need to be aligned to what the student will do in the workplace (Biggs, 1999) and they need to be assessed.

Taylor defines transfer of learning to be when "...learning in one context or with one set of materials impacts on performance in another context or with other related materials" (Taylor, 1997: 1). There is currently much debate in literature as to whether skills can be transferred from one context to another (Stein, 1998). Perhaps some of them can only be taught in the workplace where learning is situated and contexualised (Lave & Wenger, 1991). Hyland and Johnson (1998) have suggested that perhaps key skills or core skills do not actually exist and therefore cannot be transferred. Salomon and Perkins (cited in Grayson, 1993) have identified two types of transfer of knowledge: the "low road" transfer which involves an automatic transfer of highly practiced skills and the "high road" transfer which involves decontextualising and then re-representing knowledge. The latter requires

more mental involvement and abstraction and allows for transfer between situations that are very different. In order for transfer to occur, students need to be able to decontextualise what they know and re-contextualise it in a new context or situation. This is presuming that active learning has occurred in the first place (Grayson, 1993). Students need to understand principles rather than procedures because it is the underlying principles that will help students recall the procedures (Shepherd, undated).

Candy and Crebert state that the transition from academics to workplace could be improved if academic institutions "... introduce into their curricula a range of learning styles that exposes students to equivalent styles available in the workplace... " (Candy & Crebert, 1991: 589). This was written fourteen years ago, but still seems to be a subject of much debate – HOW to teach workplace skills in the classroom so that the student can transfer them to the workplace. In this way learning will be active (Grayson, 1993) and contextualised, minimising the gap between classroom learning and the workplace (Candy and Crebert, 1991) so that transfer can take place. It is said that if students are not given the support and encouragement needed from workplace supervisors, then transfer of the skills acquired in the classroom will not transfer successfully to the workplace (Shepherd, undated).

One of the emphases in higher education today is to provide a learner-centred type of learning (Bugg, 1998; Hansen & Stephens, 2000) where students are actively involved in their learning and interact with others, making the learning more meaningful.

One means of achieving active learning is by providing collaborative learning opportunities (Cove & Love, 1996) for students both in the classroom as well as in the "community" (workplace). This type of learning involves group work where students learn in community with their peers and others (Wilson & Ryder, 1996) and are able to obtain the skills needed in the workplace (Biggs, 1998). It is a holistic type of learning that produces more than just the academic skills because it integrates the academic, social and emotional aspects of

students (Cove and Love, 1996). Emotions can affect learning in both positive or negative ways. Emotions drive learning and memory, so depressed emotions can result in a decrease in motivation amongst students (Cove & Love, 1996). Learning is seen as an active social process where students and academics need to work in collaboration with each other.

According to Pascarella & Terenzini, (1991) students are likely to learn better and achieve academically if they are involved in the "life" of the institution (college). Holistic learning means involving the students not only in the classroom, but in activities outside the classroom as well – all aspects of campus life. Astin's theory states that "... students learn by being involved" (in Pascarella & Terenzini, 1991: 50). This depends, of course, on whether the student takes the opportunity to become involved in activities outside the classroom. It is to a large extent student dependent. Negative experiences on campus can cause students to withdraw eventually from both academic and social aspects of the institution. This affects their learning negatively.

Vygotsky (in Riddle, 1999) believes that social learning leads to cognitive learning. He states that students can do or learn something better when they do it under the guidance of a supervisor or in collaboration with peers than they would on their own. He called this phenomenon the Zone of Proximal Development (ZPD). This ZPD closes the gap between what a people know and what they have the potential to know. In order for this to happen a lecturer needs to collaborate with students so that the learning experience becomes reciprocal. This involves the use of group-work where the classroom becomes a learning community where students play an active role in their own learning as well as that of their peers (Riddle, 1999).

Fink (2003) claims that students learn better when the learning is significant and the students can see the importance of it. He has used Bloom's cognitive taxonomy (Bloom, 1956) and put together a new "Taxonomy of Significant Learning" where he has added aspects such as the human dimension, caring and learning to learn. He claims that this leads

to a more holistic type of learning that develops the whole student intellectually, emotionally and socially (Cove & Love, 1996; Fink, 2003). Significant learning is interactive, synergistic and involves some kind of lasting change that is important to the student. This type of learning can take place if an integrated course design is used in the curriculum (Fink, 2003).

Lave and Wenger's theory of situated learning (Lave & Wenger, 1991) states that learning needs to be situated in a specific place at a specific time so that students can experience their learning in the real world (Candy & Crebert, 1991). Situated learning involves participation in a community of practice (*such as a classroom or workplace*) where students join the community and learn at the periphery. As they learn more and become more competent they move closer and closer to the centre of the community until they are able to participate fully. Lave and Wenger (1991) have called this Legitimate Peripheral Participation. This makes learning social, holistic, significant and meaningful and should enable students first of all to acquire key skills (CCFOs) in a classroom and then transfer them to the workplace by active participation.

All of the types of learning mentioned above seem to be supported by the constructivism learning theory. This theory is based on the fact that "... learners actively construct knowledge by integrating new information and experiences into what they have previously come to understand, revising and reinterpreting old knowledge in order to reconcile it with the new" (Kerka, 1997: 1). This works best when it takes place in the context in which the new knowledge and skills will be used, thus making transfer of knowledge more effective. Workplace learning is constructivist, situated learning (Kerka, 1997) which relies on transfer of skills from the classroom to the workplace.

In South Africa the OBE approach has been introduced in higher education. This approach requires that attention be focussed on the required end-results of learning as well as the teaching and learning processes that enable students to achieve them (Jacobs, undated).

This makes OBE very appropriate for the types of learner-centred approaches to learning that have been mentioned above and that are required in order to equip students with workplace skills. The OBE approach encourages self-confidence, reflection and enhances the CCFOs (key skills) by incorporating them into the programme learning outcomes. It prepares students to apply the CCFOs in the workplace where they need to be assessed together with the technical aspects of their learning (Forbes, 2005).

Academic and workplace learning must be integrated so that students are prepared for the workplace. In this way the teaching, learning and assessment methods will be aligned with the curriculum purpose (Strydom et al, 2001), which is to provide students with the necessary skills, attitudes and knowledge to function in the workplace.

### 2.3.3 Studies done on Workplace Skills.

A study done by Poock (2001) at an American university found that graduate students needed certain skills or competencies: communication, leadership, teaching and instruction skills, professional adaptability and self-awareness. In this study, graduate students, junior faculty, recent alumni, employers of alumni and university directors were given questionnaires. The outcome of the study was the introduction of a number of stand-alone, credit-bearing courses that address each of the skills identified. These are attended by any students, but are not compulsory (Poock, 2001). A shortcoming in this "solution" is that not all students will benefit from the courses and the skills may not be contextualised.

At Griffith University, Australia, it was found that engineering graduates who had attended a structured work placement as part of their degree felt that they had acquired the key (generic) skills needed by the engineering workplace compared with graduates who did not have a work placement (Patrick and Crebert, 2004). The development of these workplace skills was enhanced by the fact that they were able to learn them in context and they felt adequately prepared for their first job. Data was obtained from the graduates themselves using questionnaires, so the results were based on graduates' perceptions.

In the United Kingdom a study was conducted on new post-graduate students from the University of Lancashire (Nabi and Bagley, 1999), to examine the graduates' perceptions of the importance of key skills during their studies. Questionnaires were used to gather the data from the graduates. The results showed that the graduates rated personal communication and problem solving skills as being useful, while they rated their abilities in those skills as only average. These were their perceptions soon after graduating.

A study done by Mangan (2004) in USA found that third year medical students were not well prepared for their clinical rotations in the workplace in terms of key skills such as: interviewing and examining patients, communication and professionalism. The data was obtained from directors of the medical schools using questionnaires. One observation made by an official at the American Association of American Medical Colleges was that perhaps the directors in this study had unrealistic expectations of students who were working with patients for the first time. It was felt that the purpose of workplace learning was to provide an opportunity to learn these skills (Mangan, 2004).

In the field of physiotherapy (physical therapy) a recent study was conducted where the perceptions of clinical supervisors were obtained in terms of inappropriate and appropriate behaviour (key skills) found in students (Wolff-Burke, 2005). Clinical supervisors were interviewed and tapes of the interviews were transcribed. The transcripts were analysed using qualitative methods for emergent themes and concepts. The inappropriate behaviours (also called generic inabilities) identified in students were: having an attitude, poor communication, a lack of interest and being unprofessional. The appropriate behaviours (also called generic abilities) identified were: accepting responsibility for learning, communication, empathy and professionalism. These are the abilities that were expected by the supervisors and are also consistent with the requirements of the profession (Wolff-Burke, 2005). It is interesting to note that the clinical supervisors did not mention problem solving and critical thinking in their list of appropriate behaviours. The results of this study were based on the perceptions of supervisors. Students' perceptions were not included.

In Malaysia the perceptions of students and employers were examined in an attempt to determine the importance of workplace skills (Mohamed et al., 2004). Questionnaires were given to both students as well as potential employers asking them to identify the skills needed in the workplace as well as their importance. Results show that both groups identified leadership as being most important followed by managerial skills, personal development and social networking skills. The students rated the importance of the skills higher than the employers did. This study did not examine the students' acquisition of the skills, but only their perceptions of their importance.

In a recent study done in South Africa on the transfer of skills from classroom to workplace (Engel-Hills et al., 2005) radiography students identified group-work, communication and problem solving as skills that needed more attention in the classroom. The study suggests that in order to prepare students adequately for the workplace curriculum changes are needed. The authors have suggested that in order for this to happen funding should be made available for further research and support in this area. In this study postgraduate students were used as subjects.

In another recent South African study (Bitzer, 2005) first year students were studied in order to find out their perceptions of their levels of confidence with regard to their ability to demonstrate the CCFOs. Questionnaires were given to the students at the beginning and then again at the end of their first year. Results suggest that confidence in some skills was related to the students' academic performance. These skills were problem solving and self-management. This study did not look at the actual acquisition of the CCFOs or how they were acquired, but focussed only on the students' confidence in their ability to demonstrate them. The study suggests that further research is required to determine how best the CCFOs can be taught. This seems to be a gap in the literature.

### 2.3.4 Gaps in Literature

While it seems to have been agreed internationally that key skills are needed for the workplace there is little written on the actual mechanisms used at the micro level (in the classroom) for preparing students effectively for the workplace during their studies. Most countries have identified the same skills as being "key" to the workplace and these are very similar to our own CCFOs. There is controversy in the literature about whether these skills can be taught in the classroom and then transferred to the workplace or not. Most feel that if they are taught appropriately they will be transferred. None of the literature reviewed has actually recommended any particular teaching strategies that can be used to teach the key skills in the classroom. In the field of radiography it is accepted that the key skills are needed and are just as important as the technical skills.

Studies done in this area have not used the current students as a source of data except the study by Kember and McKay (1996) where radiography students reflected on integration of course content in the workplace but not on key skills, and the study by Bitzer (2005) who focussed on students' confidence levels. Opinions have been obtained from graduates, supervisors, employers and clinical instructors. Studies have also been done on the identification of key skills or on the importance of them. There do not seem to be any studies done where both the students and the supervisors/employers have been asked their perceptions of the students' actual acquisition of key skills on entering the workplace for their experiential learning. Students have not been asked to reflect on their own performance in these areas. Neither does there appear to have been any studies done on first year radiography students in South Africa.

## 2.4 PROFESSIONAL COMPETENCE / REFLECTIVE PRACTITICE

Radiography is a profession and therefore requires that its graduates be professionally competent when entering the job market. The question of what professional competence is and how to "measure" it has been the subject of debate in literature not only in health

fields, but in other disciplines as well. Employers are now expecting higher education institutions to provide them with employees who are "professionally competent" as well as being "reflective practitioners", but what is meant by these terms?

### 2.4.1 Professional Competence

The World Health Organisation (WHO) defined professional competence in the health field as "... knowledge, appropriate attitudes and observable mechanical or intellectual skills which, together account for the ability to deliver a specified profession" (WHO, 1988: 68). Storey has suggested a definition for nursing that says competence is "... the knowledge, skills, abilities and behaviours that nurses need to perform their work to a professional standard, and is the key lever for achieving results that enable the organisation to achieve its health care objectives" (Storey, 2001: 3). This definition, unlike the previous one, indicates that the work must be done to a "professional standard". This means that professions need to have their own occupational standards (Storey, 2001) or competency standards (Hager, 1993) spelt out clearly so that they can be used as a benchmark.

Occupational or competency standards are set by the different professions and state very clearly what that profession expects and accepts as competent performance. They help to distinguish between professional and non-professional performance and can be used as a guide by educators when developing the curriculum for a profession. The role of the professional body is thus very important in the curriculum development process. It needs to be involved in a co-operative relationship with the educational providers. The standards are holistic in character and bring together tasks as well as attributes in an integrated manner (Hager, 1993).

Competence is a dynamic process that changes as a person acquires more knowledge, experience and skills. It is the demonstration, through practice, of the integration of cognitive, affective and psychomotor skills. Competence can be seen as a continuum with "just knowing how" at the lower end and "knowing how to do something very well" at the

top end with "doing something competently" falling somewhere in the middle (Storey, 2001). It is this "doing something competently" that needs to be clearly stated as a standard that can be measured in order to verify competence.

To say that a person is competent is an expression of confidence in that person that he/she will perform as required (Holmes, 1994). Professional competence is closely related to a person's attributes or characteristics. These all affect how people perform (Holmes, 1992). Experiential learning gives students opportunities to become professionally competent and it is here that all their learning is drawn together and applied to produce the professionally competent practitioner. It is noted that key skills play an important part in competence.

### 2.4.2 Reflective Practice

Donald Schön has written much about reflective practice and has coined the terms "reflection-in-action" and "reflection-on-action" (Shön, 1987). He claims that people (practitioners) solve problems by using a combination of knowing and doing. When faced with a problem in practice they draw on previous experiences that are similar and try out some possible solutions until the problem is solved. This is reflection-in-action or "thinking on one's feet" and is done instinctively. Reflection-on-action is when the practitioner evaluates (reflects on) this process afterwards, thereby enhancing his/her learning. He claims that this is what distinguishes the effective practitioner from the less effective one. He feels that people learn by: doing, by reflecting on one's actions, by reflecting on what one has already done and by working together with others in practice (Schön, 1987). This builds competence. Smith (2004), however, states that reflection takes time and that in busy classrooms or workplaces there is not always time to stop and reflect. If reflection is delayed it can compromise the reflection process. Reflections need to be recorded immediately.

### 2.4.3 Studies Done on Reflective Practice.

Kolb developed a Learning Style Inventory that measures a student's preferred style of learning. He classified these styles as being activist, reflector, pragmatist and theoriser. Each of these styles corresponds to one of the steps in Kolb's learning cycle. (Kelly, 1997). Reflection is very much part of these learning styles and the ideal situation would be if a learner equally possessed all four styles. Reflection is mentioned extensively in the literature on experiential learning in all fields of study where it is being recognised as an effective tool for enhancing student learning (Bell and Gillett, 1996; Grundy, 1987; Kelly, 1997; Mbali, undated; McGlinn, 2003; O'Halloran, 2001; Smith, 2001).

Reflective practice is being encouraged internationally in radiography (Baird, 1997; O'Halloran, 2001; vander Hoek, 2001). Critical reflection helps students find new ways of understanding and solving problems, by analysing what actually occurred and the implications that arise from this. Baird (1997) states that professional competence means knowing how to adapt the rules and fit the theories to the new problem. This involves reflection. Reflective practice does not happen easily in radiography because of the large workloads that practitioners have to deal with. They tend to focus on "getting the job done" as quickly as possible. There is no time to reflect. It is a skill that needs to be taught to students through designing and integrating such opportunities into the educational programme curricula (Baird, 1997).

It appears that reflective practice is an effective way of getting students to adopt a deep, meaningful approach to learning (Biggs, 1999). It also allows them to acquire some of the key skills required by employers both in the classroom as well as in the workplace e.g. critical thinking, solving problems, communication, finding new ways to learn, professional development (some of the CCFOs). Reflective practice plays a large role in the acquisition of professional competence in the workplace. Professional competence gained during the experiential learning programmes offered to students must be assessed in order to verify its existence. Professional competence is holistic and has knowledge as well as affective and

psychomotor aspects, all of which need to be assessed and verified using suitable assessment tools.

### 2.4.4 Assessing Reflection and Experiential Learning

The use of OBE in higher education has resulted in a "... student centered approach that encourages self-confidence, reflection on learning and the enhancement of critical outcomes (CCFOs) as a direct link to the successful integration and application of contextual or discipline specific learning" (Forbes, 2005: 52). Experiential learning should be part of the learning programme and needs to be assessed to guarantee that learning will take place. The type of assessment strategies used will influence the teaching methods.

The technical (contextual) as well as non-technical (generic/critical) competencies need to be assessed. The CTP draft policy document on the assessment of experiential training (CTP, 2003) states that all learning that takes place must be assessed. This includes the "...unplanned learning about the vocation or career, the organisational and social contexts of work, ethics and behaviour" (CTP, 2003: 4). Assessment methods should include use of self and peer assessments, report writing, observations, interviews, portfolios and examinations (CTP, 2003; Forbes, 2005).

In order to demonstrate competence the practitioner must provide evidence of performance as well as capability. This involves both workplace and classroom learning and incorporates cognitive processes, theories and concepts related to performance in the workplace. The use of the portfolio is considered in many health fields to be a reliable method of assessing competence where the student can produce authentic evidence from the workplace (Storey, 2001). It allows students to engage in active reflective practice about their own performance both in the workplace and in the classroom (CTP, 2003; Hodges, 2004). It is considered by the CTP (2003) to be a fair and valid method of assessment where students can provide authentic evidence of all aspects of learning that have taken place. The students critically reflect on the evidence in an attempt to

demonstrate that they achieved all the required learning outcomes. This requires active involvement by the student (CTP, 2003). The compilation of a portfolio is in itself a learning process where the student can identify areas of weakness and improve on them.

