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The Importance of Teamwork and Understanding: a Study of Shared Learning between Undergraduate Dental Students and Trainee Dental Technicians.

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THE IMPORTANCE OF TEAMWORK AND UNDERSTANDING: A STUDY OF SHARED LEARNING BETWEEN UNDERGRADUATE DENTAL STUDENTS AND TRAINEE DENTAL TECHNICIANS.

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by Michael G Reeson

ABSTRACT

This researcher investigated the professional experiences and development of trainee dental technicians and undergraduate dental students during a shared learning exercise in a combined UK university dental school and hospital. Two purposes framed the investigation: 1. To gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities and 2. To examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages.

Using a qualitative approach with a phenomenological framework, data sources included reflective diaries, focus group interviews and other salient material. Dialogue between the researcher and participants played a major part in ensuring the rigour of the study, participants having the opportunity to review the central concepts and excerpts within the thesis.

Results indicated that both trainee dental technicians and undergraduate dental students were pragmatic but positive in terms of their expectations of shared learning. In particular, they regarded the exercise as useful in terms of communication and understanding each other's role. Overall there was little evidence arising from the data to support issues of power and perceived social and interprofessional hierarchies as impediments to learning. Findings from this study are consistent with previous research into interprofessional education, which demonstrate the significance of preconceptions based upon traditional and perhaps stereotypical perceptions of their own professional status. The students regarded the processes of shared learning as having a positive impact on future interprofessional teamwork.

This empirical study assists in creating understandings about the benefits and limitations to shared learning between these two groups within the dental team. It also contributes to a currently under-theorised account of how relationships developed between these two groups may affect longer-term professional development. Implications are offered for future research involving the investigation that such learning may have on patient care.

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CHAPTER 1: INTRODUCTION

1.1 Background to the study

High standards of both technical and clinical work in dentistry are important to the comfort and health of patients and to the function and appearance of their mouths. Patients do not experience their treatment and care as separate episodes (Fox et al, 2003): the clinical and technical aspects of any procedure, for example the fabrication of a single tooth restoration, are complementary and, while distinct, should not be seen as separate (Pietrobon et al, 2007). Ultimately the professional behaviours, abilities and skills of dentists, technicians and dental technologists reflect the quality of their education, training and experience. The effectiveness of the team is limited both by the standard of the least skilful of its members as well as by the degree to which they co-operate (Nuffield Foundation, 1993). As such a successful outcome of treatment in a health or care setting for the patient depends on two or more people working together.

Historically, the working relationship between dentist and dental technician has always rested on a basis of communication by written prescription with little face to face dialogue, due to the fact that the majority of dental technicians work in laboratories separate from the dental surgery. As a result, both parties have made assumptions, based on their own experience, about the others approach to the needs of the end user, the patient.

Unsurprisingly, this sometimes unreliable means of communication resulted in a variable quality of service (Davenport et al, 2000) and a body of literature exists describing the unsatisfactory interface between clinician and laboratory (Leith et al, 2000; Schneider, 2000; Warden, 2002; McGarry et al, 2004; Tamamoto, 2005; Christensen, 1995; 2005; 2009; Reeson et al, 2005; 2009; Juszczyk et al, 2009; Evans et al, 2010).

There is also a significant body of literature highlighting the poor nature of prescription patterns that contravene the European Union Directives for the fabrication of oral prostheses (Afsharzand et al, 2006; Lynch et al, 2003; Grey et al, 2004; Newsome, 2011). Indeed, in 2007 and 2010 a number of cases, were highlighted in the media (Mail Online, 2007; The Independent, 2010) regarding dentists having fitted potentially dangerous crowns to patients, provoking allergic reactions. In these particular cases work had been sent to overseas dental laboratories where there was no quality control of the materials used and lack of regulation meant there was no way of finding out the exact fabrication materials and construction. As a dentist, there is an obligation to obtain consent for the treatment that is being provided and this means offering the patient a choice of materials. It is professionally unacceptable to make assumptions and worse still to cut corners in the interests of personal gain (GDC, 2005). Dentists and dental technicians do not have an equivalent Hippocratic Oath and it is critically important to point out that this lack of professional testimony and regulation is one of the predicates to the research in this thesis.

Today, patients have become both arbitrators and consumers of medical care (Weiss, 2007), and this necessitates the need to satisfy the demands of well informed and vocal individuals who are prepared to question medical and dental professionals at every turn.

The involvement of the patient in his or her own treatment has become common currency in health care (McCarthy, 1996), and, because expectations have been raised, they must also be met. Although there is substantial literature showing the damaging effect on immediate patient care when interprofessional working is less than effective, (Colwell Report, 1974; Bristol Royal Infirmary Inquiry, 2001; Victoria Climbé, 2003) the longer term view both on patients and the professions suggests that there are perhaps more fundamental reasons why such concerns continue to exist. The literature demonstrates significant conceptual gaps in the relationship between the dental professionals (Nuffield Foundation, 1980, 1993; GDC, 1997, 2006; Lovas et al, 2008; Morison et al 2008; Ross et al, 2009; Evans et al, 2010). This thesis occupies itself with the development of that relationship, and the longer term effect of being exposed to other professionals; considering what residual effects, if any, are the most desirable?