The portfolio is a popular tool because it would appear to be one of the best ways (Benett, 1993) to assess most of the outcomes that are difficult to measure using observation and the awarding of a numerical value on a mark sheet or rubric. It promotes a deep approach to learning through reflection (Benett, 1993; Kelly, 1997; O'Halloran, 2001; Smith, 2001). The portfolio also helps the student develop reading, writing, communication and critical thinking skills. It is an excellent self-assessment tool that can also be used as a summative assessment. Outcomes are either achieved or not achieved and students need to achieve all required outcomes in order to be considered professionally competent. The portfolio provides a holistic assessment of students and enhances their reflective practice skills.

Many countries are encouraging the use of portfolios to assess radiography students in the classroom as well as the workplace. They are thus well on the way to developing professionally competent reflective practitioners for the workplace who possess both technical and generic/critical competencies. The portfolio is used to assess learning while at the same time teach students the art of reflective practice or reflection-on-action. It serves as an assessment as well as a learning tool within the curriculum.

## 2.5 CURRICULUM

In this section curriculum will be discussed in terms of definitions, types and effects of changing a curriculum.

### 2.5.1 Introduction and Definitions

Any discussion about Curriculum should surely be preceded by a definition of this term as it is used very loosely to mean a number of things. Stenhouse (1975: 4) defines it as "... an

attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice". This implies that curriculum is a cyclical process involving planning a proposal, scrutinising it, changing it, implementing it, scrutinising it again, planning a new proposal etc. Bertram et al (2000) suggest that there are two views regarding curriculum. These are that it is either a plan or a practice. As a plan it is the document, or teaching blueprint, in other words it says what the intended teaching will be. This plan includes the aims and purposes of the curriculum, what should be taught, how it should be taught and how learning will be assessed. It is known as the official curriculum, the formal curriculum or the intended curriculum. What ends up actually being taught may not be the same as what was intended to be taught because the educator interprets the curriculum within the context in which he/she operates. This type of curriculum is called the experienced curriculum, the actual curriculum or the implemented curriculum. (Bertram et al, 2000).

In contrast to these three views Rhodes University have defined curriculum as "...the planned process, the actual implementation of the teaching and the students' "experiences" of the learning process." (Rhodes University, 1998: 1). This would seem to be a more inclusive definition that covers all aspects of curriculum. It includes both the intended and the actual curriculum, This is the definition that has been used for the purposes of this study.

Bertram et al (2000) state that a curriculum is informed by the government, constructed by a particular society, and implemented by the educator in a particular context. All of these will affect the end result in some way. Curriculum is influenced by the politics and power of the government, the society, the institution, the department (discipline), the educator and to some extent the students themselves. The beliefs and values of the community at that time as well as the policies of education and the government of the day will influence the content of a curriculum. A curriculum is implemented at the lowest level (micro level) by the educator and so is influenced by the teaching philosophy, the beliefs and teaching skills

of that educator as well as the type of students in the classroom. The "...time and place in which any curriculum is planned and implemented makes that curriculum what it is." (Bertram et al, 2000: 19). In radiography the government has made some strong statements in its policies about preparing students for the workplace and including the CCFOs in the learning programme outcomes. This has a major influence on the design and development of the curriculum that will need to be changed to accommodate the government's needs.

Students learn things that are not in the curriculum This is known as the hidden curriculum and could have a negative or a positive influence on the learners (Bertram et al, 2000). Learning to obey rules, following instructions and working together in teams are examples of the positive effects of a hidden curriculum whereas learning that failure in a course means you are not good enough is a negative effect.

### 2.5.2 Types and Paradigms

In South Africa there is pressure on higher educational institutions to incorporate the principles of OBE into all higher education curricula. This appears to be in keeping with the trend already being used in England, Wales, Canada, United States of America and Australia. (Elliott and Hughes, 1998). This means that our curriculum is outcomes based or outcomes driven as well as being policy driven. It promotes the use of a constructivist approach to learning where learners "... actively seek, organise, integrate knowledge with previous knowledge and use this information to complete activities that are relevant to the real world." (Lethbridge College, 1998: 2). When developing a curriculum we need to start at the end with the "destination" and work backwards (Lethbridge College, 1998). The destination should be in the form of clearly defined, measurable outcomes and assessment criteria.

A typical curriculum development cycle would involve firstly deciding what the purpose or rationale is for the curriculum. In the case of radiography the purpose is to provide professionally competent, reflective practitioners for the radiography workplace. This first

step would take into consideration the context in which the learning will take place, the reason why and who the learners will be. The next step is to decide on the outcome or where the learner must end up and why. (aims and objectives). Once this is known the content, teaching strategies and necessary resources must be considered. All learning outcomes, teaching strategies and assessment methods used must align with each other and with the main purpose of the curriculum as well as with both the institution and government policies. Finally there must be some method of measuring/evaluating to what extent the purpose has been achieved. This will then lead back to the purpose or rationale for the curriculum. Does it need changing? All curricula fall into a curriculum paradigm, depending on their characteristics.

### 2.5.3 Curriculum Paradigms for Radiography

Habermas (in Grundy, 1987) has described the curriculum paradigms in terms of technical, practical or emancipatory. The technical paradigm is where student learning is controlled so that the end product conforms to the original objectives i.e. the educator is in control of the students' learning. It is content based. In the practical paradigm the students and educator interact in order to make meaning of the world. It is based on the educator's judgment and the student's understanding. In the emancipatory paradigm the students and educator are both involved and participate in the learning process. There is both self-reflection and action (Grundy, 1987).

The profession of radiography contains technical as well as ethical and social aspects and does have a focus on skills, so it is difficult to place it within one particular curriculum paradigm. It falls partly into Habermas' technical paradigm because it does focus at times on teacher inputs, controlling the learning outputs and is content-based (Grundy, 1987). It could be said that it also falls partly in the practical paradigm because it is value-laden and is based on the lecturer's professional judgment and requires students to understand (Luckett, 1995). The current radiography curriculum has been designed using the outcomes format, with clearly stated outcomes and appropriate assessment criteria. The "design

down/build back approach" (SAQA, 2000) has been used, where the knowledge, skills and attitudes required at the end of programme were identified, then assessments were selected that would develop these and then the appropriate teaching strategies were selected.

However, in order to equip students with the required key skills (CCFOs) a shift towards the emancipatory paradigm (Grundy, 1987) would be appropriate. In this paradigm students and lecturer work together and students are encouraged to engage in reflective thinking and go out as reflective practitioners to make a change in the world of work. The lecturer provides a curriculum that allows the student to be a reflective thinker who learns by understanding (Grundy, 1987) and is able to make value judgments.

### 2.5.4 Changing a Curriculum

A shift in paradigm could bring with it a myriad of problems and resistance. Evaluation of the curriculum is required as part of the ongoing quality assurance cycle to ensure that good "customer" care is always provided (Morley, 2002). Weaknesses found in the curriculum are analysed and improvements are made. Sometimes these improvements need to include a paradigm shift, which is inevitable when policy changes have been made at government (macro) levels e.g. the introduction of the OBE approach to teaching in South African higher educational institutions.

Resistance is met when standards for a curriculum are imposed from on high (Luckett & Webbstock, 1999) e.g. from a central government body, because each institution has its own academic culture and serves a specific community. A bottom-up approach to developing the curriculum would be better (Strydom et al, 2001) where departments and lecturers can be involved with developing their own curricula. This would ensure that specific workplace needs could be met as long as the macro-system requirements are being met at a micro-level (Luckett & Webbstock, 1999). The interpretation of policy is often difficult and needs to be facilitated by experts in case of any conflict that may arise due to different interpretations. (Strydom et al, 2001).

Institutions need the support of the workplace and local government stakeholders when changes are made to the curriculum (Johnson, 2002) because any changes at a micro level will affect all stakeholders involved with the students. Support is needed from the employers (Groenewald & Baird, undated) as they are responsible for guiding students in the workplace. If the curriculum results in more work for them they may resist the change and see it as a possible threat. The spin-off from this is that they will gain extra pairs of hands in their departments. This should turn out to be an opportunity and not a matter for resistance. Lecturers need to be given more power in designing their own curricula (Trowler & Knight, 2002) at a micro level so that learning will be more relevant and meaningful for students.

### 2.5.5 Incorporating Experiential Learning into the Curriculum.

With the introduction of the OBE approach, curricula must change in order to accommodate this new approach. This change includes new ways of teaching and learning that will be aligned with the revised curriculum. There is much being written about incorporating experiential learning and key skills into the curriculum outcomes. If they are integrated into the curriculum, the specific outcomes that can be achieved in the workplace can easily be identified and credits can be given for workplace learning (Forbes, 2005). CCFOs can be written into the outcomes and assessment criteria of the curriculum so that they are both taught and assessed (CTP, 2003).

Policy documents have been written about experiential learning and the assessment thereof. The DIT and CTP have two such documents. These state that experiential learning and CCFOs must be incorporated into the curriculum learning outcomes and assessment criteria. (CTP, 2003; DIT, 2005). Experiential learning is a mode of learning that is a component of the whole learning programme. It must, therefore, be assessed. The competencies needed for the qualification are written into the curriculum as learning outcomes. These competencies relate to the development of both workplace and personal skills (CTP, 2003).

When developing the curriculum for experiential learning it is imperative to involve the employers and the professional bodies to ensure that the curriculum is relevant for both the employers/workplace and the profession. Formal agreements need to be drawn up between the workplace and academic institutions where the roles of each are clearly defined. Each programme must have an Advisory board consisting of members from both workplace and academic institution (DIT, 2005). The writing of experiential learning outcomes must be done together by the academics, professionals and employers. These outcomes with their assessment criteria must be well structured and meaningfully integrated into the curriculum (Forbes, 2005) so that the required competencies can be both learnt and assessed, producing a professionally competent graduate. All learning outcomes must align with the needs of the workplace, the student and the institution, while at the same time being in line with national policies. It has now been written into the DIT policy for experiential learning that lecturers must be exposed to the workplace in order to maintain their practical skills in their field and keep abreast of new developments in the industry/profession (DIT, 2005).

DIT is currently in the process of reviewing all its qualifications to bring them in line with the requirements of SAQA and the NQF. This process is the ideal opportunity to bring about changes e.g. shift the radiography curriculum paradigm to one more suitable for training radiographers not only to be professionally competent, but also to be reflective practitioners who possess all the CCFOs needed by the workplace. Sounds idealistic!

## 2.6 CONCLUSION

A review of the literature indicates that all employers need graduates to have certain key skills when they are employed. The skills identified around the world are similar to the South African CCFOs that are required by our own local employers. These seem to be known globally as workplace skills or key skills. The dilemma, according to the literature reviewed, is <u>how</u> to teach these skills in the classroom so that the students will be able to transfer them successfully into the workplace. This is one gap that has been identified.

Teaching and learning methods need to be appropriate and relevant and assessment should include reflective thinking and the assessment of key skills. The workplace wants competent practitioners who are able to reflect "on practice" and "in practice" and they are relying on the educational institutions to provide this. Certainly this is so in the profession of radiography, but literature does not tell us HOW to do this in the classroom. A review of the curriculum theories seems to indicate that perhaps radiography needs to shift its paradigm in order to be able to produce the reflective practitioner who will be equipped with the workplace skills. A shift towards the emancipatory paradigm seems appropriate.

This review of studies done has indicated some gaps. Workplace supervisors are asked to give opinions on students, but seldom are students ever asked for input on themselves. Studies have been done asking post-graduates opinions, but not undergraduates. The actual teaching and learning methods and strategies used to teach specific key skills have not been spelt out in literature. It is still not definitely known if skills are or can be transferred from classroom to workplace. The assessment of the workplace skills in the workplace has not been addressed sufficiently. No specific assessment methods have been used or evaluated. The use of portfolios is mentioned, but the alignment of this with the academic curriculum needs to be investigated.

This study has attempted to address the gaps and suggest some strategies to overcome the problems particularly in the context of curriculum development for radiography. The following questions have not been answered in the literature: What has the workplace to say about the skills that our radiography learners actually have when they arrive at the workplace? What are the students' perceptions of this and how do we teach these skills?

Chapter three will outline the methodology selected for this study. Reasons for the selections will be given and the instruments used to obtain the data will be described.

# CHAPTER THREE

# METHODOLOGY AND DESIGN

## 3.1 INTRODUCTION

In this chapter the design and methodology of the research will be discussed with respect to the reason or rationale behind the choice of design and methods used to obtain and analyse the data. Choices were based on the type of research being done and theories obtained from literature. Ethical clearance for this study was sought through the relevant institutional channels.

## 3.2 DESIGN

The purpose of this study was to understand and interpret the perceptions of students and supervisors on the preparedness of students for their workplace learning in the field of radiography in terms of the CCFOs. This was done to give a better understanding of the perceived needs of the students and the supervisors in the workplace and to highlight any learning gaps so that suggestions could be made for improving or changing the radiography curriculum at DIT.

This was a qualitative, exploratory study that aimed to inform further critical curriculum development. It fell into the exploratory, interpretive paradigm because it was a study done to satisfy the researcher's curiosity, provide understanding and interpret the meanings that people gave to a phenomenon. (Babbie & Mouton, 2001; van der Mescht, undated). According to Neuman (2000) the interpretive paradigm of social science aims to "learn what is meaningful and relevant to the people being studied" (Neuman, 2000: 71). This was the case in this study where research was conducted on people who had experience of the problem - students and supervisors. The study took place within the field of radiography

training and included both the classroom and the experiential (workplace) learning components of the programme. The unit of analysis was a radiography training programme at DIT.

## 3.3 METHODOLOGY

The study took place within the field of radiography training in KZN. Training is currently done through the DIT where the academic learning is provided. The compulsory experiential training is carried out in accredited hospitals in Durban and Pietermaritzburg according to a legal agreement between the DIT and the KZN Department of Health. This study included both academic and experiential learning components in a specific training programme, the National Diploma in Radiography and in particular the first year of study.

There were two groups of participants in this study. The first group was the Pietermaritzburg student radiographers who completed their first year of study in 2004 and were working in the public hospitals and the second group was the workplace supervisors (qualified radiographers) at the three training hospitals in Pietermaritzburg – Greys, Edendale and Northdale hospitals. Only the supervisors who had physically worked with the students in their first year of study were included as participants.

### 3.3.1 The Students

In the first group there were ten students who were to have been participants in this study, however two students did not participate so only eight were interviewed. The two students who did not participate were unable to attend the interview sessions when I was available. When they were available it was too late as the interview data had already been transcribed and categorised. The group of eight included one private practice student. The students completed their first year of studies on campus at the DIT in October 2004 together with the Durban students. They then went to the hospitals for their experiential learning until the end of January 2005 when they returned to DIT to register and study as second year students. These particular students were selected because they had all (except the private

practice one) worked in three different hospitals in Pietermaritzburg and so had been exposed to a wide variety of clinical and work situations. This has added richness to the data obtained.

### 3.3.2 The Supervisors

The second group of participants was the supervisors. There were approximately fifty radiographers in total, however only those who had worked in the diagnostic radiography departments with the students between October 2004 and January 2005 were considered for the study. Supervisors in the therapy department were excluded, as they had not worked with all of the students. One supervisor from the ultrasound department was included in the study as she had spent considerable time with all the students. Her department is different from a diagnostic one, but the CCFOs are also needed by professional staff working there. The supervisors working in the diagnostic Computered Tomography (CT) and Magnetic Resonance Imaging (MRI) sections were also excluded as first year students do not work in these areas. A total of forty-five questionnaires were given out to the relevant supervisors and 22 were received back. The supervisors included those doing their community service, juniors, seniors, chiefs and assistant directors (managers). This provided a wide range of opinions from people with different levels of professional status and experience.

### 3.3.3 The Questionnaire.

The instruments used to gather the data were questionnaires for the supervisors (see pages 2-5, Appendix C) and interviews for the students (see pages 1-3, Appendix D). The questionnaire used was a self-administered questionnaire (Leung, 2004). The purpose of this questionnaire was to elicit the responses of qualified radiographers in relation to the skills that student radiographers acquire during their first year of study at the Durban Institute of Technology (DIT). The questions asked all relate to the South African CCFOs as listed in the SAQA documents (SAQA, 1997).

Section A of the questionnaire contained specific closed questions that provided background data. Section B contained a set of closed questions with space for respondents to make comments on each question/answer. A Likert scale of 1-5 (Anderson, 1990) was used so that data could easily be analysed. This section thus made use of both a closed and open format (Leung, 2004). Each question dealt only with one piece of information so respondents would not become confused or misled. Section C was an open format, using open-ended questions that provided data that could not be obtained in Section B.

The questionnaire was short and easy to read (Frary, 1996) so that the busy supervisors would not be discouraged by a long document that would need lots of time to answer. If it had been long the supervisors might not even have attempted to complete it or would have started and then given up half way through. The questions were simple and I tried not to introduce bias by not asking any leading questions (Leung, 2004). The respondents were all qualified radiographers who had worked with student radiographers in the past so they had the necessary knowledge to enable them to answer the questions.

A short covering letter (see page 1, Appendix C) was included with the questionnaire explaining the purpose of the instrument (Anderson, 1990; Leung, 2004). The letter offered a guarantee of confidentiality and also thanked the respondents for their participation. It briefly explained the importance of the results for the radiography curriculum. For ethical reasons, letters were first written to the hospital managers (see pages 1-3, Appendix E) asking permission to conduct the research on their staff members (Cohen et al, 2001). This was obtained easily as patients were not being involved in the study and so medical ethics was not being encroached upon. Permission was granted telephonically by two of the hospitals and in writing (see page 4, Appendix E) by one.

The questionnaire was piloted, but not too successfully. I sent it electronically to six of the senior supervisors and asked for responses to be emailed back to me. This caused logistical problems. Some of those returned were blank. Respondents were not familiar with the use

of "tracking" or inserting comments. The responses I did get were helpful. Questions were understood well. Comments did reveal that some respondents had strong feelings about certain issues. For example, one felt very strongly that each hospital should have its own dedicated "tutor" who should work only with students. This was evident in a few of her comments. Another respondent focussed on the fact that the students are still teenagers and she "blamed" their lack of skills on their age. These were unexpected, but interesting comments. My supervisor gave some good advice about the format and the use of the Likert scale (Anderson, 1999) which I used to amend the questionnaire.

The questionnaires were given to the workplace supervisors before the students returned to the hospitals at the end of June 2005. This was done so that the supervisors were not influenced by any "new" skills that students may have acquired at DIT after workplace block in January 2005. I intended to deliver the questionnaires to the hospitals and personally hand them to each supervisor with a short explanation of the purpose of the study. This was not possible, however, as some supervisors were working night shifts, some were on leave, some were ill and those on duty were too busy to stop and listen. The questionnaires were left with the departmental managers who handed them to each supervisor when they came on duty. This process took a few days to complete and all were asked to return the completed questionnaires to the managers on the day they received them. I collected these within the two weeks following distribution. Some were incomplete and these were returned to the managers in an attempt to get a better return.

The strength of this questionnaire was that it was short and easy to complete. The questions dealt with one piece of information at a time so respondents were not distracted and reliable data was obtained. The data was easy to analyse and present in table form because the Likert scale was used (Anderson, 1990). The use of some open-ended questions at the end of the questionnaire opened up the opportunity for "new" issues to be revealed that I had not anticipated.

There were some weaknesses in this instrument. Although not a weakness of the instrument itself, it was noted that some of the questions could have been answered according to the personal feelings or passions of the respondents as was seen in the piloting of the questionnaire. Due to workload pressures and/or apathy some supervisors did not return their questionnaires even after a few reminders. However a 49 % return was achieved. I was not able to pilot the instrument for a second time, but major changes had not been made since the first pilot test so perhaps a second one was not necessary (Anderson, 1990).

### 3.3.4 The interview

The instrument used to obtain data from the students was the interview as there were a small number of students and the aim was to obtain as much data as possible from them. The demographics of the students was not included in the data collection as it was not intended to be part of this particular study. Permission to interview the students was obtained from the DIT Radiography Head of Department (see page 1, Appendix F). She allowed the students to move in and out of their practical lessons in order to attend my interviews, enabling me to see most of them on the same day. Six students were interviewed on the DIT campus, using a semi-structured forty-five-minute interview where students were guided to focus on critical incidents that they had experienced. This was done on a one-to-one basis using an interview guide that served as a flexible checklist to ensure that all the important topics were covered (Lofland & Lofland, 1984). The private practice student was interviewed separately on another day at her workplace. She was included in the study because I thought her comments and perceptions would be valuable, as her experiences were different from the rest of the students. One of the students who had failed his first year was interviewed at the Pietermaritzburg DIT campus.

Participants were well informed about the research procedure when first approached to participate. They were given the right to refuse to take part, but all chose to participate freely (Cohen et al, 2001). They were told that any information given would be kept confidential and would not be divulged for any purposes other than for this study. This was

done in an attempt to eliminate context effects and respondent/interviewer bias from the findings.

All interviews were recorded on a sixty-minute rather than a ninety-minute tape to ensure that no data was lost due to the stretching of the tapes, as sometimes occurs in the longer ones. The use of a tape recorder allowed me to give my full attention to what the students were saying and engage with them more meaningfully. Students' names were not mentioned at any time during the recorded interview and names were not recorded in the transcribed tapes. Numbers were used to identify the different students on the transcripts, but their identities were not revealed (Lofland & Lofland, 1984). Each student was given a small gift as a token of appreciation for their valuable input (Cohen et al, 2001). Although this could be seen as setting a precedent for any future participants, the gifts were very small and inexpensive and were only given once all data had been collected. I felt that the students were professional enough to be able to handle receiving a small gift.

At the beginning of each interview a short introduction was given to the student, where the purpose of the interview was explained (Lofland & Lofland, 1984). Students were assured of anonymity and were encouraged to speak openly, as no information given by them would be used against them. This also allowed them time to relax. They were told that they could stop the interview and withdraw at any stage if they wished. During the interviews students were invited to speak freely around a specific set of topics. They were encouraged to discuss all aspects of their experiences in the hospitals during the time October 2004 to January 2005 and extra discussion was encouraged on any other related topics that the students raised. I was well known to the students (known researcher) so they were able to feel comfortable with me (Lofland & Lofland, 1984). I had already established an easy rapport with them in the classroom so students felt comfortable in my presence. I attempted to create an environment that was unthreatening to the them by reminding them that I was acting in my capacity as a student and not a lecturer.

The interviews went well and most students remained within the forty-five-minutes allocated. Two went well over the limit, but I allowed them to continue, as their contributions appeared to be of value to the research. The students were given the option of leaving when their time was up, but they chose to stay. One major problem encountered during the first six interview sessions was the quality of some of the resulting tapes. The air-conditioner in the interview room created a loud background noise on the tapes. Another problem was with the quality of recordings when second language students were interviewed. Their accent was difficult to understand at times. These problems made the transcribing process very difficult, as I did not do it myself and had to be consulted regularly to clarify words and sentences. Sound problems were overcome by playing the tapes on a good quality sound system that had separate controls for treble and bass. One of the tapes (Student number 5) had to be excluded because the student was very shy and soft-spoken. In many places he could not be heard at all, he did not engage in discussion at all, his answers were very brief so his input did not contribute to the study. The private practice student and the repeat student were interviewed in a quiet room with no noise interference and the quality of the tapes was very good.

The timing of the collection of data was critical and had to be done before the students returned to the hospitals for their next workplace block. This was to ensure that they would not be influenced by any "new" experiences they may have encountered as second year students on campus. Interviews were, therefore, conducted in March 2005. If the data had been collected after the students had returned to the hospital it would not have been reliable and could have been influenced by any new skills that they had learned during their second year DIT block. Six of the interviews were conducted in fairly quick succession in case students were tempted to discuss with each other the contents of the interviews thus prompting each other. "Friends" were interviewed one after the other. This also allowed for consistency when asking questions and guiding the students around the topic. I had easy access to the students while they were still on the DIT campus. They would not have been able to give me adequate time for a meaningful interview if they had been at the hospitals

because they would have been too busy with patients. The repeat student and private practice students were interviewed later as it was a last minute decision to include them in the study. They were not expecting to be included and so had not discussed the interviews with their colleagues.

## 3.3 TREATMENT OF DATA

No secondary sources were used in this study. All data was obtained using primary sources – students and supervisors' opinions. The responses from the supervisors' questionnaires were collated and grouped using the tables. Three tables were drawn up; one for a summary of the demographic data (see page 1, Appendix G), one for a summary of the supervisors' responses to the closed questions (see page 1, Appendix H) and another for a summary of their comments (see pages 1 -2, Appendix I). These were then analysed and evaluated to identify the areas of strengths and weaknesses in terms of supervisors' perceptions of student preparedness in terms of the CCFOs.

The demographics of the supervisors who returned the questionnaires were very evenly distributed. This was unplanned, but is interesting to note. As can be seen in the table on page 1 in appendix G, the supervisors were equally represented in terms of workplace, rank, number of years qualified and number of years working with students. The data obtained thus came from a wide variety of respondents and this has added to the richness of the responses.

The student interviews were transcribed by an appointed person from the interview tapes onto the computer. No editing was done so the data retained its originality with grammar errors, use of slang etc. Non-verbal language was not recorded because it was not considered to be an important factor in this study. The Nvivo computer programme was not used, as was originally intended, because the amount of data was considered to be manageable and was easier to categorise manually. I used my own experience and judgment to categorise the data. The first categories were *a priori* categories (Lacey &

Luff, 2001) identified before scrutinising the data and were similar to those in the supervisors' questionnaires. These categories were used in order to identify broadly the areas of strengths and weaknesses, in terms of developing CCFOs, identified by students so that the responses could be compared with those of the supervisors. The strengths and weaknesses were compared with those of the data gathered from the supervisors so that a better understanding could be gained of the perceived problems. I also looked for any links between the weaknesses identified and classroom learning outcomes to see if the areas of weakness could be taught in a classroom situation or if they would be better taught in the hospitals. This understanding has helped in making recommendations for changes/improvements to the classroom and workplace learning activities so that the needs of both students and supervisors can be better met.

It was my intention to allow the "voices" of the students to be heard so the major part of the data analysis and evaluation has been focussed on their interview responses. The interview data was further analysed and evaluated a number of times to identify any additional emergent categories (Lacey & Luff, 2001) raised by students in terms of their experiences in the hospitals as well as on campus. These emergent categories were all related to the development of CCFOs, but were of a more general nature that affected the students' holistic learning experiences on campus, in the hospitals as well as in their private lives. After further scrutiny some of the categories were collapsed and incorporated into more appropriate categories and sub-categories. Sections that had been repeated were removed to reduce the amount of data to a manageable size. These categories and sub-categories of interview data were analysed and evaluated based on my own professional judgement and experience. Appropriate pieces of interview text have been included in the discussion section of the analysis chapter, under the relevant headings, to give the discussion openness, authenticity and credibility (Chenaill, 1995). A summary of the process used to categorise the interview data can be seen on pages 1-5 in Appendix J.

## 3.5 CONCLUSION

In this chapter the choice of design and methodology have been described and justified. Reasons were given as to the choice of the particular methodology selected for this study. The use of the questionnaire and its implementation was explained. Some of the weaknesses and strengths of using a questionnaire to gather data were identified. The interview was discussed and its implementation was described. The methods used for the treatment of the data were described. The findings obtained from the analysis of the data will be discussed in chapter four.

# CHAPTER FOUR

# ANALYSIS, EVALUATION AND DISCUSSION OF RESULTS

## 4.1 INTRODUCTION

In this chapter the results of the supervisors' questionnaires and the students' interviews will be evaluated and discussed in terms of the development of CCFOs by the first year student radiographers. The main objective of the analysis and evaluation of data was to attempt to answer the questions that were posed at the beginning of this study, the main one being:

- What curriculum measures are required to ensure that the radiography training at DIT fully prepares the first year students for their workplace learning in terms of the CCFOs?

In order to answer this question the following two questions needed to be addressed:

- To what extent do students believe that they have been adequately prepared for the workplace in terms of the CCFOs and
- To what extent do the supervisors believe that the students have been adequately prepared?

It is these perceived opinions that have been analysed and evaluated. In this chapter the supervisors' responses and comments will be presented in tables followed by a short description of the results. In the discussion of the students' data verbatim reporting will be used to capture the richness of the comments and perceptions of the students. This approach will allow the "voices" of the students and their experiences with regard to their development of the CCFOs to be heard. The major part of this chapter will focus on the students' experiences and the last part will include a summary of the acquisition of the CCFOs in terms of the students' and supervisors' responses.

The responses obtained from the closed questions on the supervisors' questionnaires can be seen in table 4.1 below. This table can also be seen on page 1 in Appendix H.

**Table 4.1 Responses of Supervisors to the Questionnaire.**

| LIKERT SCORE | CRITICAL CROSS-FIELD OUTCOMES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rad tech 1 | Pt care 2 | Prob solve 3 | Team work 4 | Time mgt 5 | Crit eval 6 | Comm 7 | Use equip safely 8 | Relate theory to Clin 9 | Reflect on pract 10 | Life of Dep. 11 | Cult & Enviro 12 | Impr Knowl 13 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 2 | 1 | 2 | 5 | 2 | 6 | 8 | 1 | 2 | 3 | 6 | 8 | 1 | 3 |
| 3 | 6 | 9 | 13 | 11 | 10 | 10 | 7 | 6 | 11 | 8 | 9 | 8 | 11 |
| 4 | 13 | 8 | 1 | 8 | 5 | 3 | 14 | 12 | 5 | 5 | 3 | 7 | 5 |
| 5 | 1 | 3 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| NR | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 |

First (shaded) Column = The Likert Scale Scores
1 = Not at all 2 = Poorly, 3 = Satisfactory, 4 = Well, 5 = Very well, NR = No response

The shaded column represents the Likert scores as indicated above. The numbers indicated just below each CCFO in the second row of the table correspond to the question numbers in the questionnaire. The numbers within the table represent the number of responses received for each CCFO in terms of the Likert score. For example 11 supervisors rated teamwork with a score of 3 indicating that this CCFO was satisfactory. The last row in the table indicates the number of supervisors who did not respond to the question. These responses will be woven into the discussion where appropriate.

A summarised version of the supervisors' comments and responses to the open ended questions in the questionnaire can be seen in table 4.2 below. The entire table of comments and responses can be seen on pages 1-2 in Appendix I.

**Table 4.2 Summary of Supervisors' Responses to Open ended Questions.**

| Supervisor | How to teach "bad" skills better | What necessary skills are Missing | How should missing skills be taught | Other Comments. |
|---|---|---|---|---|
| A | More practical needed | Patient care | DIT clinical tutors in hospital | Not mature enough |
| C | Students must want to learn in hospitals | Understanding of real world. Reasoning. | | |
| D | Students need good attitudes | Personal pride. Egos in check. Work speed. | Closer supervision. Award mark for hospital block. Relevant assessment | Students must be willing to learn. Need good attitude to work and learning. |
| E | No problems | Pride in the profession. Physical appearance. | | |
| F | Make aware of their role in health team. | | | Need some US skills in 1st year. |
| G | More time needed. Learn by doing. | | | |
| H | Need more time in hospital. Need a mentor help them. | Stress management. | Talks by qualified people i.e. social workers. | Need to be more involved in hospital "life" |
| I | Have hospital mentor | | | Students must know their part in health team. |
| J | Have clinical tutors | | | |
| M | More time in hospitals | Confidence – ? lack of practice | | More time in hospitals to build confidence. |
| O | In hospital with clinical tutor. | | | |
| P | | | | Learn by doing in real situation. |
| Q | Learn by doing | Stress mgt, | By experience | Learn by being thrown in the deep end- doing |
| R | Do patt recog at DIT | | | |
| U | Do Patt recog at DIT | Lateral thinking | | More time on evaluating films. |
| V | Provide a clinical tutor at hospitals. | Stress mgt & coping skills. | Role play in class & actual doing in hospitals. | Need guidance from a clinical tutor. Request forms only analysed when they have to. |

This table is a summary of the one found on pages 1-2 in Appendix I. Responses in the second and third columns of the table in the appendix have already been accounted for in

Table 4.1 and so have not been included in the above table. The supervisors' comments in the above table will be integrated into the discussion where appropriate.

It has already been established in the literature review that generic/workplace skills need to be taught in the classroom in order to prepare students for their workplace learning. These responses will also be woven into the discussion of the students' perceptions where appropriate. Literature has also indicated that the South African CCFOs are a fair representation of the generic skills identified internationally. It was therefore not the intention of this study to focus on either of these issues. The above have been assumed in this study. Gaps found in the literature survey were:

- HOW to teach CCFOs
- Perceptions of first year students on whether or not they had acquired the CCFOs and how?

After scrutinizing the students' interview data as discussed in the previous section, four main categories finally emerged: Teaching and Learning, Students, DIT/Hospitals and Training Gaps. The category on Training Gaps will be summarised briefly at the end of this chapter, but will be further discussed in Chapter five. The first three categories were further categorized into a number of sub-categories. Some of these sub-categories were collapsed and grouped with others in order to produce fewer sub-categories, reduce the amount of data being dealt with and eliminate unnecessary repetition. The final categories and sub-categories that will be discussed in this section can be seen as Round 8 on page 6 in appendix J.

The discussion of results will include the first three categories and their sub-categories as mentioned above starting from the largest to smallest categories (Chenaill, 1995). Each sub-category will be discussed in terms of the findings, examples from the data and supporting/related literature. The strengths and weaknesses identified in the sub-categories

will be woven into the discussions. All data obtained from the students relate to the development of CCFOs so these outcomes will not be focused on individually, but will be mentioned as they appear in the data. The gaps in training will be discussed further in the chapter on recommendations and conclusions. Discussions of curriculum will be integrated into the findings where appropriate.

## 4.2 TEACHING AND LEARNING

This was the largest theme to emerge from the data and so it will be dealt with first and as it is such an important part of a curriculum it will be discussed in more detail than the others. This study has indirectly evaluated the effectiveness of the teaching and learning strategies used in the OBE approach to teaching the first years at DIT. This was not the intention of the study, but it has emerged from the students' interview data. Some teaching and learning weaknesses were highlighted in the data and these will be used to review the curriculum so that it aligns with the needs of the students, the workplace and the academic institution.

The main sub-categories that emerged in this section were: The "Real" thing, Integration/Application and Collaboration. These will be discussed in terms of the findings, discussion and their relation to the literature/theories in chapter two with examples from the interview data. Most students found that the teaching and learning strategies used in their first year were appropriate and effective for the development of workplace skills (CCFOs and technical skills) therefore in this section the strengths seem to outweigh the weaknesses by far.

### 4.2.1 The "Real" Thing.

Learning by "doing" is an important part of experiential learning (NSEE, 1998) where students are exposed to the "real" thing in the "real" situation. This real situation need not necessarily be in the workplace. It is possible for lecturers to provide students with experiential learning in the classroom or laboratory situation by simulating the "real" thing

(Candy & Crebert, 1991). This classroom type of experiential learning was used at DIT and students felt that it was able to provide them with a number of skills, but there were some skills that were better learnt or indeed reinforced in the workplace.

> "It helped a lot 'cos you worked with the machinery and then you got to know.. Ok, I can look at this and I can see it and you were able to touch and feel it".

> "So, it's like because when you see something you remember it more than you would by just reading it because if you read you just forget"

The above students were commenting on the effectiveness of learning by doing and seeing. They were taught the theory of using equipment and technology safely, but it only became meaningful when it was reinforced in the laboratory by using the real thing. This supports the theories of situated learning (Lave & Wenger, 1991), experiential learning (Kolb, 1984) and using the OBE approach as discussed in the literature survey in chapter two. At DIT an attempt has been made to teach the CCFOs by engaging first year students in some kind of activity that allows them to practice the actual skill – so they are learning by doing.

> "The fire course did - especially when we went in the tunnel and we were in a dangerous situation also made you depend on everyone else to do your job"

Students attended a Fire Course at the beginning of their training to encourage teamwork, communication and collaboration. This allowed students to learn a skill by engaging in it themselves rather than being taught in theory only. A number of students have commented that this was an effective exercise where they also got to know each other before commencing their studies, making it easier for them to form groups in the classroom. Six of the supervisors also felt that the students should learn by "doing" through having more practical sessions and more time in the hospitals. One supervisor even suggested they should learn by being "thrown in the deep end" at the hospitals.