The training of both dentists and dental technicians in the United Kingdom has normally been structured in such a way that the trainee dental technician has only minimal contact, if any at all, with clinical undergraduates during their training. This is due to the wide variety of education providers offering dental technology programmes, many of which do not have established links with dental teaching hospitals. As a result, there is little day to day contact between professionals, the segregation leading to potential difficulties when dentist and technician meet in daily practice (Davenport et al, 2000; McGarry et al, 2004; Christensen, 1995; 2005; 2009).

However, it is essential that a dialogue consisting of informed communication and discussion between technician and dentist takes place in a way that allows the expertise of both to be used to achieve the best possible outcome for the patient (Pietrobon et al, 2007). For example, when a try-in of a denture or a framework try-in for a removable partial denture requires some changes, the dentist should be able to call the technician and describe the changes while the case is fresh in his or her mind; conversely when a decision is made about a complex treatment pathway an informed meeting should take place where each discusses the implications of the decision on overall patient care. Indeed, accurate interpretation of messages is made easier when nonverbal and verbal communications complement each other. Nonverbal cues can be used to elaborate on verbal messages to reinforce the information sent when trying to achieve communicative goals; messages have been shown to be remembered better when nonverbal signals affirm the verbal exchange (Knapp & Hall, 2007). Communication and decision making by writing alone is seldom sufficient (Christensen, 2009; Davenport et al, 2000).

In other professions, such as pharmacy, students work alongside other health and social care students in training for issues as diverse as terminal care planning for example. This type of co-training approach emphasises the importance of communication skills and the importance of listening effectively. Interprofessional dialogues enable students to realise the extent of their differences as well as their similarities, resulting in a rich appreciation of the reason for team working (Lakhani et al, 2008). The study of dispositions has highlighted that there are certain qualities associated with effective relationship building.

This is critically important in professions such as medicine, teaching and social work for example, where the qualities of empathy (Cooper, 2002), caring (Walker-Gleaves, 2010), compassion (Mickel, 2008) and active listening (Fassaert et al, 2007) are essential. Students cultivate and practice such qualities in their day-to-day activities and in their relationships with others within and beyond the classroom.

Closer cooperation between trainee dental technicians and undergraduate dental students during their otherwise disparate courses of training has been suggested as a solution to actual and perceived difficulties in the quality of provision of dental health (Christensen, 1995; 2002; 2005; 2009; McGarry et al, 2004; Reeson et al, 2005; 2009; Evans et al, 2010; Maryan, 2011) and there is a growing belief that training without exposure to clinical dentistry is incomplete (Barrett et al, 1999). For effective team work to take place, it has been established that the team members should have a clearer understanding of one another's role than has previously been the case (Nuffield Foundation, 1980; 1993; General Dental Council, (GDC) 1997; 2001; 2002; 2004; 2006). In the light of this it seems sensible to conclude that bringing together the combined training and experience of both clinician and technician, in other words undergoing interprofessional training during pre-service training, will bring greater benefit to the patient (Challoner, 2002; Warden, 2002; McGarry et al, 2004; Christensen, 2005; 2009). Such interprofessional education is the focus of this thesis. Interprofessional education is a challenge to all professional educators and participant's as the participants inevitably bring with them their essential professional differences and as a result both practical and philosophical barriers exist.

Ginsburg & Tregunno (2005) point out that the strong professional cultures that hinder realization of effective and widespread collaborative practice in the wider health context co-exist, often problematically, with the personal values and priorities.

Historically, health professionals have been established to function as specialised groups, each with their own assumptions, beliefs, identities and practices that constrain the ways that they interpret and act on problems (D'Amour et al, 2005; Oandasan et al, 2005). However, functioning as specialized groups leads to complex cultural developments that begin during training and continue through into practice, such as the formation of well defined professional boundaries (Glen et al, 2002), the presence of stereotypes (Hind et al, 2003) and limited knowledge about each other's roles due to the relative isolation on novice professionals during training (Reese et al, 2001; Drinka et al, 2000). These factors collectively work against effective interprofessional collaboration and it is therefore important to acknowledge the risk of entrenching negative attitudes rather than fostering constructive ones, or at least questioning existing beliefs. Indeed, for interprofessional learning to be successful, prejudices must be broken down, values and beliefs must be explored and practices examined. Above all, there must be willingness among all involved to engage in the process.

Contact theory is one of the theories underpinning much thinking about interprofessional education. According to this theory, interaction between different members of different groups under a controlled set of conditions can lead to a reduction in prejudice (Brown & Hewstone 2005; Allport, 1954). Reduction in prejudice and modifying negative attitude is one of the aims of interprofessional education (Barr, 2002; Carpenter, 1995).