There were divided opinions on the development of patient care and communication skills. Some students felt that they acquired these skills adequately on campus by simulating the situation with their peers, but a few felt that it was necessary to have a real patient so that their interactions could be relevant to the job.

> "I think in Psychodynamics we were asked to, well during the lecture, we were asked to come in pairs in front of the class and act out like I'm the radiographer and you're the patient – act out how would you tell the patient that you are going to do this x-ray.... It wasn't just look at the textbook and read it, it was practiced as well".

This student was amongst the majority who felt that the patient communication was taught effectively by using a classroom simulation. They had no problem transferring this skill to the workplace. Perhaps this is a "low road" transfer that does not involve too much decontextualisation and re-construction of knowledge (Grayson, 1993) as long as the patient is conscious and able to communicate normally. One of the supervisors also felt that role-play in the classroom was a good teaching strategy.

There were some students, however, who felt that the patient communication skill was best learnt with a real patient – not necessarily in a hospital, but with a real patient.

> " I think we should've been able to at least have patients that come into the clinic *(laboratory)*, not just skeletons"

> "In theory it was taught very well, but in practical I don't think it was taught very well because you feel like an idiot talking to a skeleton.... You don't feel comfortable doing it. So I think they should take a few days and take us to the hospitals to do that"

> "Ja, you see that's the bad part. Like maybe ... um ... I think that during some pracs if we could spend time in a department with patients and watch how other radiographers interact with patients, it'll be good"

In the DIT laboratory students were encouraged to "talk" to the skeleton during the practicals - as if it were a real patient. This embarrassed some of the students and made them feel uncomfortable. The first year students were young and in a new and frightening environment so many of them took a while to relax with their new lecturers and peers. Talking to a skeleton was a stressful activity for them. These students seemed to prefer to stand at the periphery of the practical situation for a longer period than their peers and gradually move inwards as they became more confident. This supports Lave and Wenger's (1991) theory of "Legitimate Peripheral Participation" where students observe from a distance and learn from the "expert", then gradually move to participation in the center of that community. Some students took longer to participate than others, possibly due to their personal attributes (Holmes, 1992). According to one supervisor a lack of confidence could have been due to lack of practice in the hospitals.

Students were taught to engage in critical evaluation and problem solving by analyzing the quality of the radiographs that they produced during their practical sessions. In their first year students were not expected to identify abnormalities or diseases so they were only exposed to radiographs of "normal" bones. It seems from the students' responses that we have underestimated their capacity to cope with the abnormal situations. It was assumed that they should learn the normal first and then progress to the more complex.

> " ... and when I came here (*hospital*), sometimes I didn't know the difference between what was normal and what was abnormal. So it's always, like if you showing us radiographs at Tech, you must show us normal and abnormal so you know the difference..."

> "... when we speak about all the different... um ... diseases and bone defects or fractures and stuff – we need pictures (*radiographs*) to remember them"

Most students felt that they would be able to cope with evaluating radiographs containing more complex structures like broken bones. They claimed that in the real world of the hospitals the patients who come for x-rays do have something wrong so the students should be exposed to these abnormalities early in their training. Again this is supported by the experiential and situated learning theories already mentioned previously. Students needed to learn by experiencing what they would actually see in the workplace. The students felt that this would make it easier for them to transfer their problem solving and critical evaluation skills to the workplace where the "abnormal" is a routine feature. Two of the supervisors also felt that students needed to be able to recognise abnormal radiographs and they suggested that the skill of "pattern recognition" should be taught where radiographs with abnormalities/diseases are analysed and critically evaluated. It seems that in this case our curriculum has not taken Vygotsky's PZD phenomenon into account (Riddle, 1999) and students have been held back below their potential to cope with more difficult concepts.

#### 4.2.1.1 Summary

According to the students' comments, many of the CCFOs can be taught on campus by allowing them to work with the "real" thing. Using technology and equipment safely was taught effectively because of the "hands-on" approach with "real" equipment. Teamwork was learnt by working together in groups and having to depend on each other for the completion of a task within a specific time. This also taught them time- and self-management. Being sensitive to different cultures and environments was achieved when they were involved in a project that required them to interview peers of a different culture and compare their respective cultures. These learning strategies were incorporated into the course curriculum and all such strategies involved active learning where students were engaged in a task that was meaningful and relevant to their future career (Bugg, 1998; Hansen & Stephens, 2000). It would seem that one weakness of the curriculum was the failure to provide students with access to "real" patients and "real" radiographs before going to the hospitals. This gap needs to be addressed in the curriculum.

### 4.2.2 Integration/Application

In this section the development of CCFOs through the application and integration of theory, practical and workplace learning will be discussed. Effective learning takes place when subjects are integrated and theory is applied in practice and integrated into the workplace. Students need to be able to see how each of their subjects and their learning activities relate to the whole learning programme and how these are relevant to the job they will be doing. This produces significant learning (Fink, 2003) that results in a lasting change within the student and is supported by the constructivism theory of learning. New knowledge and experiences are integrated into previously learnt knowledge and experiences so new meaning can be given to the old (Kerka, 1997).

#### 4.2.2.1 Integration of Theory and Practical

Students felt that there was good application of the theory and practical on campus because the two activities took place immediately after each other on the same day. This all enhanced the development of CCFOs.

> "I think it was very well done because we learnt with you and then we went immediately and practiced it which makes me to remember it a lot better"

> "Oh yes, because in the viewing boxes, like we had chances to, like you finished x-raying the skeleton, whatever, but you go back to the other room and you evaluate your radiographs, see where your mistakes were, how you can improve them"

On campus the OBE approach to teaching and learning was used so that outcomes could be achieved in a holistic and integrated manner. Knowledge, skills and attitudes were all reinforced on the same day because classroom (theory) and laboratory (practical) learning were conducted together. Students felt that by being able to integrate the classroom learning immediately in a practical way, their acquisition of skills was enhanced. This use of the OBE approach to learning allowed the student to acquire the knowledge, put it into practice and then reflect on it (Jacobs, 2005) – all on the same day. This type of learning

supported Kolb's experiential learning cycle (Kolb, 1984) and was made even more effective because all activities stages of the cycle happened in a short space of time (six hours).

#### 4.2.2.2 Integration of Subjects

The subjects taught in the classroom need to be integrated and linked with each other in order for learning to be relevant and significant (Fink, 2003). In the OBE curriculum, learning was integrated and the outcomes were aligned to the workplace. When students could not see the links between their subjects they found it difficult to learn.

> "Yes, because then at least Anatomy you've got the bones and they tell you what the bones look like and then you have Rad Prac and you x-ray and on your x-ray you can see the same exact thing that you've seen in Anatomy and at least you can identify the structures and you know what's going on"

> "It was very well done. We didn't put everything in separate boxes and then take it out of this box and apply it here, or take out of this box and apply it there. Everything ran into each other which was very nice".

Students were able to recognize that their subjects fitted into the "bigger picture" of the whole programme. The various lecturers made them aware of links during class, but most students picked these up themselves and could integrate them in their own learning. By being made aware of the importance of the integration of subjects students learnt the skill of seeing the small parts that make up the whole. Subjects not only linked with each other, but also linked with the workplace.

However, not all subjects in the first year programme linked with others and all students were able to identify this shortcoming.

> "...we don't understand why we got to do Physiology. I mean you do your first year, you doing all your subjects - coz you've been told that all subjects interlink and you

> trying to link the subjects that like.., but then you just don't, you can't find the place for Physiology"

Physiology was one of the first year subjects taken by all students. It is very relevant in second year when they learn about different diseases in a subject called Pathology. These two subjects are very closely linked. The students all recognized that Physiology had no relevance in first year and should have been placed in second year. One student stated that he "loses interest" when he see that a subject is not relevant. Another student stated that all the work learnt in first year in this subject would be forgotten by the time it was needed in second year. First and second year curricula need to be reviewed and aligned to meet the needs of the students at the appropriate levels of study.

#### 4.2.2.3 Integration in Hospitals

The majority of students were able to identify that the skills they learnt on campus were easily integrated into the hospital situation because they were relevant and aligned to what was needed in the workplace (Biggs, 1999).

> "...during the Rad Prac we had those worksheets that was time allocated. You see, then you can do section A in 20 minutes, section B this time and you were supposed to be finished at that time. So at the hospital you don't have to take that long with one patient, because the other patients are waiting. You have to do fast, and with the good result. So we had to have time management skills there and being fast with patients"

For this student time management skills taught in class were easily transferred to the hospital. Time management in a hospital situation is very relevant and important when dealing with sick people, especially in emergency situations. Students needed to work quickly, but at the same time efficiently and produce good quality work. This skill was learnt on campus during the group-work session by allocating specific time limits to each activity. According to all the students this was a very successful teaching strategy and they were able to transfer their skill and manage their time and work effectively in the hospitals.

It is interesting to note that many supervisors only rated this skill as being satisfactory.

Sometimes theory can only be fully applied and integrated in the hospital situation rather than on campus. Most students felt that cultural sensitivity was only fully achieved in the hospital situation where they were exposed to a variety of patients and staff even though the class on campus was culturally diverse. Students were exposed to the different cultures in the three hospitals they worked in. These hospitals were culturally diverse with respect to patients and staff. This helped them integrate the cultural sensitivity they had learnt on campus into the workplace.

> "At Tech we were taught it's not about race, and everyone should be treated the same and you don't just say because "oh, you're ... you're smelling bad" When we got to the hospital we were like, so, OK this is a patient. ... we didn't look at colour, we didn't look at race. We just looked at getting the job done to perfection..."

Being culturally sensitive to others and being able to respect all people is an important skill for a health worker to possess in the hospital environment. Hospital policies demand that all patients should be treated the same and that no patient should be discriminated against in any way. Many of the patients that the students dealt with came from extremely poor backgrounds, were dirty and did not smell very good. Most students, like the one above, felt that they had been equipped with the necessary skills to be able to cope with these types of patients. It is interesting to note that this skill was taught theoretically in the classroom and was applied in practice in the hospitals, but most students felt that this was adequate. They were able to transfer the knowledge into the hospital and apply it there. They understood the principles of patient communication and were able to apply this to the process (Shepherd, undated).

#### 4.2.2.4 Summary

Students felt that they were able to develop the CCFOs successfully through the application of theory in a practical and/or workplace situation. They were able to learn either through theory or in practical situations and then integrate these skills into the hospitals. They felt that their subjects did not all link with each other and this made it difficult to learn the one that appeared to have no relation to the others. They were unable to make the learning material meaningful and could not see its relevance. This problem needs to be addressed through a review and change in the curriculum.

### 4.2.3 Collaboration

This section covers the findings related to the development of CCFOs through working in collaboration with others. This includes the students, their peers, supervisors, lecturers and patients where communication, problem solving and teamwork have featured strongly. There was strong support by students for the use of the OBE approach in teaching and learning where group-work has been used extensively in the first year programme to achieve learning outcomes.

#### 4.2.3.1 Learning with Peers

Most of the learning activities on campus required that students work with their peers. This was in groups and in pairs doing role-play, practical sessions, film viewing and group discussions.

> "We did learn team-work in the first year.... In Psychodynamics Miss X made us walk blind one day – one person blind, one person seeing and leading the way – we learnt a lot through that"

> "Yes, the groupwork prac. – that helped a lot coz everybody has different views on certain things – on how to study etc and you learn how to do all that. And some have superior knowledge than others and we learnt through that"

"The film viewing prac. set up because we helped each other. I know Z and I were together and we helped each other a lot... Like we split it up – which ones we learnt and which ones we didn't know and then .. um .. whatever I learnt and I didn't know she explained to me if she understood it. And whatever she didn't understand, I explained to her"

"Ja, they did teach us – the *(Zulu)* students. They did teach us a few Zulu phrases and they would tell us exactly. I know the one girl actually wrote down a dictionary of her own just to teach us"

These students all felt that by working together with others they learnt more than they would have on their own. This is supported by Vygotsky's theory that social learning leads to cognitive development (in Riddle, 1999). There was synergy in working collaboratively (Cove & Love, 1996) even if it was just with one other person. The exercise that was done in the first example had a great impact on the students and was commented on by many of them. They learnt the importance of communication and trusting their peers. They also stated that working with others taught them to understand other people and how they behave as well as understanding themselves. Students worked in pairs for some of their first year activities and had to share knowledge. One of their assessments involved working with one other person where they both contributed to each other's marks – very risky. Each student played a role not only in their own learning, but in that of their peers as well (Riddle, 1999).

Being able to function as a team member is an important skill in the medical field. Every person is part of a team, both within their departments as well as within the whole hospital so good teamwork skills are essential. Two supervisors felt that students needed to learn their part (role) in the whole health team within the hospital. It is interesting to note that the Zulu students helped the non-Zulu speakers by compiling a working dictionary. The majority of patients in KZN are Zulu speaking so a working knowledge of the language is important for communication purposes. It is interesting to note that none of the supervisors

commented on this "missing" skill. Collaborative learning helped the students to develop workplace skills (Bugg, 1998) that they were able to transfer successfully to the workplace.

#### 4.2.3.2 Group-work

Group-work has been a contentious issue with many academics and its benefits are still being debated. The students found that working together in groups benefited them in many, and sometimes unexpected, ways even though they started out not liking the concept.

> "There were like people who had problems, family problems, but we helped them out and being friends we were compassionate to each other when it came to problems."

> "Well, you taught us nicely Mrs. S, because in our groupwork we didn't have any conflicts. We just solved our problems nicely and we didn't fight at all or take advantage of each other"

> "Groupwork, it actually did help coz ... for example one of our members is, they actually black and then they got way different cultures from the normal culture or from black people, but the way he does things is different from the way we do things so we actually got to know how to talk to him ... coz we all black and he is black, but he is different"

> "So the Counseling course did actually help us a lot more about us personally. What type of person you are. So it was more about finding who you really are and then what the person you are going to be – how that person's going to help somebody else"

These students identified some unexpected benefits from working in groups. Most of the theory work was discussed in group sessions where students worked in collaboration with five or six other students of their choice. They formed their own learning communities (Wilson & Ryder, 1996). Care and compassion, problem solving, cultural tolerance and reflection were all identified by these students as skills learnt by working in groups. This allowed for the holistic type of learning to occur that Cove & Love (1996) mention in the

literature survey. It was interesting to note that even within a specific culture there were further cultural differences that needed to be understood and tolerated so that there could be harmony within a group.

Students learnt problem-solving skills in their groups by being faced with problems that needed solving – learning by "doing". Their learning was active and participative (Bugg, 1998). The self-reflection was done in a non-threatening group situation. Reflection is part of Schön's (1987) theory of reflective practice where reflection builds competence, a quality that is used to measure successful learning in the radiography profession. Most students felt happy to reflect on themselves in a small group and found it non-threatening. One student commented that she found it very easy to reflect inwardly because it was about herself and she could "identify myself".

#### 4.2.3.3 Communication

Communication skills are essential when working in collaboration with others especially in the work situation. The students felt that by being exposed to learning activities that involved other students, they had learnt to communicate effectively. They felt that this skill helped them in the hospitals when dealing with supervisors and patients.

> "Um, ja, like with groupwork, that helped us to really get to find out like how he's working – like with groups of people just like in the hospitals because you get some people pulling their weight, others aren't pulling their weight..."

> "Actually it was more than excellent because when we are working with different people or different kinds of people or patients. So everything that we are taught at Tech was helping a lot"

Working in groups taught the students to communicate effectively with different types of people. They were able to apply this skill in the hospitals where there was a great variety of types of patients as well as supervisors and hospital staff. One student felt that he was able

to cope with the different types of patients and staff at the three different hospitals, but that "if I'd been working in one hospital I'd never be able to understand." He felt that he would even be able to cope in other countries with the skills he had learnt. Communication skills are one of the most common workplace skills needed by all fields in all countries. Most supervisors agreed that this skill was well done by students in the hospitals.

#### 4.2.3.4 Summary

Working in collaboration with others has developed the social skills of our students. They have acquired communication, problem solving, teamwork, time management, self-reflection and cultural sensitivity skills. These skills helped them to adapt to the three different hospital situations in which they were placed. The students' comments have also indicated that the use of the OBE approach to their curriculum was successful in terms of collaborative, active learning. There were no students who found group learning to be ineffective, even although it is known that some of them do not "like" group-work. The classroom became a learning community where everyone learnt from everyone else (Wilson & Ryder, 1996).

### 4.2.4 Conclusion

It would appear from the discussion in this section that the teaching and learning strategies used in the first year programme were successful in developing workplace skills because they involved the student in actually "doing" the skill either in the classroom or in the practical laboratory. A few students and supervisors felt that patient care and communication was better taught using a "real" patient and that they would prefer to visit the hospitals earlier in their first year. Students also felt that critical evaluation of radiographs in the classroom should include abnormal films and that physiology should rather be taught in second year. This needs to be addressed through a curriculum review.

## 4.3 STUDENTS

The student is the most important stakeholder in the tertiary institution and is the whole reason for its existence. The most effective teaching and learning strategies are not necessarily a guarantee that students will be successful. There are many personal factors that affect how a student will learn and acquire the necessary skills (Cove & Love, 1996). Most first year students come fresh from high school to the higher education institution where they are expected to be responsible for their own learning and cope with large workloads. This places enormous pressure on students and can affect their learning if they are not able to adapt. This section will deal with the personal issues that our students faced in their first year of study and how these impacted on their development of the CCFOs. It will include the insecurities, fears and stresses experienced, the building of confidence and self-esteem and motivation/inspirations. These will be discussed in terms of the findings, examples from the interview data, discussions and links to theories and literature where applicable.

### 4.3.1 Negative Personal Issues

Students had to adjust to a number of different situations during their first year of study. All of them entered higher education for the first time and some left home for the first time. All of them had to form new relationships. They came from different backgrounds and situations and all arrived with different expectations of tertiary education (Pascarella & Terenzini, 1991). These impacted on their studies in some way.

Students felt that a sense of insecurity and inferiority had held them back in certain areas such as being involved in the life of the academic and workplace institutions.

> "We were included, but I think we do feel inferior.... We were invited to Christmas parties or whatever parties they were having, but you know, I think we prefer the company of, you know, each other in first year"

> "Meetings and stuff. We didn't really go to them, we didn't really feel it was necessary to go because they the ones that are qualified and we wouldn't have any.. um .. sort of input or any changes in whether we went or we didn't go to their meetings"

Students felt left out of the non-technical areas of hospital life. They did not feel that they were totally a part of the institution. This seems to stem from feelings of insecurity or inferiority. They felt they were merely students and didn't have a contribution to make. This was echoed by one supervisor who felt that students lacked maturity. Another suggested that students needed a good attitude to their learning. This could possibly be because they did not become involved in non-academic activities on campus and had not gained confidence in these areas. This is a weakness on the part of the DIT as can be seen by the student's comments below.

> "You know for that week of meetings, everybody found, some people found they were wasting their time because it's like they felt like nothing was going to be done either way because like we know this department so well. We can tell them whatever we want to tell them, but nobody takes what we say to heart"

This is one student's perception of what happens, but it needs to be heard. From the student's point of view the department did not take their comments, opinions and requests seriously. This is not conducive to holistic learning where students' social and emotional needs should be met (Cove & Love, 1996). If students do not or cannot learn the skill of being involved in all aspects of their learning on campus they will not be able to transfer it into the hospitals where they are expected to become professionally competent. Professional competence has been discussed in the literature survey in chapter two. This competence includes both technical and non-technical aspects of a student (Hager, 1993). Radiographers are required to be competent in their techniques (taking x-rays), but they are also required to uphold professional codes of conduct and behave in a responsible manner in order to be deemed professionally competent (Holmes, 1992). They need to know how

all aspects of the department and hospital function. These are all taken into consideration when assessing student competence in the hospitals.

The students stated that time was a major problem that prevented them from becoming involved in other activities on campus. All of them have placed great emphasis on the time factor. This will be discussed again in the next section, but is noted in relation to this section.

> "No at Tech we actually didn't. We didn't coz our schedule was very tight so at Tech you don't have time to go and play sports or do anything else. You just got to study and that's all"

> "Well, the lecturers always say we have to have a social life, but I mean you can't have a social life and still expect to achieve at, like Tech so..."

> "And then also what's worse is if you traveling from far places, that you .. waking up early in the morning and getting home late in the afternoons. You tired, you eat, do your homework, still have time to study, still have time to do your assignments, it's hectic!"

These comments indicate that there is an imbalance in the students' lives. They are expected to have relaxation time, but in their opinion the curriculum has made this almost impossible. This is the students' perception, but for them it is real and has caused great stress for them. It indicates that the curriculum is too full and needs to be reviewed. The use of OBE has increased the students' workloads because of the greater amount of work that they are required to do on their own. Students need to be involved in the review of the curriculum so that their "voices" can be heard. A curriculum placed more within the emancipatory paradigm (Grundy, 1987) may be able to address this problem because there would be a closer relationship between students and lecturers. It is easy for lecturers to dismiss students' complaints about workload as a lack of good time management, but in this study the problem has emerged too often to be ignored. Students need to be involved in

outside activities and literature suggests that this involvement improves their academic performance (Pascarella & Terenzini, 1991).

#### 4.3.1.1 Summary

Negative influences in the students' lives impacted on their ability to acquire certain skills on campus (Pascarella & Terenzini, 1991). It is interesting to note that none of the students mentioned personal problems in terms of their home life. This could be because the students themselves didn't feel they were important, or they didn't think of them during the interviews or they did not want to discuss their home problems with the interviewer.

### 4.3.2 Positive Personal Issues

The students identified a number of positive factors that influenced their development of CCFOs. Many of the skills were taught on campus and then reinforced in the hospitals because of the positive aspects of the environment there.

#### 4.3.2.1 Positive Issues at Hospitals and DIT

Students felt that their levels of confidence were high when they went to the hospitals. These confidence levels were improved by just being in the hospital.

> "I think when we started at the hospital, the majority of us spoke with confidence there because we were placed in a real working situation which we haven't been there before. ... So that, I think, I think that made us more confident – being able to communicate better with everybody.."

> "... also if you have a problem working in a team or a problem with one of the other students or a qualified you knew how to handle it – to go to someone else and deal with it so they can't say anything nasty about you'

This confirms that the experiential learning situation had a very positive influence on students (Kerka, 1998). Communication and problem solving skills were learnt on campus, but were reinforced by working in the hospitals where students experienced their learning in the real world (Candy & Crebert, 1991). This is an example of the successful transfer of a skill from campus to workplace. The students were able to learn the skills in one context and then transfer them to another context. This is supported by the constructivist theory of learning. Students felt confident in the hospitals and this enhanced their learning and motivated them (Kerka, 1998).

In the classroom students were told about life in the hospitals in an attempt to encourage and motivate them to want to improve their knowledge both on campus and in the hospitals. The students felt that this was effective as they found the hospitals very motivating and inspiring. Most of them took the initiative and went out of their way to learn more – even to the point of extending the bounds of the scope of practice.

> "Yes, I know at one hospital they had a theatre case and I said, "It's Friday afternoon, no patients coming in. Can I go to theatre?" and they said, "Why, you know you not allowed", but they allowed us to go.... You were allowed to go and see things which made it easier to learn and every patient presented with something different"

This student developed the skill of wanting to improve her knowledge, but pushed it beyond the bounds of her scope. First year students are only permitted by law to work within the scope of their training. She had gone into the operating theatre that is out of bounds to first years. This could have constituted a breach of professional conduct if something had gone wrong. However, it has indicated that students are motivated and inspired to improve their knowledge. DIT certainly succeeded with this student. There was one supervisor, however, who felt that students still needed to learn this skill and needed to be willing to learn and have good attitudes to learning.

#### 4.3.2.2 Personal Attributes

Some students felt that there were skills that could not be taught in the classroom, but were inherent attributes that students either had or did not have. These skills were: improving knowledge, communication, reflection and time-management.

> "I'd say it was 70% personal. Some people are happy with not having the full understanding and knowing that's all you want from us. But I need to know if there is more to it, otherwise I can't learn it"
>
> "No, it's just a drive that you have to want to excel"
>
> "If you're a shy person I don't think you can learn how not to be shy. So it was about like that. … they cannot teach you how to speak to a patient"
>
> "No, I don't think so because you can't force me to reflect because it is my thing and it is part of me. You can't force me. If I don't like I can hide my things, I can protect myself."
>
> "No, it *(reflecting)* comes naturally, ja.
>
> "Ja, I'd say it's something inside you which you have to decide like what you have to do, what you don't have to do, how much time you've got. Because like I mean I can tell you how to do certain things, but you go home and do the exact opposite"

The above comments indicate that some students felt that personality had a lot to do with whether a skill (CCFO) was developed or not. There were mixed feelings about this. As can be seen some felt that certain skills could not be taught and others felt that the skills were already inherent within a person. These were possibly reflections of their own personalities and may not have been general statements about others. It raises the question as to whether these are indeed skills (that can be acquired) or personality attributes (that a person is "stuck" with). It would be interesting to ask these same students about the same skills once they have completed their studies to ascertain whether or how their personalities

changed during their training (Pascarella & Terenzini, 1991). Perhaps a lack of confidence is a hindrance in the acquisition of these particular skills and with time and experience this could possibly change. Literature suggests that students change emotionally during their years of study and that personal traits affect the style of a person's professional competence (Holmes, 1992).

### 4.3.3 Conclusion

Students felt that personal issues affected their learning in some way. The negative issues like insecurities, lack of confidence, time constraints and certain personal attributes hindered the learning of certain CCFOs. There were personal issues that had a positive influence on both their performance and their learning such as a sense of confidence and a desire to learn more and extend their knowledge.

## 4.4 DIT AND HOSPITALS

Students were exposed to a variety of environments both on campus and in the hospitals. All of these environments had an impact on the students' learning experiences and activities – some positive and some negative. In this section the students' comments have focussed on: the support and encouragement received (or not received) on campus and in the hospitals, the preparation and orientation of students for and in the hospitals as well as the time constraints experienced on campus and in the hospitals. These have all had some kind of influence on the development and application of CCFOs.

### 4.4.1 Support and Encouragement

Students need to be in a supportive learning environment where the transfer of knowledge and skills is considered to be an important learning outcome (Shepherd, undated). The support and encouragement that they get (or don't get) from both academic and hospital institutions will impact on their learning experiences. Students worked under the guidance of lecturers on campus and their supervisors (qualified radiographers) in the hospitals.

They had different experiences in the hospitals and on campus – some good and some bad. It is not possible to make a judgment as to whether these perceptions were real or not, but for the students they were and need to be taken seriously.

#### 4.4.1.1 Negative DIT Experiences.

Some students felt that DIT had not provided a supportive environment from a personal perspective and that their personal problems were not being taken care of. Although they were able to use their problem solving skills in the learning environment, they felt that they needed help with solving certain personal issues that were too big for them to handle on their own.

> "I think as the Tech you must take good care of us. Like for myself, I'm from far away from part of KZN and I had to struggle with accommodation and nobody helped me. That is why I had to change to the other hospital, but I don't like working in Durban. I do like Maritzburg, but the problem is accommodation".

> "The department itself because some other departments are concerned with their other.. they are concerned with the problems of their students, so I think the department itself should take responsibility."

The student in the first example was placed in a Pietermaritzburg hospital, but was compelled to move to Durban because she could not solve her accommodation problem. Although accommodation during work placements is not the DIT's responsibility she felt that it should be. She has, in her mind, had to compromise her experiential learning because she ended up in a hospital where she was not happy. The student in the second example had similar feelings about the need for the department to help them solve their personal problems. This was the feeling of a few students. They felt that their very own department did not care about their personal issues so they felt abandoned outside the safety of the warm and friendly classroom (Biggs, 1999) environment. Feelings of emotional insecurity and lack of faith in their department can affect the holistic learning process (Cove & Love,

1996) that focuses on the emotional, intellectual and social needs of the students. The question is who is responsible for the emotional and personal needs of students – academics (faculty), student affairs or both? According to students the academic department should be responsible. There needs to be more involvement of the department with the students' problems (Pascarella & Terenzini, 1991).

#### 4.4.1.2 Negative Hospital Experiences.

This lack of support was also perceived by students to be present in the hospitals – support from patients and staff. Many of them could not solve problems regarding the patients. They felt that the patients became nervous when being x-rayed by a student. All students are ethically bound to identify their "student" status to the patients before commencing with an examination. Students felt that this was a barrier to effective communication because the patients appeared to have no confidence in them.

> "But some of them *(patients)* once you tell them you are a student they so scared because of the examination, they think you gonna mess up"

> "It's different when dealing with the patient because some of them don't wanna, they don't wanna talk quickly. They don't even wanna hear from a student. The point that you are a student – it's making them feel that you are a nonsense, ja."

If the patients had no confidence in the students it was because they would not perceive them as being competent because competence is the confidence that someone has that a person can perform well (Holmes, 1994). First year students were already grappling with the issue of self-confidence because of the new situations they found themselves in, so having to deal with these types of patients made them feel even less confident. In the medical profession student doctors in the USA are only exposed to real patients in their third year (Mangan, 2004), unlike radiography students who start working with them at the end of their first year. It is only in the workplace that students will learn to deal with these different types of situations even if they have learnt communication skills in the classroom.

One of the supervisors felt that the skill of communicating with difficult patients should be learnt in the hospitals and not on campus. It would be impossible to teach students about every possible type of patient, but from the students' comments they need to know how to react to this particular situation. This could be included in the experiential curriculum by making it part of the learning outcomes – dealing with difficult patients.

#### 4.4.1.3 Negative Experiences with Supervisors

Some students felt that there was a lack of support from their supervisors in the hospitals. These were the people who were meant to encourage and assist them in making the transition from the classroom to the workplace an enjoyable and exciting experience (Shepherd, undated). Unfortunately, the students found that the workplace was not filled with "nice" people.

> "...work with a different qualified that actually shouts at you. So if you keep a patient with you for more than twenty minutes in the room they'll shout at you – What you doing with the patient?"

> "You can transfer it *(teamwork)* into the hospital with certain people. Other people don't take to it very easily – they insist they have all of the experience and you just have to stand and watch them."

The students' first experiences of hospital life were not all pleasant. They had been taught skills such as time management and teamwork in the classroom and were ready to apply this to the work situation, but lack of support and encouragement made this difficult for them. In the first example the student's time management skills were questioned and he was reprimanded for taking too long when x-raying the patient. A lack of confidence or a sense of insecurity in this new environment caused the student to take his time when doing x-rays for fear of doing the wrong thing. This supervisor's response did not build confidence in the student, but rather added to his feelings of insecurity (Pascarella & Terenzini, 1991). Professional competence cannot be obtained under these circumstances.

Students cannot transfer skills taught in the classroom if they are not given the necessary support and encouragement in the workplace (Shepherd, undated).

Some supervisors do not include the students as part of the team when x-raying patients as can be seen in the second example. Teamwork was learnt on campus and students were keen to participate in their new workplace "communities" (Lave & Wenger, 1991), but were forced to stand on the periphery and observe because supervisors were too busy to allow students to get involved. This does not promote transfer of skills from classroom to workplace and it goes against Vygotsky's theory that learning is a social activity (in Riddle, 1999). This problem could be solved by having specifically appointed clinical tutors/mentors in the hospitals. Many supervisors identified this as an urgent need. This was identified in the pilot study of the questionnaire by a supervisor who felt very strongly about the need for clinical tutors. A number of students felt this lack of support from supervisors at the beginning of their experiential learning, but fortunately there were some good experiences of support and encouragement at DIT and in the hospitals.

#### 4.4.1.4 Positive Experiences at DIT

Students felt that on the whole most of their experiences at the DIT were positive and that they were treated well by the academic staff. Help was offered when it was needed and appropriate guidance was given during the development of workplace skills on campus.

> "Sometimes you can pick up certain stuff by your own, but then sometimes it is helpful for you to be told that this is where this links with that. Most times you can pick it up on your own"

> "Yes, lecturers made themselves very much available so if we weren't able to see them today, we could see them another time."

When relating parts to the whole and looking for links between subjects and topics and between theory and practical the students felt that most times they were able to cope, but

that they did need some help from lecturers at times. Once the links had been pointed out the students were able to identify other links for themselves. An outcomes driven curriculum (Lethbridge College, 1998) was used and this made it easier for students to see the links and integrations. On campus they learnt how the parts fitted into a whole when they could see how their subjects linked with each other and then later how the classroom learning related to the workplace. This skill was enhanced through the assistance given by lecturers. Students appreciated the availability of the lecturers on campus as this helped them feel secure and gain confidence.

#### 4.4.1.5 Positive Experiences with Supervisors

There were some good experiences in the hospitals as well as some bad ones. In spite of the bad examples already mentioned above some students felt that generally they had been treated well. The supervisors spent time with them when critically evaluating their films and assisted them with this. The students were thus able to improve the problem solving and critical thinking skills that they had learnt on campus. They were allowed time on quiet afternoons to reflect on their work and analyse their radiographs under the guidance of the supervisors (Riddle, 1999). This type of learning is a good example of what should happen in a curriculum based in the emancipatory paradigm (Grundy, 1987). Most of the supervisors felt that a clinical tutor should be specifically appointed to provide this type of close collaboration with students as they themselves were too busy "doing the job".

> "We were able to do it well in the hospitals. The qualifieds there did allow us every now and then when we had time – particularly on a Friday when patients were a bit slower – to take time and evaluate the films."

> " Ja, they ask you. And when the x-ray is done they sit with you, with the x-ray and you start telling them what is wrong with the anatomy....coz we were taught evaluation at Tech..."

"... and evaluating the radiographs was good because when like the tutors here ask us questions on, you know, what's this and what do you think this is? Right, you know it"

Students were able to build their confidence levels and therefore become more competent by being given a safe and encouraging environment to work in (Biggs, 1999). They were not pressured by time constraints and were able to work co-operatively with the supervisors. There was good collaboration between students and supervisors. In this way students were also able to participate more in the community in which they worked (Lave & Wenger, 1991) and learn in a social context and see the significance of their classroom learning in the workplace (Fink, 2003). Most students felt that the supervisors were co-operative and helpful. One student commented that the supervisors were able to point out the links between theory and the real thing. This reinforcement helped students "believe" what they had learnt on campus, giving credibility to the lecturers. The student in private practice felt that she had received excellent support from her radiologists because they encouraged a culture of learning for all staff in their practice. Their practice was a learning community of practice.

#### 4.4.1.6 Summary

The importance of support and encouragement, especially in their first year, was highlighted by the students in their comments and opinions. They seemed able to cope with the few negative incidents that occurred in the beginning and learnt that people are different and that there will always be problems and conflicts to deal with in the work situation. Their group work experiences on campus taught them to deal with different types of people and be tolerant of differences.

### 4.4.2 Preparation and Orientation for Hospitals

Entering the world of work for the first time could have been a very daunting experience for the first year students if they had not been prepared in some way for this experience.

The students had divided feelings about the way they had been prepared for the hospitals. Most of them felt that the DIT had prepared them not only in terms of skills, but psychologically as well (Bawden, 2000). They felt that the lecturers had given them glimpses into hospital life by using examples and telling them throughout the year what to expect when they got there. They were able to see how the classroom learning fitted into the big clinical picture.

> "The lecturers were always there and telling us – this is important and this could happen in the hospital situation. They kept on preparing us for the hospital situations – that this would happen and that would happen. And it's true – all that did happen"

Examples used in the classroom were taken from the real life experiences of the lecturers who work in hospitals on a locum basis. As one student said, "Seeing is believing". By providing examples that were real, students could contextualise their learning and thus make it meaningful (Kerka, 1997). This type of preparation (relating the theory to the clinical) for the workplace appears to have been successful as students were confident and easily able to transfer their skills and knowledge to the workplace situation. The curriculum was contextualised to meet the needs of the student – which was to learn how to be a radiographer in a hospital – thus aligning the curriculum to the needs of students and employers (Biggs, 1999).