Reflection on the role and importance of “others” leads to better understanding and a more reinforced acquaintance, which in turn, lessens prejudice and breaks stereotypes, thus facilitating environments conducive to collaboration (Lakhani et al, 2008; WHO, 1988). In sum, shared learning with the aim of longer term impact on interprofessional working is clearly important. This researcher investigated the challenges faced by both trainee dental technicians and undergraduate dental students during a shared learning experience in a UK university dental school/hospital.

Two purposes framed this investigation:

- To gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities.

- To examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages.

1.2 The Nature of this thesis

The central thesis of this study is concerned with the challenges faced by both trainee dental technicians and undergraduate dental students during a shared learning experience in a UK university dental school/hospital. Three threads of research are examined: 1. Professional identity formation in the medical and dental profession. 2. Professional training in shaping professional practices and working. 3. Professional educational curricula design.

Currently there is a paucity of research into shared learning between trainee dental technicians and undergraduate dental students and arguably it is both a consequence and a reflection of, the professional practice and learning impediments as well as the contested substantive nature of such curricula. To address shortcomings in the research literature, the experiences of trainee dental technicians and undergraduate dental students working together is the major focus of this thesis and accordingly, examines the experiences and challenges faced by both these groups of students during a shared learning experience in a UK university dental school/hospital.

Proceeding from the study's purposes, the research had the following objectives:

- To examine the experiences and development of trainee dental technicians and undergraduate dental students during shared learning opportunities.

- To examine professional and occupational disciplinary developmental benefits or disadvantages of the shared learning opportunity.

This study therefore explored four main research questions:

- What are the individual students' experiences and perceptions of their team working skills and group dynamics?

- What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?

- Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?

- How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

Adopting a qualitative methodology, the overall goal of this study is to understand trainee dental technicians and undergraduate dental students' experiences of shared learning opportunities and its possible benefits and longer term consequences. As with most qualitative based studies, this study is designed to examine a small group of individuals' lived experiences in a specific context (Rossman et al, 2003). The particular and unique characteristics of this setting and the selection and number of the participants are recognized in that they may therefore limit the transferability of the findings. However, it is hoped that the depth and rigor of this study will illuminate issues which may be concealed in other settings. A single and specific context will be studied, i.e., a Dental Teaching Hospital in the North of England.

Furthermore, the small group of participants will be selected purposefully as they will be students currently enrolled on a recognized training course within a University Dental School/Hospital. It is also important to point out that it is not the purpose of this study to research the effects of the study upon patient care; this will be the subject of a further research study. Figure 1 is a diagrammatic representation of how the research questions addressed the study's major purposes. Figure 2 is a diagrammatic representation of the whole study, showing the relationship between Research Purposes, the research Questions, the Conceptual Content and Data Collection.

Figure 1. Representations of how the research questions address the study's two major purposes

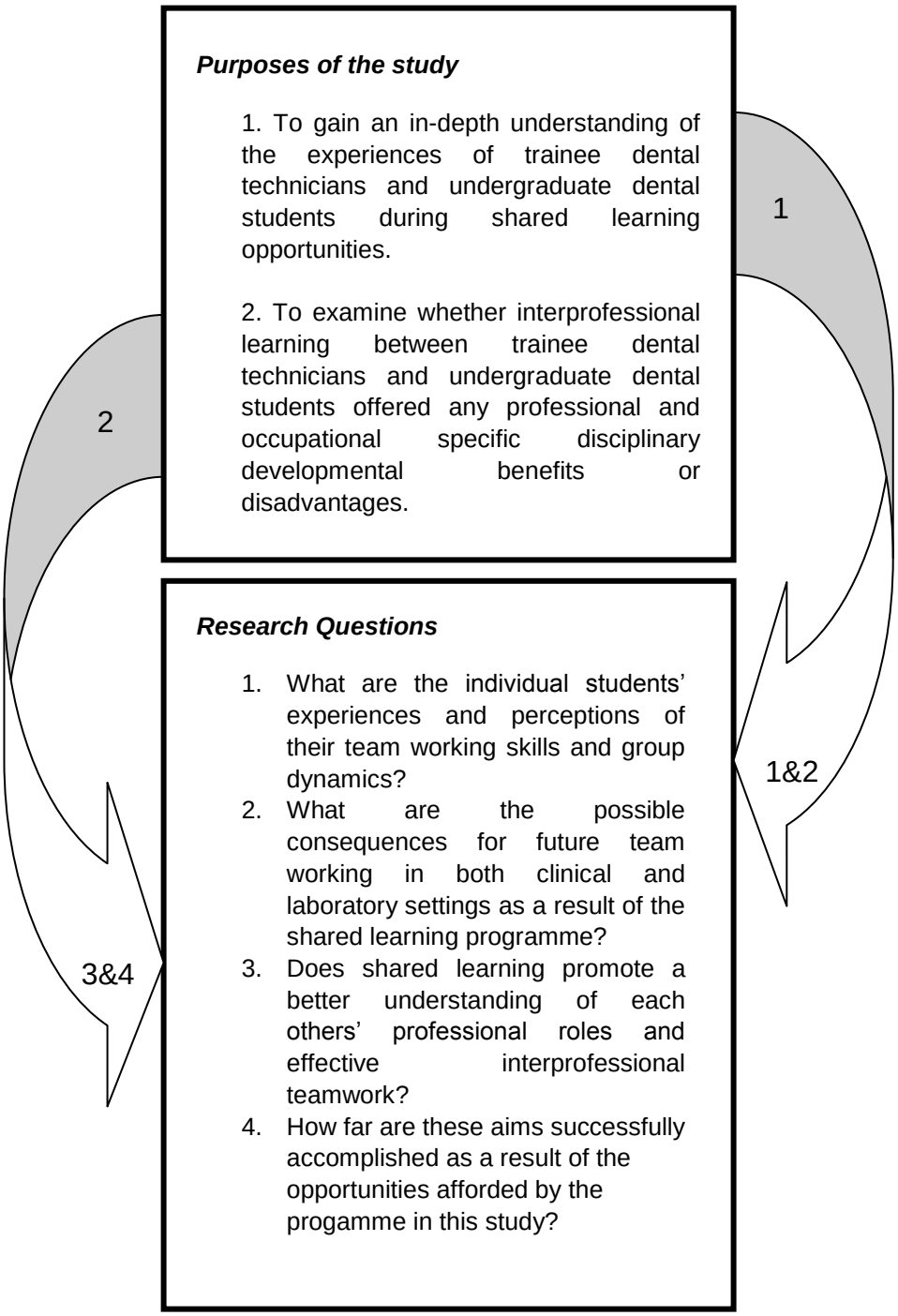
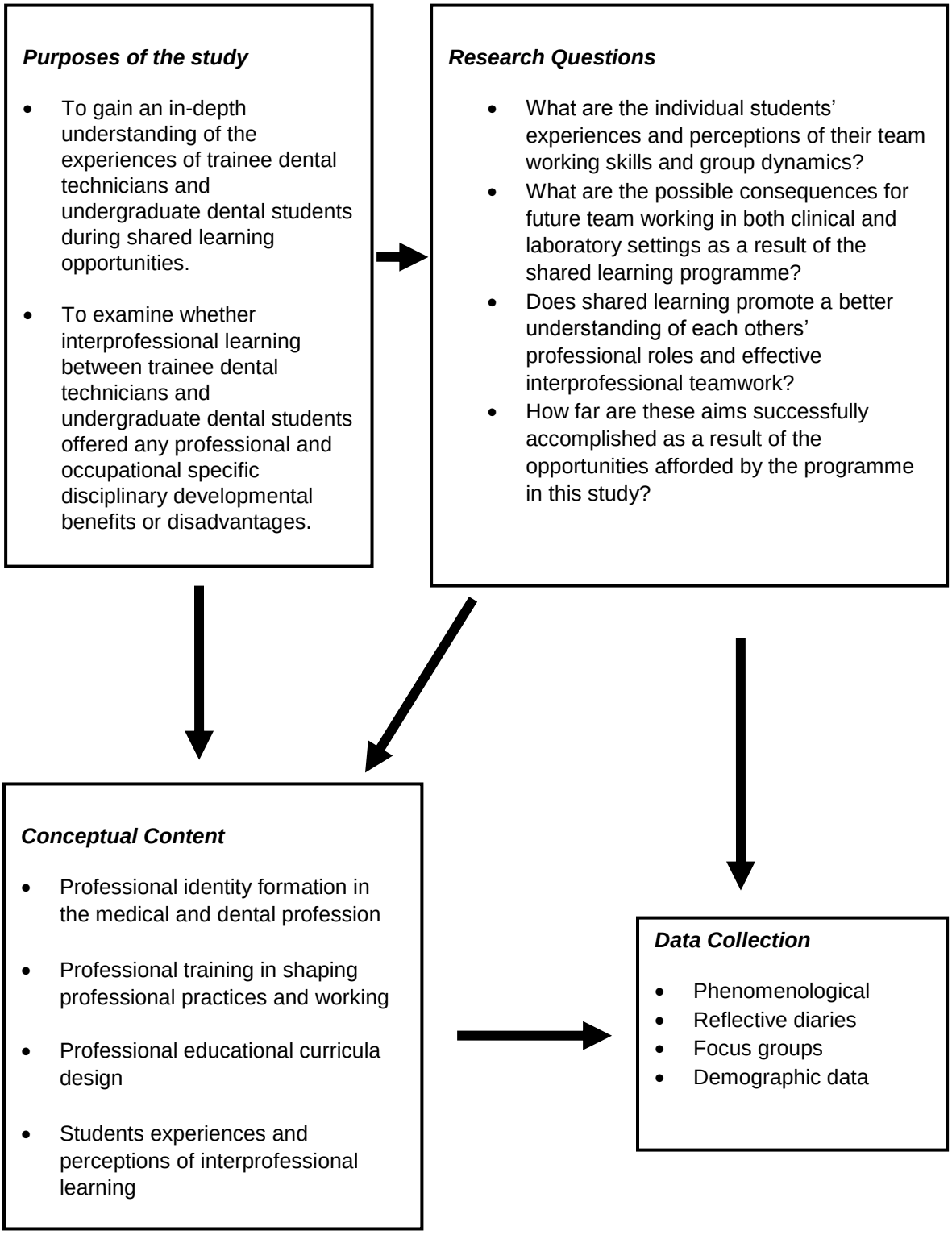