#### 4.4.2.1 DIT

There were some students who felt that the DIT had failed in preparing them for what they had to face in the hospitals. These weaknesses related mainly to patient communication. Students felt that perhaps it was not possible to prepare students on campus for this unless real patients were used as previously mentioned. Simulations and role-play were helpful, but did not adequately represent the real thing because sick people were very different from healthy peers and skeletons. Part of the problem in communicating with patients was that

some students could not speak the patients' language – Zulu. All non-Zulu speaking students felt the same.

> "When we first arrived at the hospitals we didn't know what to say. This was orientation, it was hard for us to actually communicate. It took about two weeks to get used to the people at the hospitals.."

> "I don't think we would have been prepared for that *(patient communication)* yet. It's scary. Hospitals are scary, especially the first time. You don't know anybody. You haven't touched a patient before. You've just been doing x-rays on a skeleton..."

> "I think the Tech should offer Zulu, especially in Psychodynamics. We have a patient coming in, we don't understand them and we can't keep calling a qualified and saying "Sorry, can you please translate." OK hand signals we can use sometimes, but that's to a certain extent.... I think we should have Zulu"

In the health professions patient communication is one of the most important CCFOs. Patient care is emphasized in all medical teaching programmes and hospital policies. It has also been identified as a skill that is lacking in medical students (Mangan, 2004). It has been suggested that students can learn from the patients themselves and that the patient becomes the "text" for the student (Spencer, 2003). This makes it even more important that students in a medical programme should be able to relate to and understand the patient. Being able to speak the patient's language is a skill that enhances patient communication and care. It allows the patient to relax and relate more meaningfully to the health care worker. Radiography students have identified this as a weakness in the curriculum and as mentioned previously have turned to their Zulu-speaking peers for assistance. The curriculum should meet the needs of the community (Bertram *et al.*, 2000) and in KZN the majority of patients in state hospitals are Zulu-speaking and many cannot speak English. Language skills are therefore important and should be included in all curricula.

#### 4.4.2.2 Hospitals

Some students stated that they had problems adjusting their time management skills to the hospital situation. They had learnt how to manage and control their personal and work time very well in the classroom and laboratory at DIT, but in the hospital it was different. They felt that they were not prepared for the strict time controls in the workplace. On campus they had worked in a fairly relaxed environment, but in the hospitals they were required to be professional, efficient and quick at all times.

> "OK, when I first came I wasn't able to manage my time in the general room taking x-rays because doing x-rays on a skeleton compared to a patient a skeleton is easier and a patient is a bit harder so I had to get used to that. I had to adjust myself to work fast at it and know my work and hands so that I can be faster at what I'm doing..."

> ""Ja, I was excited when – I was excited, but I found it difficult for me to cope. I got hungry and tired from standing for so long and they don't let us sit down. Folding your arms, they don't let us. So you have to be active from 08.00am up until 4.00pm and its *(tea)* a short time – fifteen minutes sitting, eating and then another time its 30 minutes *(lunch)* – few time. You stand a long, pushing beds, stretchers. Eishh"

Learning to manage personal and work time are all part of becoming professionally competent. In the medical fields time management is important because the "clients" are sick people who need to be dealt with quickly, but not made to feel that they are being rushed. Tea and lunch times need to be strictly adhered to and at times are even sacrificed. Emergencies are part of the daily routines where health workers are required to "think on their feet" (Schön, 1987). This means having to work (and think) fast, but accurately. This skill comes with competence and requires time to master. Students felt that they needed a period of adjustment in the hospital before they could work fast. Some of the supervisors felt that students needed more time in the hospitals in order to build their confidence levels. Competence can only be truly achieved in the workplace by working on real patients

(Storey, 2001). It needs practice and comes with experience. The students felt that they needed this time to adjust to the new environment with its new stresses (real patients). Their tea and lunch breaks even seemed to be too short for them in the beginning and their bodies took time to adjust to being active all day.

#### 4.4.2.3 Summary

Learning skills in one context (classroom) and then transferring them to another context (hospitals) requires some kind of adjustment period. Students need to adapt to their new environments even though they do have the required skills. They need time to de-contextuialise and re-contextualise their knowledge and skills (Kerka, 1997). This time of adjustment will depend on each student's individual capability and is all part of becoming competent. These periods of adjustment need to be acknowledged and accounted for in the workplace curriculum so that supervisors' expectations of a first year student are not unrealistic as was suggested in the study by Mangan (2004).

### 4.4.3 Time Constraints

Time management is a skill where a person is able to control his/her own time where possible. According to the students they were able to learn this skill on campus and then apply it in the hospital. Time, however, could not always be managed and students identified this as being a major problem both on campus and in the hospitals. There were time constraints that they felt they had no control over. Time, in fact appeared to control them. This caused much stress and prevented them from learning the skill of being involved in the "life" of the institutions (campus and hospitals). These time constraints – not to be confused with time management - were identified by all the students.

#### 4.4.3.1 DIT Time Constraints

The students felt that they had no time on campus to enjoy the activities that most other students were able to participate in. They had not been able to take part in any of the extra curricular activities and sports on campus because of the way their timetable was

structured. Most days they had lectures the whole day and ended at about 1500hours and there was no time for fun. The word "stress" emerged in all the student interviews and was repeated a few times by each student. They felt that this was beyond their control and that they had no power to change it. Supervisors agreed that stress management was a skill needed by students to help them cope with their busy lives.

> "There was no like fun. The only fun you have is with your friends and it's like, um, a Radiography student's day is like hectic compared to the other students. We have lots of long lectures for one subject and then we have small breaks sometimes. It's not easy."

> "... You never get to see those things in first year. So it's like you actually don't even know who is Miss DIT and where's Mr. DIT."

> "Like as I travel, by the time I get home it's already dark so there's not much that I can do . .... Joining like certain sports club like cricket or soccer then I know I won't have the time to be able to do anything."

> "We have no time to be a part of SRC. We have no time like the other faculties, they have enough time so, enough time to do everything."

The students all felt that they had too many subjects and that the timetable was too full. Any small breaks they had, they spent in the library or sitting doing work in a quiet corner of the campus. They had no time to relax and have fun. Some students traveled from far every day to attend lectures so they had the added stress of traveling - leaving home early and arriving back late in the evenings. It is said that students need to be involved in "other" activities to enhance their academic performance (Pascarella & Terenzini, 1991). They need a balanced life where academic, social and emotional needs are met (Cove & Love, 1996). Students felt that the DIT focused too much on academics and not enough on the students themselves. The radiography curriculum is structured in such a way that first year students carry a large load. As mentioned previously students felt that some of the work

could possibly be done in second year as it was not relevant to first years. A change in curriculum structure would help to resolve this pressure. There is the danger that students could become discouraged by the negative experience of these time constraints resulting in their withdrawal from both academic and social aspects of the institution (Pascarella & Terenzini, 1991). Students may then become susceptible to depression and become de-motivated. This would negatively affect their learning (Cove & Love, 1996).

#### 4.4.3.2 Time Constraints in Hospitals

The same time constraints mentioned above were also experienced by the students in the hospitals. They all felt that things in the hospitals were rushed because of the excessively large numbers of patients every day as well as the staff shortages in all hospitals. This placed a lot of stress on the students who had been taught at DIT that as first years they should not work alone, but should be under the close supervision of a supervisor when working with patients. They felt that there was no time to practice their skills properly and correctly because they were being rushed by busy supervisors.

> "Otherwise we didn't really get time to critically evaluate every film that we did. We could look at it and say, "I've got what I needed. It looks OK, I could've changed this or that, but it looks diagnostically acceptable"

> "It was, but not like all the hospitals don't do the same patient care and like because in the hospitals they rushed for time. If you busy then it's like you don't get to do the proper patient care. Sometimes you rushed to do it like anyhow because you have to do it quickly, so that's where the difference is"

> "You just work and work and work! I think the only time you have is tea or lunch and that's mostly... With night duty some of the time it's not that bad. That's when you have time where you just sit and think *(reflect)*."

Radiography students were sent to the workplace to learn all aspects of the "job" of radiography. Supervisors were expected to work with the first years and guide them to a

point where the student would feel confident to work alone. Students would thus move from the periphery where they began by observing to full participation (Lave & Wenger, 1991) in the community of radiographers. This could only have happened if they had been guided by the supervisors in an active collaborative environment as suggested by Vygotsky's Zone of Proximal Development (in Riddle, 1999). It appears that in the hospitals students were being thrown in the deep end and left to sink or swim. One of the supervisors even felt that this was the best way for students to learn. Supervisors have always felt very strongly about having tutors in the hospitals to work with students, but the question has been who would employ this tutor – hospitals or DIT?

The students' comments in the examples above indicate that they felt they were being forced by circumstances to compromise on the quality of their work. There was no time to critically evaluate their films, no time to provide the correct standard of patient care and communication and no time for reflection. Settling for second best will not produce professional competence in a student. Competence cannot be achieved if professional standards are not being met (Storey, 2001). This is especially important in the profession of radiography, where a service is being provided to the public using dangerous radiation that needs to be monitored carefully according to medico-legal standards. Standards are important in health care professions and are closely controlled by professional bodies.

Students indicated that they had no time to reflect in the hospitals so they found it difficult to reflect on their practice (Schön, 1987). This is the same problem mentioned by Baird (1997) who states that radiographers tend to focus on getting the job done as quickly as possible. Large workloads make it difficult for radiography students to stop and reflect on what they are doing during the day. Time is needed to reflect and record thoughts as quickly as possible. If the recording is done later it compromises the reflection process (Smith, 2004).

According to various policies all experiential learning must be assessed and the assessment strategies should include portfolios where the student is able to actively reflect on his/her performance in the workplace and produce authentic evidence (CTP, 2003; DIT, 2005; Forbes, 2005). Currently reflective practice is not included in the assessment of experiential learning in the radiography workplace in KZN. It needs to be incorporated into the DIT curriculum for experiential learning so that professional competence can be assessed according to the requirements of the DIT policy for experiential learning. If students are required to produce reflective portfolios as part of their assessments they need time to be able to reflect actively. This is a problem in the radiography departments where students are at times regarded as an extra workforce to help relieve the workload. The skill of reflection is an area that needs further attention at DIT especially in the experiential learning situation. The use of a portfolio would be a useful learning and assessment strategy

#### 4.4.3.3 Summary

The problem of time affected the students academically, socially and personally and they felt helpless in solving the problem. On campus they were rushed and could not enjoy life as students like their peers in other departments did. They focused on academics and did not have time for fun activities with their fellow radiography students. This same time problem followed them to the hospitals where students did not have time to perform to the standard they had been taught and had no time to practice self- reflection. Experiential learning assessment by DIT does not currently include a portfolio or reflective practice and needs to be addressed in the curriculum so that it is line with the various policies.

### 4.4.4 Conclusion

Students received both good and bad support and encouragement on campus and in the hospitals. Generally they felt that the support received was good with the occasional bad example. They felt that more attention needed to be given to their personal problems by the DIT. Patients treated them well most of the time, but they did encounter some who were

not prepared to be x-rayed by students. Time was a problem on campus and in the hospitals where students felt stressed and unable to become involved in "outside" activities like other students or reflect on their practice. Although this was a problem the students did cope and managed to reach the end of their first year in one piece. The positive experiences seemed to have outweighed the negative, but there is a strong indication that the curriculum needs reviewing especially in the assessment of experiential learning.

## 4.5 DEVELOPMENT OF CCFOs

The students' and supervisors' perceptions were explored in this study and the results of this exploration have been discussed in detail above. A summary of these perceptions is included in this section to round off any loose ends that may have been left untied and give focus back to the research questions.

### 4.5.1 Students' Perceptions

All students felt that the technical aspects (techniques) were taught well and that they had acquired the appropriate technical skills needed for the hospitals. This was achieved by applying theoretical knowledge in the practical sessions. Problem solving, communication, team work, critical evaluation, time management and cultural sensitivity were skills that students felt they had best acquired during their group work in the classroom and radiography laboratory on campus. The group work, film viewing and practical sessions were often mentioned as being successful teaching methods for these skills. Patient care and cultural sensitivity were learnt in a theory lecture where role-play, simulations and case studies were used to contextualise the learning in the absence of the "real thing".

Students felt that they had successfully learnt how to see "the big picture" in terms of how all their subjects related (or did not relate) to each other and the workplace. They were able to use this skill to enhance their learning. Using technology and equipment safely was learnt both in the theory lecture as well as in the practical sessions in the laboratory where

students were able to apply and reinforce the theory immediately. Students felt that they had been motivated to want to improve their knowledge and skills by the DIT. They were eager to learn new things in the hospitals and were able to apply this because the supervisors and doctors explained things to them and taught them when they asked for help.

Students did not feel that they had adequately acquired the skill of reflection as they were constrained by time both on campus and in the hospitals. They were able to do inner reflection in the reflective assignments, but felt that this skill still needed much more attention. The skill of participating in the life of the institutions was not acquired as students felt they had no time to engage in "other" activities on campus even though some of them wanted to. In the hospitals they felt that as students they did not have the confidence to participate and this held them back.

### 4.5.2 Supervisors' Perceptions

In general the supervisors felt that students were able to perform the techniques well and very few problems were experienced with the technical skills. Supervisors felt that communication and using equipment safely were well taught on campus and students had transferred these skills successfully to the workplace. Most of them rated patient care and cultural sensitivity as being either satisfactory or well done. Problem solving, teamwork, time management, critical evaluation, relating the theory to the clinical (big picture) and improving knowledge were mostly rated as having been satisfactory. Critical evaluation, reflection and being involved in the life of the institutions were rated by most supervisors as being either poor or satisfactory.

### 4.5.3 Areas of Consensus/Disagreement

The supervisors' perceptions were not too different from those of the students. Both felt that communication and using equipment safely were well done and both felt that reflection and participating in the life of institutions were not well done. Students felt that they had

acquired the skill of critical evaluation, but supervisors seemed to disagree with them on this CCFO. This could be due to the fact that the supervisors were more experienced in this skill and possibly had unrealistic expectations of the first year students. The other skills were generally rated as having been satisfactorily acquired. A few supervisors identified stress management as a skill that students needed in order to cope in the hospitals. The students all stated that they experienced stress so this seems to be a life skill that they need in addition to the CCFOs. Some supervisors commented on the fact that students needed to be "willing" to learn, should have good attitudes and a pride in themselves and their profession. These are attributes that students will no doubt acquire as they mature and gain more experience. The supervisors' perceptions have helped add validity to this study as there appears to be a general consensus between the perceptions of the students and the supervisors.

## 4.6 TRAINING GAPS

Data obtained from the students and supervisors helped identify some of the training gaps in the first year radiography curriculum at DIT. These will be listed below and discussed further in the next chapter where suggestions for improving the curriculum will be given. The gaps identified were:

- Need for more exposure at an earlier stage in training to "real" patients
- Need to visit hospitals earlier in the first year or spend more time in the hospitals.
- Clinical tutors needed in the hospitals to work with the students.
- Better preparation for the workplace in terms of orientation before and at the time of commencing experiential learning –-time to adjust.
- Teach Zulu to non-Zulu speaking students.
- Curriculum is too full – Physiology should be moved to second year.

- Give more attention to students' personal and social problems and allow them time to get involved in other activities.
- Experiential learning not assessed adequately – only technical skills assessed. Not aligned to policy requirements – no reflection, no portfolios.

These gaps were found in the hospitals as well as on campus. The first three gaps mentioned and the last one relate to the students' experiential learning in the hospitals while the fourth, fifth and sixth gaps need to be addressed on campus. All of the training gaps are linked to the curriculum and can be addressed through a change in this area. These gaps will be discussed in chapter five where recommendations will be suggested and concluding remarks will be made.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

## 5.1 INTRODUCTION

In this study the perceptions of the DIT first year student radiographers who were placed in Pietermaritzburg hospitals for their experiential learning, as well as their supervisors, were explored in terms of the development of the South African CCFOs. This was done in an attempt to understand the problems in the workplace so that changes could be made to the curriculum. It was hoped that these changes would promote more effective learning and transfer of the CCFOs to the workplace. The main focus of the study was on the voices of the students because this appeared to be an untapped source of data in radiography. The results obtained were discussed in detail in chapter four and will be drawn together in this chapter where concluding comments will be made.

The training gaps identified in the previous chapter will be addressed in this chapter and recommendations will be made for improving the curriculum in order to close the gaps. Areas for further research will be identified as well.

## 5.2 CONCLUSION

This study was born out of a need to understand the real problems experienced by students and supervisors in the radiography workplace. Supervisors were saying that students did not know how to speak to patients, solve problems, work as team members or manage their work (time). When questioned, students usually felt that they had no problems with these skills. It was therefore necessary to obtain a better understanding of this problem through formal research. The results will hopefully be used to improve or change the curriculum so that students from DIT will meet the needs of the workplace in terms of the required

CCFOs. The students were interviewed and the supervisors were given questionnaires to complete. All questions related to the CCFOs.

The results showed that the students were satisfied with the way they had been taught the CCFOs using the OBE approach and its appropriate teaching strategies. They had learnt most of the CCFOs with the exception of reflection and participating in the life of the institutions. There was an overwhelming support for the use of group work in the classroom and many of the skills were learnt during these group sessions. Wherever possible the students were required to actually perform the CCFOs in the process of learning the course content so they learnt by doing and found this to be a successful strategy. The learning activities were similar or the same as what they did in the workplace making them relevant, significant and meaningful. Most of what the students did and learnt on campus was found to be the same in the workplace.

Reflection and participating in the life of the institutions were not successfully taught in the classroom. The students attributed this to the fact that they had no time. Their timetable was too full and the workplace was too busy for them to take "time out" to practice these skills. In spite of the great stress that this placed on students they managed to survive their first year and move on into second year. They were given two assignments during first year that required reflective reports to be written. These were apparently not sufficient to teach students the skill adequately. The type of reflective practice required in radiography is an on-going process that should happen continuously and cannot be learnt by doing a few "once-off" reports in assignments.

The supervisors' perceptions revealed interesting similarities to those of the students. Contrary to what they had been saying over the years, the supervisors agreed that students had learnt how to communicate with patients, manage their time and work, solve problems and work as team members. They agreed with the students that reflection and participating in the life of the institution were weaknesses in terms of the CCFOs.