Figure 2. Representation of the whole study



1.3 The Contribution of this thesis

Interprofessional learning (IPE) is well documented in the literature. Across the National Health Service, clinical teams from a variety of professions work together in delivering patient care, with traditional professional roles becoming increasingly challenged by new working practices. Indeed, shared learning between health care professionals in the NHS has been advocated as a means of improving the ability of individuals to work together in optimising patient outcomes (Department of Health (DH) 2000; 2001).

The importance of interprofessional working is a central theme in the Government's health and social care policy (Department of Health (DH) 2000; 2001). Nationally, the promotion of interprofessional learning at all levels is a key UK Government strategy to improve communication and collaborative working to enhance quality care for all service users. One way of contributing to this is for students from different professions to learn together. The General Dental Council (1997; 2002) in its document 'The first five years The undergraduate dental curriculum' suggests that learning opportunities and experiences should enable dental students and those of the professions complementary to dentistry to work and train together. The report goes on to say that there is a need for undergraduates to gain experience of working with Professionals Complementary to Dentistry (PCDs) during the undergraduate programme. The report recommended that funding streams should be identified to ensure those dental students and students of the professions complementary to dentistry (PCDs) have significant and appropriate opportunities to train and work together. This may require dental schools to devise innovative mechanisms through which such experience can be gained.

Within the context of dentistry, there is perhaps the greatest need for a sophisticated account of the importance of interprofessional learning. One of the most important issues arising from the literature is the concept of the dental team (General Dental Council 1998; 2001; 2002; 2004; 2006) and few issues have engendered stronger or more divergent views. For effective teamwork to take place, the team members should have a clearer understanding of one another's role than has previously been the case. In other words, if each can acquire a better understanding of the work of the other, a higher standard of oral health care should result.

This thesis evaluated student experiences of shared professional learning using themes from both the literature and the students' own narratives, and developed a new practice based perspective on shared training between trainee dental technicians and undergraduate dental students. Through these insights, this study may well provide a framework for shared learning between these two groups within the dental team. Within the qualitative design, these student experiences and perspectives upon shared learning and what it may contribute to their own learning will be examined.

Therefore, the study does not simply add to existing research on shared learning between these two professional groups; it contributes new knowledge and original insights into the complex and significantly under-researched area of students' own values, relationships, beliefs and practices resting on their developmental journey. The research does this in three particular ways. First, this research illuminates the shared learning experiences of trainee dental technicians and undergraduate dental students. Second, this research adds to the limited body of information as to whether there are barriers to such learning.

Finally, data gathered as part of this study will be of importance to both academic and vocational educators involved with the training of both dental technicians and dentists. It will also offer information regarding the quality of dental care provision to patients and move forwards the theoretical literature on interprofessional learning. Through these insights a framework for shared learning between these two members of the dental team may well provide a benchmark for other institutions nationally.

The review of the literature that follows is divided into three sections;

- Professional identity formation in the medical and dental profession.
- Professional training in shaping professional practices and working.
- Professional educational curricula design.

The literature review concludes by summarising past and current salient research into interprofessional learning.

1.4 Defining the terms used in this thesis

In this thesis, there are many references to the main participants in the study – the students. In most sections of the thesis, the results for example, for the sake of simplicity the term trainee dental technician is used to describe those students who upon prescription from a dentist construct custom made restorative dental appliances. These students are on a three year technical training programme leading to a qualification as a dental technician.

Likewise the term undergraduate dental student refers to those students enrolled on a five year undergraduate degree programme leading to a qualification as a dentist. The term clinical tutor refers to qualified clinical academics involved in the teaching of the undergraduate dental students. It should also be noted that since the introduction of statutory registration for dental technicians in 2006, the title ‘dental technician’ and ‘dental technologist’ are protected by law. Only those persons with the relevant qualification in dental technology and who are registered with the GDC can use this title. However, there are, for example, researchers in dental materials who call themselves dental technologist’s even though they have no formal training as a dental technician.