The results of this study have reinforced the effectiveness of the OBE approach to teaching radiography in the first year. Students did not at any stage say that they did not like group work. The OBE approach is very social and this obviously appealed to the young people who enjoy "chatting" to their peers. Their social skills were channelled into a useful direction. The learning activities in the radiography classroom were collaborative, active, participative, significant and relevant to the workplace – all characteristics of OBE. Although this study did not set out to evaluate the teaching and learning strategies used, it has indeed done so. The approach used appears to be successful in teaching not only the course content, but workplace skills as well.

Reflective practice and involvement in the institution were not taught well due to the time constraints placed on students. But one cannot entirely blame the time factor. These skills may possibly not have been given enough attention by the lecturers, thus making them difficult for students to learn. Students were never asked to actively reflect on a daily or even weekly basis so they did not place importance on this skill. They were also not encouraged by lecturers to participate in outside activities on campus or in the hospitals so it is no wonder they did not acquire these two skills. Yes, time was a factor, but this cannot be cited as the only reason. The assessment of experiential training does not make provision for any type of reflective practice on the part of the students. It merely assesses the technical skills and some scientific knowledge. The assessment strategies used do not align with the DIT experiential learning policy that requires students to reflect on their practice. It is therefore not possible to determine whether students have acquired the skill or not because there is no authentic evidence to go by and this skill cannot be assessed by observation only.

The students' voices were heard in this study. Their perceptions formed the main part of the data. Although these inputs were based on perceptions it was interesting to note that everything they said could be supported by literature. The data they provided was rich and full of useful and interesting information due to the maturity and insight with which they

answered the interview questions. Their inputs could be used for a number of publications in the future. It was encouraging to see the similarities between the students' and supervisors' perceptions. This suggests that perhaps the students' voices are in fact reliable and should be taken more seriously. This would result in them being more involved in matters outside the classroom – if we believed in them.

A number of other issues emerged from the student data that were indirectly related to the CCFOs, but were relevant and important. These issues were used as categories in the discussion of results and became the subheadings in chapter four. Apart from the teaching and learning issues already mentioned, students identified issues such as negative and positive personal issues that affected their learning. These all influenced whether they felt secure and confident or not both in the hospitals and on campus. They experienced a lot of stress due to the full timetables and large workloads. Some were afraid of their supervisors and others felt insecure with real patients. The "busyness" of the hospitals resulted in students having to compromise on their professional standards and this caused conflict within them. In spite of these negative issues most students managed to "swim" rather than "sink". They received the support they needed in the classroom, but due to the staff shortages in the hospitals supervisors were not always able to give the students the assistance and guidance needed by a first year. The hospitals did not have dedicated student tutors and all supervisors were part of the general workforce who worked under great pressure to get through the work quickly. Students therefore tended to "stick together" and help each other. Hopefully this was not a case of the blind leading the blind!

Students were prepared by the DIT for the workplace, but this seems not to have been enough. Arriving in the workplace was a shock to the system for many students and a time of orientation just before going to the hospitals as well as on arrival would have helped them adjust and "find their feet". This would have served as a small bridge from campus to hospital, making the transition a little smoother. Students would then have been able to see their part in the big team.

A number of training gaps were identified in the analysis of the data and were listed at the end of chapter four. These will be discussed in the next section and recommendations will be made for improving the curriculum in order to address the gaps. A curriculum is needed that will meet the needs of the students, the workplace and the institution.

## 5.3 RECOMMENDATIONS

Many students felt that they needed to have access to real patients earlier in their training. This was endorsed by some of the qualifieds as well. This problem could be solved by sending the students to the hospitals for a short introductory experiential learning session one third of the way through their programme. Students could be given simple outcomes to achieve while in the hospitals e.g communicating with patients, preparing equipment for examinations, cleaning the darkroom processor, performing administrative procedures and filing x-rays. These would need to be incorporated into the curriculum and students would need to produce authentic evidence that they had achieved the outcome. This would allow the students to have more time in the hospitals, be exposed to real patients and be prepared for the big experiential block at the end of their first year.

The training of clinical tutors/mentors would allow the students to focus on becoming professionally competent by doing things correctly from the beginning. This person would ensure that all students were working within their scope of practice and would provide the guidance needed for students to develop to their full potential. They would also assist the student with personal issues and help them become involved in the life of the hospitals. The problem surrounding this idealistic suggestion is the question of who would employ and pay this person. Hospitals are wanting their money's worth from their employees in terms of "doing the job" of x-raying patients and the DIT has no financial resources to afford the luxury of having a staff member working off-campus. Perhaps the solution is to appoint a few part-time DIT tutors who would cost less than permanent staff. These part-time tutors could work flexi-time and cover all hospitals every day, even if it was only in the

mornings. They could also be responsible for the assessment of students in the hospitals and could assist them with their reflective practice skills.

If the problem of the overloaded timetable could be solved the students would be able to participate in outside activities on campus. This may even enhance their academic performance because they would be more relaxed and would be enjoying a more holistic learning experience. This can only be addressed by changing the curriculum through the correct DIT channels as it would involve the movement of subjects from one level to another e.g. physiology. The DIT is currently reviewing all curricula so this needs to be addressed in the new curriculum. Appropriate subjects or topics should be taught at the appropriate levels and subjects should be integrated to make them meaningful and relevant to what the student will do in the workplace. This process has already started and the new curriculum will be introduced in 2007. It would be advantageous to "test" it in 2006 if possible.

The experiential learning component of radiography training is not currently being assessed according to the new DIT criteria. Although the workplace learning is part of the curriculum it has not yet been integrated into the qualification outcomes. The assessment focuses only on the technical skills of the student and does not take into account the attitudes and professional aspects. Students do not reflect on their workplace experiences and portfolios have not yet been introduced as assessment tools. This should be included in the curriculum with clearly stated learning outcomes and their assessment criteria. Again this process has already begun at DIT and the employers and students have been included in the review of the curriculum. As important stakeholders the students' voices have been heard and they have already made valuable contributions to the new curriculum. Hospitals have been extensively consulted on workplace issues and their inputs have been incorporated into the draft qualification documents. The teaching, learning and assessment strategies are still to be worked on, but these need to include the use of reflective portfolios so that students can learn the skill. The use of portfolios will also provide a holistic and

authentic assessment of a student's performance in the hospitals. It would be an ideal method of assessing professional competence where performance would be measured against a set of minimum professional standards. These minimum standards for radiography in South Africa are currently being worked on by the Standards Generating Body and it is hoped that they will be in place before the new curricula are implemented.

The ideal curriculum for radiography should be situated somewhere between the practical and emancipatory paradigms. This would help students to develop a closer relationship with lecturers who would not carry all the power. Students would be responsible for their own learning and would develop critical reflective skills that would enhance their professional competence. During the current curriculum review the DIT should make an attempt to shift the curriculum towards the emancipatory paradigm so that it can be sure of producing the reflective practitioner that is needed by the profession and the workplace. Students would then be able to take ownership of their learning and form collaborative relationships on campus and in the hospitals. The DIT and the hospitals should also make a greater effort to form these collaborative relationships between themselves so that experiential learning can become truly integrated with academic learning.

## 5.4 CONCLUDING REMARKS

This study has brought to light a number of important curriculum issues that have already begun to be addressed through the curriculum review at DIT. It has also focused attention on the students and the problems they encounter both on campus and in the hospitals. It is hoped that through this study their issues will receive attention as indeed some already are. The gaps that motivated this study have been addressed. Training gaps identified by the study have also been addressed and suggestions have been made to rectify them. There is a need for further research in the area of assessment of experiential learning.

The following questions have emerged from this study:

- What outcomes do we need to assess in the workplace?
- How do we best assess these?
- What are the competency standards for radiography at first year level?

These areas need further research as a matter of urgency in order to align them with both national and institutional policies. The field of radiography is under-researched, but contains a wealth of data waiting to be uncovered by aspiring researchers both in the qualitative and quantitative paradigms.

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# APPENDIX A

## THE SOUTH AFRICAN CCFOs

## AND ADAPTED CCFOs

## FOR RADIOGRAPHY

**ADAPTATION OF THE SOUTH AFRICAN CCFOs FOR RADIOGRAPHY FIRST YEAR TRAINING**

| SOUTH AFRICAN CCFOs (SAQA,1997) | ADAPTED CCFOs – NUMBERED AS THEY APPEAR IN THE SUPERVISORS' QUESTIONNAIRE |
|---|---|
| | 1. Perform radiographic techniques correctly (Not a CCFO) |
| 1. Identify and solve problems in which responses that display that responsible decisions using critical and creative thinking have been made. | 3. Identify problems and solve them using critical Thinking. |
| 2. Work effectively with others as a member of a team, group, organisation or community. | 4. Work as a member of a professional team. |
| 3. Organise and manage oneself and one's activities responsibly and effectively. | 5. Manage time and work effectively. |
| 4. Collect, analyse, organise and critically evaluate information. | 6. Critically evaluate and analyse request forms, radiographs and patient case sheets/notes. |
| 5. Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation | 7. Communicate effectively with staff, patients and peers<br>2. Practice good patient care. |
| 6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others. | 8. Use equipment and accessories safely and responsibly |
| 7. Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation | 9. Relate the theory to the clinical situation (able to see the big picture) |
| 8. Reflecting on and exploring a variety of strategies to learn more effectively. | 10. Reflect on work and improve it by making necessary changes. |
| 9. Participating as responsible citizens in the life of the local, national and global communities. | 11. Participate in the "life" of the department/hospital |
| 10. Being culturally and aesthetically sensitive across a range of social contexts. | 12. Be sensitive to all cultures and environments |
| 11. Exploring education and career opportunities. | 13. Eager to improve knowledge and skills and find out new things. |
| 12. Developing entrepreneurial opportunities | Not applicable to First Year Students therefore not used. |

# APPENDIX B

## RADIOGRAPHY TEACHING STRATEGIES

TEACHING / ASSESSMENT STRATEGIES

**Theory Lecture**

- Used to introduce the topic for the day
- Used to explain difficult or new concepts
- Students take notes

**Group work**

- Students work in groups of 4 – 6.
- Worksheets are given to students – these contain a number of activities for discussion.
- Each activity has a time allocation
- Students discuss the topics and refer to various books and study handouts.
- Leaders and timekeepers are elected.
- Work covers the topic for the day
- All work covered in these sessions and the lecture is assessed in a theory paper

**Practical**

- Students work in pairs and help each other.
- Time limits are set.
- Practical done is relevant to the topic of the day – application of theory.
- Students take x-rays of a skeleton (as if it were a real person)
- Students are assisted by the laboratory tutors.
- Practical assessments are conducted on work done in these sessions

**Film Viewing Practical**

- Students work in the same pairs as for the practical.
- Radiographs taken during the practical session are viewed and evaluated according to set criteria.
- Anatomical structures are identified and named – working together.
- The quality of the radiographs is assessed and improvements are suggested.
- Time limits are set for this activity.
- Film viewing assessments are done working with a "strange" partner.

**Individual Assignment**

- Students work on their own
- A first draft is marked and returned to the student for improvement
- Students learn to use the library, gather information, analyse it, use it in a written discussion and present it in the correct format
- Correct referencing techniques are learnt
- Strict due dates and times are adhered to

**Group Assignment**

- Students work in groups of 4/5
- The topic is handled by all students.
- Meetings are held to discuss the topic and information obtained.
- Detailed minutes of meetings are taken to verify the discussions
- First draft is marked and returned to students for improvement
- Reflective report is written by each student indicating their contribution and role in the assignment, how they handled problems and what they identified as their own strengths and weaknesses
- The group allocates an individual mark to each student out of 20 with a reason for giving the mark
- All members put together the final draft
- Final draft contains the assignment, minutes of meetings, reports and individual group Marks
- Each student receives an individual mark based on the EVIDENCE supplied

**Peer Assessment**

- Students mark each other's assignments and film viewing assessments and oral presentation
- These marks do not count towards the final mark

**Reflective Report**

- These are done for both the assignments
- They are marked according to set criteria and marks are allocated
- Marks contribute a small percentage towards the final mark.

**Oral Presentation**

- Each student presents a certain aspect of the group assignment
- Presentations are done in front of 2 groups and the examiners – not the entire class
- Students are peer – assessed but marks do not count

**Experiential Assessment**

- This is a registered subject that is assessed
- Students are assessed in the hospitals while x-raying a patient
- Technical aspects are assessed using set criteria
- Scientific knowledge is assessed orally as applied to the examination the student is performing
- Pass mark for competence is 70% and students are permitted to try until competence is reached
- Marks obtained count towards the final Pass or Fail

# APPENDIX C

## SUPERVISORS' QUESTIONNAIRE

FROM:

Lynda Swindon,
64 Macleroy Road,
Northern Park,
Pietermaritzburg, 3201.

Dear Colleagues,

I am currently doing my Masters in Education (Higher Education) through the University of KwaZulu Natal. My research paper deals with the preparedness of student radiographers for the workplace in terms of certain critical skills. Radiography is in the process of developing a new curriculum and the results of this research could help the academic institution with this process.

I have enclosed a questionnaire that I would ask you to complete for me. This questionnaire will help to identify the strengths and weaknesses of the first year radiography course in preparing students with the necessary skills for the workplace. All information given by you will be confidential and will only be used for the purposes of this research paper. All opinions are entirely your own, based on your own experiences with the current **SECOND** year students.

Please could you complete this questionnaire and hand to your Chief radiographer or to myself. I appreciate your participation and thank you in advance.

Thank you,

In case of queries please contact:

Researcher: Lynda Swindon – phone: 031 2042450 (w) OR
Supervisor: Ruth Searle – phone: 033 2606250

24 June 2005.

## CONFIDENTIAL QUESTIONNAIRE

Please complete this questionnaire as honestly as you can. The information contained in your answers will be confidential and is to be used for research purposes only.
This questionnaire pertains to the **current second year students** who rotate through your hospital.

### SECTION A

Gender:..... Rank: .....

Present place of employment: .....

When did you qualify: .....

At which institution did you train? .....

At which hospital/s did you do your clinical training? .....

How long have you worked with students? .....

What additional qualifications do you have? .....

.....

---

### SECTION B

Indicate how you think the DIT has prepared the current second year students in terms of the skills listed in the table below.

1 = not at all/poorly. 2 = satisfactorily. 3 = fairly well. 4 = very well. 5 = excellently.

Space has been provided for your comments/observations.
These are your own personal opinions and will be help us to improve our curriculum.

| | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| 1. Ability to perform general skeletal radiographic techniques correctly<br>**Comments:** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 2. Practicing good patient care<br>**Comments:** | | | | | |
| 3. Ability to identify problems and solve them using Critical thinking.<br>**Comments:** | | | | | |
| 4. Work as a member of a professional team<br>**Comments:** | | | | | |
| 5. Manage their time and their own work effectively<br>**Comments:** | | | | | |
| 6. Critically evaluate and analyse request forms, radiographs and patient case sheets/notes<br>**Comments:** | | | | | |
| 7. Communicate effectively with staff, patients and peers.<br>**Comments:** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 8. Use all equipment and accessories safely and responsibly. (this includes the darkroom)<br>**Comments:** | | | | | |
| 9. Ability to relate the theory to the clinical situation<br>**Comments:** | | | | | |
| 10. Ability to reflect on their work and improve it by making the necessary changes.<br>**Comments:** | | | | | |
| 11. Ability to participate in the "life" of the department/hospital<br>**Comments:** | | | | | |
| 12. Be sensitive to all cultures and environments<br>**Comments:** | | | | | |
| 13. Be eager to improve their knowledge and skills and find out new things.<br>**Comments:** | | | | | |

**SECTION C**

**In your opinion:**

1. Which of the skills listed in Section B can be taught at the DIT? (Give a reason/s for your answers)

2. Which of the skills listed in Section B can ONLY be taught in the hospital? (Give a reason/s for your answer)

3. With regard to the areas where the DIT has NOT adequately prepared the students, how can these skills be taught to the students?

4. Are there any skills NOT been listed in Section B that students should be taught? (Where and how should these skills be taught?)

**THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.**
**Lynda Swindon.**

## APPENDIX D

## STUDENTS' INTERVIEW

## GUIDELINES

**RESEARCH INTERVIEW**

**GUIDE TO QUESTIONS**

**Introduction:**

Thank you for taking the time to speak to me. I need to reassure you that this is confidential and your name will not be mentioned at any stage.

The information you give me will be used only for the purposes of this research. I need to use a tape recorder because it would take too long for me to write everything down now. The tapes are for my records only and are not submitted as part of the research. Are you happy with this. Do you still wish to continue?

You have just begun your second year of study and have had time to practice in the hospitals as a first year student. I will be asking you questions that relate to the skills you learnt while you were in my first year class so you need to cast your mind back to the way you were taught in first year.

I need you to be very honest with your answers and comments as these will help us to improve our curriculum. If you feel very strongly about something feel free to express those feelings.

Are you comfortable? Can we begin?

**Main Questions – a guide only:**

(Other questions will be asked around these)

I am going to ask you to think about how well (or not well) the DIT provided you with the necessary skills to cope in the hospitals.

I will go through a list of skills and I want you to discuss these with me and give your honest and personal comments on:

a) Did DIT teach you the skill or not?

b) How did they teach you the skill?

c) Where and by whom can this skill best be taught?

d) How can this skill best be taught?

1. Perform general skeletal radiographic techniques.
2. Practice good patient care?
3. Solve problems and think critically?
4. Work as a member of a professional team?
5. Manage your own time and work effectively?
6. Critically evaluate and analyse request forms, radiographs and patients' case sheets?
7. Communicate effectively with staff, patients and peers?
8. Use all equipment and accessories safely and responsibly? (incl. Darkroom)?
9. Be able to relate the theory to the clinical situation?

10. Reflect on your work and improve it by making the necessary changes?

11. Participate in the "life" of the hospital?

12. Be sensitive to all cultures and environments?

13. Be eager to improve your knowledge and skills and find out new things?

**Extra Questions:**

Are there any skills that you found you did not have, but should have had when you went to the hospital?

Where and how should these be taught to students?