1.5 Organization of this thesis

This thesis is organized into six chapters. Chapter 1 presents an introduction and background of the problem as well as an overview of the purposes, research questions, methodological details and limitations of the study. Chapter 2 contains the major conceptual and theoretical framework. Three threads of research are examined: 1. Professional identity formation in the medical and dental profession. 2. Professional training in shaping professional practices and working. 3. Professional educational curricula design. Chapter 3 contains a description of the qualitative methodology undertaken, justifying the phenomenological approach adopted. In addition, the chapter discusses the procedures and methods of collecting and analyzing the data. Chapter 4 includes the findings in the shape of detailed narratives from the participants. Chapter 5 contains a discussion of the findings aligned with the two original purposes of the study and located within the original conceptual threads of the field of literature.

Chapter 6 contains the conclusions and implications of the research study related to its original aims and purposes as well as suggestions for further work in the field.

CHAPTER 2: REVIEW OF THE LITERATURE

2.0 Literature overview

The review of the literature was undertaken with two purposes in mind. Firstly, to situate this study in the body of scientific and expert knowledge on the currently under-theorised literature about the benefits to shared learning between trainee dental technicians and undergraduate dental students. Secondly, to treat the literature as an additional data source for answering the research questions:

- What are the individual students' experiences and perceptions of their team working skills and group dynamics?
- What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?
- Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?
- How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

In order to make sense of the focus of this study, it is important to pursue a theoretical framework in which to place the study. Without a framework, it is difficult to make sense of the subject matter, understand the issues in their broader context, and indeed to place the study findings in an informed and insightful context.

Within the current study in their journey towards becoming healthcare professionals, students develop a range of beliefs and attitudes about the professions for which they are preparing themselves. They develop an understanding about the boundaries of their profession, and the ways in which they may interact with others as part of an interprofessional healthcare team. These sets of beliefs, attitudes and understanding about their roles, within the context of work, generally refer to their 'professional identity' (Adams et al, 2006; Lingard et al, 2002), a concept that is a gradual and evolutionary process of construction and synthesis. The process of professional identity forming is neither linear nor necessarily coherent, resting as it does on individual experience of cultural strength of collective professional identity in training, and underpinning ethos of the training programme. In contrast many studies of professional group formation draw heavily on elements of Communities of Practice research, and in particular, are predicated upon Legitimate Peripheral Participation (LPP) (Lave & Wenger, 1990). In the LPP framework, professional identity is conceptualised as a matter of discursive identity formation as an individual negotiates the norms, beliefs, attitudes and behaviours of an already formed professional group. In so doing, individuals gain entry to established Communities of Practice through the 'performance' of a professional identity that becomes more rehearsed and nuanced over time.

Within this study however, I adopt the Professional Identity formation analytical framework, since the individuals in my study are in the process of encountering a profession, through learning and exposure to others also undergoing the process of evolution and change.

A professional identity development framework therefore allows me to examine the dynamic and responsive nature of identity, and observe this as a function of critical elements of the 'derivation' of professional identity, such as relationships with other trainees, learning and reflective experiences and exposure to key professionals and their values. As such, there are three main sections in this chapter. In the first section, literature is examined concerning the history of dentistry, and the historic and culturally specific working relationship between dentist and dental technician. For this, journal articles, chapters, books, legislative reports and other publications were surveyed covering the major databases Informaworld, Swetswise, Project Muse. Secondly, I present literature that examines the evolution, development and changes in the education and training of dental technicians along with the introduction of statutory registration with the GDC. Thirdly, the literature review examines past and current concepts and practices in interprofessional learning. Finally, threads are drawn together from the major conceptual areas to establish the analytical framework for the thesis findings.

2.1 Dentistry: professional roles and identities of dentists, and dental technicians.

Modern dentistry reflects its origins clearly: in medicine and surgery and in the crafts traditionally associated with the making of jewellery, for example gold and silversmithing. It is easy traceable to antiquity, to the Phoenicians and Egyptians. In the seventeenth century 'operators for the teeth' made themselves specialists in dental work. They had a clear identity as a single group, although some scraped and pulled teeth as pupils of barber-surgeons and others were gold smiths and ivory turners.

These were crafts that became particularly useful with the realisation that the highest incomes came from supplying the rich with false teeth. These teeth were not functional in the sense of being used to eat as they are today, but they were thought to improve the wearer's appearance. In the nineteenth century improvements in technology made it more difficult for any one individual to develop the skills to do everything. The notion of dental and oral health linked to hygiene was seen as a part of dentistry distinct from the mechanical aspects of restorative and prosthetic dentistry. As a result, some people tended to specialise in the clinical side and others in the mechanical, though many continued to carry out both. In the United Kingdom, although the title 'Dentist' was protected under the 1878 Dentists Act as implying a special training and qualification, the practice of dentistry itself was not. While there was a trend for an increasing number of practitioners to hold the Licentiate in Dental Surgery, introduced by the 1858 Medical Act denoting an examined clinical skill, dentistry continued to be carried out by people from a variety of backgrounds. Most of this changed in the aftermath of the Acland Report (1919), quoted in the Nuffield Report (1993 p.68), which inquired into the extent and gravity of the evils of dental practice by persons not qualified under the Act. This report was the basis of the Dentists Act of 1921 being passed. The stricter controls laid the foundations for the current system of regulation with offenders liable to a £100 fine. The act also prohibited corporate bodies from carrying on the business of dentistry unless certain conditions were met. The 1921 Act gave the profession a measure of autonomy by setting up the 'Dental Board'.

The 1921 Act permitted unqualified dentists to register if certain conditions were met, such as age over 23 years, being of good character and if dentistry was their principal means of livelihood in five of the seven preceding years.

The 1921 Act also introduced statutory separation between dentists who could legally carry out any aspect of dentistry, both clinical (inside the mouth) and mechanical (outside the mouth), and dental mechanics, who could carry out only mechanical work and who were barred from clinical work. Dental mechanics would now support the role of the dentist, by undertaking only mechanical work, for example, the construction of dentures. This separation was confirmed in the 1956 and 1984 Dentists Acts. This segregation leads to the education and training of dentists and dental technicians becoming relatively disparate. Not until 1998 was the GDC's approach to all members of the dental team working together on a collaborative basis founded on the positive response to its 1998 consultation paper on PCDs: *Professionals Complementary to Dentistry – A Consultation Paper.* Following this response the Council decided to register all groups of PCDs under an amendment to the 1984 Dentists Act and regulate their work through educational curricula and ethical guidance, rather than through prescribed duties. They also recommended that funding streams should be identified to ensure students of the Professions Complementary to Dentistry and dental students have significant and appropriate opportunities to train and work together. This they suggested may require education providers to devise innovative mechanisms through which such experience can be gained.

One of the most important issues arising from the literature is the concept of the dental team and few issues have engendered stronger or more divergent views. As long ago as 1980 the first Nuffield Committee Inquiry into Dental Education made recommendations that the concept of the team approach to dental care should be fostered and studies into the most effective composition of the dental team should be undertaken (paras 7.18-19, 7.36). The inquiry also suggested that the training and work of dental technicians should be "*more closely integrated with that of the dental surgeon"* (Nuffield Committee, 1980, p.79). In 1993 a further inquiry by the Nuffield Committee into the training of personnel auxiliary to dentistry made a number of recommendations regarding their education and training:

"All education and training for auxiliaries should be centred on dental schools and dental teaching hospitals to promote one of our main aims – that of ensuring that close integration of the education and training of everyone working in oral health care, dentists and dental auxiliaries". (p.111)

In a direct reference to the training of dental technicians, the report stated:

"It is important that a significant part of the practical experience should be undertaken in dental hospitals or recognised dental practices so that trainees can appreciate the clinical significance of their work". (p.112)

The importance of teamwork was further reaffirmed in the Report of the General Dental Auxiliaries Review Group (1998), when it was reported that the team concept for future practice should be *"promoted through training dentists and professionals complementary to dentistry (PCDs) in close association with each other".* (p.11)

In October 2001 the GDC produced a consultation paper on regulating all members of the dental team; in this paper the GDC reported that the government's approach to regulation of the dental team is consistent with the GDC's vision stating:

"We can improve the quality and cost effectiveness of dental care by improving team working and developing the skills of everyone involved". (p.3)

McGarry et al (2004) suggests that the rehabilitation services to patients who experience dental disease is being jeopardized due to the lack of cooperation between dentist and dental technician. For effective teamwork to take place, the team members should have a clearer understanding of one another's role than has previously been the case. In other words, if each can acquire a better understanding of the work of the other, a higher standard of oral health care should result. Indeed, many would regard dental technician training as incomplete without exposure to clinical dentistry (Barrett et al, 1999). Perhaps there is room for improvement in the present situation. For example, the undergraduate dental student in the United Kingdom will by the end of their training, have spent a relatively short time on laboratory work compared to the dental technician in training (Cameron et al, 2006; Juszczyk et al, 2009; Clark et al, 2010). The claim is that reduced laboratory instruction for dental students is achieved at the expense of repetitive laboratory exercises rather than a reduction in the relevant techniques covered. The aim is to produce 'laboratory aware' rather than 'laboratory competent' dental students (Lynch et al, 2007). This reduced experience diminishes the ability of dentists to partner with dental technicians (McGarry & Jacobson, 2004). New materials and technologies will increase the need for dental technicians to be highly educated to provide support to dentists.