## APPENDIX E

## LETTERS TO HOSPITALS:

**Northdale**
**Greys**
**Edendale**
**Reply from Northdale**

64 Macleroy Road,
Northern Park,
Pietermaritzburg,
3201
24 June 2005.

Dr. Vather,
Hospital Manager,
Northdale Hospital,
Pietermaritzburg.
3201.

Dear Dr. Vather,

ATTENTION: MRS. V. DADDY

RESEARCH QUESTIONNAIRES FOR QUALIFIED RADIOGRAPHERS.

I am currently busy with my Masters in Education and part of the research component involves a questionnaire for all qualified radiographers in the Pietermaritzburg state hospitals. My topic is the development of workplace skills in terms of the South African critical cross-field outcomes. I would like to obtain the perceptions and opinions of the radiographers who have worked with our current second year students so am asking your permission to administer these short questionnaires in your x-ray department. They do not involve patients in any way.

If you require a copy of the completed dissertation I will be happy to provide one for your records.

For any queries you may have please contact me at:
Email: lyndas@dit.ac.za
Phone: 031 2042450 (work)
033 3942587 (home)

or my supervisor Ruth Searle at
Email: searle@ukzn.ac.za
Phone: 033 2606250

Many thanks,
Regards,

Lynda (Swindon)

64 Macleroy Road,
Northern Park,
Pietermaritzburg,
3201
24 June 2005.

Dr. A. Stoker,
Radiologist-in-charge,
Greys Hospital,
Pietermaritzburg.
3201.

Dear Dr. Stoker,

RESEARCH QUESTIONNAIRES FOR QUALIFIED RADIOGRAPHERS.

I am currently busy with my Masters in Education and part of the research component involves a questionnaire for all qualified radiographers in the Pietermaritzburg state hospitals. My topic is the development of workplace skills in terms of the South African critical cross-field outcomes. I would like to obtain the perceptions and opinions of the radiographers who have worked with our current second year students so am asking your permission to administer these short questionnaires in your x-ray department. They do not involve patients in any way.

If you require a copy of the completed dissertation I will be happy to provide one for your records.

For any queries you may have please contact me at:
Email: lyndas@dit.ac.za
Phone: 031 2042450 (work)
033 3942587 (home)

or my supervisor Ruth Searle at
Email: searle@ukzn.ac.za
Phone: 033 2606250

Many thanks,
Regards,

Lynda (Swindon)

64 Macleroy Road,
Northern Park,
Pietermaritzburg,
3201
24 June 2005.

Mr. S. Halimana,
X-Ray Department Manager,
Edendale Hospital,
Pietermaritzburg.
3201.

Dear Mr. Halimana,

RESEARCH QUESTIONNAIRES FOR QUALIFIED RADIOGRAPHERS.

I am currently busy with my Masters in Education and part of the research component involves a questionnaire for all qualified radiographers in the Pietermaritzburg state hospitals. My topic is the development of workplace skills in terms of the South African critical cross-field outcomes. I would like to obtain the perceptions and opinions of the radiographers who have worked with our current second year students so am asking your permission to administer these short questionnaires in your x-ray department. They do not involve patients in any way.

If you require a copy of the completed dissertation I will be happy to provide one for your records.

For any queries you may have please contact me at:
Email: lyndas@dit.ac.za
Phone: 031 2042450 (work)
033 3942587 (home)

or my supervisor Ruth Searle at
Email: searle@ukzn.ac.za
Phone: 033 2606250

Many thanks,
Regards,

Lynda (Swindon)

64 Macleroy Road,
Northern Park,
Pietermaritzburg,
3201

24 June 2005.

Dr. Vather,
Hospital Manager,
Northdale Hospital,
Pietermaritzburg.
3201.

Dear Sir,

ATTENTION: MRS . V. DADDY.

RESEARCH QUESTIONNAIRES FOR QUALIFIED RADIOGRAPHERS.

I am currently busy with my Masters in Education and part of the research component involves a questionnaire for all qualified radiographers in the Pietermaritzburg state hospitals. My topic is the development of workplace skills in terms of the South African critical cross-field outcomes. I would like to obtain the perceptions and opinions of the radiographers who have worked with our current second year students so am asking your permission to administer these short questionnaires in your hospital's x-ray department. They do not involve patients in any way.

If you require a copy of the completed dissertation I will be happy to provide one for your records.

Many thanks,
Regards,

Lynda (Swindon)

Questionnaires x 9

4.

## APPENDIX F

## EMAIL TO HEAD OF DEPARTMENT

# Mail Message

Close Previous Next Forward Reply to Sender Reply All Move Delete Read Later Properties

Print View

**From:** Ann Hesketh
**To:** Lynda Swindon
**Date:** Tuesday - March 15, 2005 2:57 PM
**Subject:** Re: Research - second year Interviews

Good luck

Ann

>>> Lynda Swindon 3/15/05 2:36:12 PM >>>
Dear Ann,

As part of my M.Ed research I am required to interview the PMB second year students. Please could I have your permisssion to do these interviews while the students are still on campus - starting on Friday 18th March. It may continue for another 2 weeks as well.

Many thanks,
Lynda.

# APPENDIX G

## SUPERVISORS' DEMOGRAPHIC DATA

## QUESTIONNAIRE RESULTS - SUPERVISORS' DEMOGRAPHIC DATA

| Supervisors | Rank | | | Years Qualified | | | Hospital | | | Years with Students. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Junior | Senior | Chief | 0-5 | 6-15 | > 15 | ND | G | EDH | 0-3 | 4-10 | > 10 |
| A | | x | | | x | | x | | | | x | |
| B | x | | | x | | | x | | | x | | |
| C | | x | | x | | | x | | | x | | |
| D | | | x | | x | | x | | | | x | |
| E | | | x | | | x | x | | | | | x |
| F | | | x | | | x | | x | | x | | |
| G | | x | | x | | | | x | | | x | |
| H | | | x | | x | | | x | | | x | |
| I | | | A.D*. | | | x | | x | | | | x |
| J | | x | | x | | | | x | | x | | |
| K | | | x | x | | | | x | | | x | |
| L | | x | | x | | | | x | | | x | |
| M | | | x | | | x | | | x | | | x |
| N | | x | | | x | | | | x | | | x |
| O | | | x | | | x | | | x | | x | |
| P | x | | | x | | | | | x | x | | |
| Q | | x | | x | | | | | x | | x | |
| R | x | | | x | | | | | x | x | | |
| S | | | x | | x | | | | x | | x | |
| T | | x | | | x | | | | x | x | | |
| U | x | | | x | | | | | x | x | | |
| V | | | A.D. | | | x | | | x | | | x |

* AD = Assistant Director (Department Manager)

# APPENDIX H

## SUPERVISORS' RESPONSES TO THE QUESTIONNAIRE

**Summary of Likert Scale Ratings by Supervisors in terms of how well the CCFOs were taught at DIT.**

Numbers within the table indicate the number of supervisors that gave each of the ratings e.g. in the second column 13 supervisors felt that Radiographic Techniques were well taught by DIT.

**Scale:** 1 = Not at all, 2 = Poorly, 3 = Satisfactory, 4 = Well, 5 = Very well.

| LIKERT SCALE RATING | CRITICAL CROSS-FIELD OUTCOMES | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rad Tech | Pt Care | Prob solve | Team work | Time mgt | Critical eval | Comm | Use Equip safely | Relate Theory to Clin | Reflect on pract | "Life" of Dept | Culture & Enviro | Improv Knowl | |
| 1 = Not at all | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **2** |
| 2 = Poorly | 1 | 2 | 5 | 2 | 6 | 8 | 1 | 2 | 3 | 6 | 8 | 1 | 3 | **48** |
| 3 = Satisfactory | 6 | 9 | 13 | 11 | 10 | 10 | 7 | 6 | 11 | 8 | 9 | 8 | 11 | **119** |
| 4 = Well | 13 | 8 | 1 | 8 | 5 | 3 | 14 | 12 | 5 | 5 | 3 | 7 | 5 | **90** |
| 5 = Very well | 1 | 3 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | **10** |
| No response given | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | **17** |

# APPENDIX I

## SUPERVISORS' RESPONSES TO

## THE OPEN QUESTIONS

**Summary of Supervisors' Responses to the Comments/Open-ended Questions on the Querstionnaire**

The numbers appearing in the second and third columns of the table represent the CCFOs as numbered in the Questionnaires.

| Supervisor | Which to teach at DIT | Which to teach only in Hospital | How to teach "bad" ones better | What necessary skills are Missing | Where should missing skills be taught | How should missing skills be taught | Other Comments. |
|---|---|---|---|---|---|---|---|
| A | 11, 12 | 6, 8 | More practicals needed | Patient care | Hospital | DIT clinical tutors in hospital | Not mature to deal with workplace |
| B | 6 | 4, 7, 8, 9 | | | | | |
| C | 1, 4, 5 | 2, 3. 7, 11, 12, | Students must want to learn in hospitals | Understanding of real world. Reasoning. | DIT and hospital | | |
| D | 1, 2, 8, | 4, 3, 5, 10, | 4. Student need good attitude | Personal pride. Egos in check. Work speed. | Hospitals | Closer supervision. Award mark for hospital block. Relevant level of assessment. | Students must be willing to learn. Need a good attitude to work and learning. |
| E | **All (as basics)** | None – need DIT first. | **No problems** | Pride in their profession. Physical appearance. | In classroom, but enhanced by example of qualifieds' conduct | | |
| F | **2, 4, 7.** | 5, (in techniques) | Make them aware of their role in health team. | | | | Need obs and gynae US skills in first year. |
| G | All | 3 In real situation | More clinical time needed. Learn by doing. | No. | | | |
| H | 1, 3, 8, 9 | 2, 4, 5, 6, 7, 10, 11, 12. | Need more time in hospital in first year. Need a mentor to closely monitor & help. | Stress management. | DIT and hospital | Talks by qualified people i.e. social workers. | Need to be more involved in hospital "life" |

| Supervisor | Which to teach at DIT | Which to teach only in Hospital | How to teach "bad" ones better | What necessary skills are Missing | Where should missing skills be taught | How should missing skills be taught | Other Comments. |
|---|---|---|---|---|---|---|---|
| I | 10 | 11 | Have hospital mentor | | | | Students need to know their part in the whole health team. |
| J | 1 (mod views) | 3 (diffic pts.) | Have clinical tutors | No | | | |
| K | 1, 3, 5 | | | | | | |
| L | | | | | | | |
| M | 1, 2, 3, 6, 7, 9, 10 | All basics at DIT rest in hospital. | More time in hospitals | Confidence – ? lack of practice | DIT & hospital | ? | Need more time in hospitals to build confidence. |
| N | | | | Nil | | | |
| O | 1, 2, 3, 6, 8 | 4, 2, 9, 11 | Teach in hospital with clinical tutor. | | | | |
| P | | 2, 3, 4 | | | | | Need to learn by doing in real situation. |
| Q | 1, 8 | All- hands on | Learn by doing | Stress mgt, | Hospital | By experience | Learn by being thrown in the deep end and doing it. |
| R | 6 + Patt recog. | | Do patt recog 1 or 2 a week at DIT | | | | |
| S | | | | | | | |
| T | | | | | | | |
| U | 3, 5, 6 | 11 | Do Patt recog at DIT | Lateral thinking | | | Need more time on evaluating films. |
| V | 1 so student is fully prepared technically | 2, 4, 6. 8. 10, 11, 12, 13 | Provide a clinical tutor at hospitals. | Stress mgt & coping skills. | DIT & hospitals. | Role play in class & actual doing in hospitals. | Need guidance from a clinical tutor most of the time. Request forms only analysed when they have to. |

# APPENDIX J

## RESEARCH DATA CATEGORIES

## DATA ANALYSIS – GROUPING AND CODING OF DATA

**ROUND 1.**

These were *a priori* categories that I needed to look at so I could "compare" students' and supervisors' perceptions of CCFOs.
In rounds 1 & 2 I used the critical skills as the main headings and the categories below as sub-headings, but there was a lot of repetition.

**CATEGORIES:**

- Skills taught sufficiently at DIT.
- Skills not taught sufficiently at DIT
- Skills taught/learnt better in hospitals
- Skills well integrated in hospitals
- Suggestions on how to improve/change teaching.

**ROUND 2**

These were categories that I allowed to "pop" out at me from the data.

**CATEGORIES:**

- Barriers to achieving skills caused by DIT
- Barriers to achieving skills caused by hospitals
- Depends on personality, confidence etc.
- Teaching/Learning methods.
- Other "stuff" of Interest.

**ROUND 3 (re-arrangement of round 1)**

This was just a re-arrangement of data in round 1 using the categories as the headings and CCFOs as sub-headings.

**CATEGORIES:**

- Taught well by DIT
- Not taught sufficiently well DIT (Gaps!!!)
- Integrated well into hospitals
- Suggestions for improved teaching/learning.

**ROUND 4 (Re-arrangement of round 2)**
This was re-arrangement of data from round 2 using the categories as the main headings and CCFOs as sub-headings.

**CATEGORIES:**
Problems/concerns relating to DIT
Problems/Concerns relating to hospitals
Personal capability, personality, confidence, maturity etc.
Teaching/Learning methods.

**ROUND 5 (miscellaneous)**
These were other categories that "popped" out of the data. They were incorporated into Round 6.

**CATEGORIES:**

Other "stuff" of Interest.
Student Suggestions/Missing skills etc.
Benefits of Experiential Learning

**ROUND 6**
In this round I allowed ANY categories to "pop" out – i.e. not related to CCFOs, but anything to do with the students' experiences in their first year of study.

**CATEGORIES:**

**6A - STUDENT ISSUES**
- Issues concerning Supervisors (negative + positive aspects)
- Preparation of students for w/place (done or not done)
- Students fears and insecurities
- Students' stresses.
- Building self-esteem, confidence, competence etc.
- Students personal attributes
- Inspirations, motivations

**6B - LEARNING ISSUES**

- Knowledge is needed first
- Need to learn on/see the "real thing"
- Theory must be integrated with practical for good learning
- Theory done at DIT is easily applied in the hospital (theory at DIT is sufficient).
- Learn with & from Others (Groups, teams)
- Learn by "doing"
- Skills learnt at DIT are applied in hospitals.
- Integration of subjects

**6C - HOSPITAL ISSUES**

- Co-operation & reinforcement received at hospitals
- Time of adjustment needed in hospitals.
- Communication between DIT & hospitals.

**6D - TIME ISSUES**

- No time at DIT
- No time at hospitals
- Need for "fun" time

**6E – OTHER**

- Reflective Practice
- Gaps
- Experiential Learning
- "Other"

This set of themes and categories seemed to have covered all aspects of the data and I felt I had reached saturation point. Nothing else was coming out of the data.
But looking at the research questions and the purpose of the study I saw that I needed to re-arrange this data so that the weaknesses and strengths could be clearly separated for comparison with data from the supervisors.

I went through all of the above categories as well as the interview transcripts and came up with the following themes and categories. These were very similar to those in Round 6 and seem to just be a re-arrangement of the data.

## ROUND 7

**CATEGORIES:**

### A - STRENGTHS:

**7A1 – DIT**
- Effective teaching of skills
- Encouraging/Supporting students

**7A2 – Hospital Issues**
- Support from Staff
- Building Confidence, Competence
- Applying DIT learning/skills

**7A3 – Student Issues**
- Motivation, Enthusiasm, Initiative
- Confidence, Self-esteem
- Attributes

**7A4 – Teaching/Learning Methods**
- Groups, Collaboration, Communication
- Integration
- Time Management
- Critical Reflection/Evaluation

### B – WEAKNESSES:

**7B1 – DIT**
- Time issues
- Preparing Students for Hospitals
- Communication with Hopsitals

**7B2 – Hospital Issues**
- Qualifieds/Supervisors
- Patients
- Time
- Techniques/Procedures

**7B3 – Student Issues**

- Personal
- Study
- Hospital
- Attributes

**7B4 – Teaching/Learning Methods**

- "Real" patients
- Seeing/Working with the real thing
- Reflection/Evaluation
- Missing/Inappropriate teaching, skills etc

| CATEGORIES | STRENGTHS | WEAKNESSES |
|---|---|---|
| **DIT** | **7A1 – DIT**<br>• Effective teaching of Skills<br>• Encouraging/Supporting Students | **7B1 – DIT**<br>• Time issues<br>• Preparing Students for hospitals<br>• Communication with Hospitals |
| **Hospitals** | **7A2 – Hospital Issues**<br>• Support from Staff<br>• Building Confidence, Competence etc.<br>• Applying DIT learning/skills | **7B2 – Hospital Issues**<br>• Qualifieds/Supervisors<br>• Patients<br>• Time<br>• Techniques/Procedures |
| **Students** | **7A3 – Student Issues**<br>• Motivation, Enthusiasm, Initiative<br>• Confidence, Self-esteem<br>• Attributes | **7B3 – Student Issues**<br>• Personal<br>• Study<br>• Hospital<br>• Attributes |
| **Teaching/Learning** | **7A4 – Teaching/Learning Methods**<br>• Groups, Collaboration, Communication etc<br>• Integration<br>• Time Management<br>• Critical Reflection/Evaluation | **7B4 – Teaching/Learning Methods**<br>• "Real" patients<br>• Seeing/Working with the real thing<br>• Reflection/Evaluation<br>• Missing/Inappropriate teaching, skills etc |

## ROUND 8

This is a further re-arrangement and combination of Rounds 6 & 7 where categories have been collapsed and incorporated into others to reduce the amount of data being analysed. These are the categories that will be used in the reporting of the findings.

## CATEGORIES

**Teaching/Learning**

- The "real" thing - (including "Seeing/working with the real thing")
- Integration/Application - (including "Knowledge/Theory")
- Collaboration – (including "Groups & Communication")

**Students**

- Negative issues – (including insecurities, fears and time)
- Positive issues – (including confidence, motivation/inspiration, attributes)

**DIT/Hospitals (Institutions)**

- Support/Encouragement
- Preparation for workplace – (on campus and at hospitals)
- Time constraints

**Training gaps**

- To be included in Recommendations/Conclusion.

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Smith, M. K. (2004) *Donald Schön: learning, reflection and change.* [online]. Available from: http://www.infed.org/thinkers/et-schon.htm [Accessed on 4 March 2004].