This is especially true for procedures such as the newest computer-aided design/computer-aided manufacturing technologies, which will demand greater cooperation between dentists and dental technicians (McGarry et al, 2004). With dental students having little or no experience with many of the newest materials and techniques, dental technicians will be the source of information for general dentists. A greater familiarity with laboratory work should lead to better understanding of the technical difficulties faced by the technician, which in turn may lead to clearer communication and more thoughtful prescribing by the dentist (Lynch et al, 2003; 2005; 2006; 2007; Rahdi et al, 2007; Afsharzand et al, 2006). One of the problems described to the Nuffield Committee in (1993), was the poor communication between dentist and technician. The report pointed out that;

"Only rarely, outside hospitals, do technicians have the opportunity to see the patient for whom they are working during the making or fitting of an appliance'. This is not in the interest of the patient, the dentist or the technician, who fails to gain an appreciation of the clinical side of dentistry, while the dentist may fail to appreciate the technical side" (p.73).

The Nuffield Foundation (1993) held the view that the most effective way of improving oral health care and delivering a national strategy was "*through teams led by dentists*"(p.109). A similar view is also held by Bennington, I. C, quoted in The Dental Technician (1995), who believes that the dental team should as far as possible;

"*share its training with other members so that part of the training will take place in centres of excellence (the dental schools and hospitals) and that dental students, technicians, nurses and hygienists will mutually benefit from training"* (p.5).

He goes on to suggest that it is important that the dentist appreciates the fact that a technician is aware of clinical problems and their importance in dealing with clinical and technical difficulties and therefore should be brought into the clinical situation to discuss these problems with the dentist and therefore, through a fuller understanding, be better able to construct the appropriately designed appliance to a higher standard. In 1997 Dame Margaret Seward of the General Dental Practitioners Association (GDPA) defined the dental team as: *"all members of the practice, clinical or hospital staff who are involved in the provision of oral healthcare to the patient"*" (p.31). Dame Margaret, a director of Teamwork, and who has worked tirelessly to improve the recognition of individual members of the dental team says that: *"Fundamental to success is a realisation that decision making must be taken by the team and free discussions must be held amongst team members at regular intervals"* (p.31).

The General Dental Council (1997) in its document '*The first five years. The undergraduate dental curriculum'* suggests that learning opportunities and experiences should enable dental students and those of the professions complementary to dentistry to *"work and train together"* (p.9). The report goes on to say that there is a need for undergraduates to gain experience of "*working with Professionals Complementary to Dentistry (PCDs) during the undergraduate programme"* (p.15). The report recommended that funding streams should be identified to ensure those dental students and students of the professions complementary to dentistry (PCDs) have significant and appropriate opportunities to train and work together. This may require dental schools to *"devise innovative mechanisms through which such experience can be gained"* (p.9).

Confidence about the growing importance of the dental team was further strengthened by the opinion expressed by the General Dental Council in (1998), that few issues facing dentistry today can be as important as the development of the dental team. Whateley (1998) in the preface to his book, *A Very Special Team* suggests; *"Professional teams are built around professional relationships and every relationship affects every other relationship"* (pix). He goes on to define the dental team as, *"a group of individuals able, willing and prepared to work with others while taking responsibility for their contribution to the dental care of an individual patient"* (p.2). In 2004 the GDC's Developing the Dental Team *(Curricula Frameworks for Registrable Qualifications for Professionals Complementary to Dentistry (PCDs)* was published its aims were to direct and guide the authorities who award PCD qualifications, and the educational institutions which provide programmes, in the design and implementation of examinations and courses of study. It would also be used as a bench mark for quality assuring future PCD education.

Developing the dental team built upon reports of the Nuffield Foundation (1980, 1993) and of the Council's Dental Auxiliaries Review Group (1998). The document also complemented the Council's framework for undergraduate education for dentists *The First Five Years* (second edition, August 2002). Within the curricula frameworks set out in this document, the Council were keen to encourage a variety of approaches to the ways in which PCD's are educated and trained in the future.

For the provision of comprehensive oral care within a team environment the report pointed out that student dental technicians should have the opportunity to, "*work with other members of the dental team*" (p.46) and it was considered important that this should include, *"working with actual patient cases"* (p.44) and gaining experience in "*a clinical setting"* (p.44). The document also wished to encourage the further development of progressive ideas and improved methods in what should be a dynamic educational process. It welcomes, for instance opportunities for the broadening of PCD education and the associated enhancement of the curriculum.

Student PCDs should be provided with the opportunity to gain experience of working with other members of the dental team, and mechanisms will need to be explored through which experiences can be gained. Closer cooperation and teamwork seem to be the way forward and such change would result in the present day dental technician being regarded as a clinical health worker, and this would further emphasise the need for training to be closely linked and coordinated with clinical dental courses, thus acknowledging the role of the dental technician in the dental team.

2.2 Dental Technicians: an examination of the development and training of dental technicians

After the First World War, dental mechanics – they became known as dental technicians only in 1942 - were trained in either private dental practice or in commercial laboratories as apprentices over a period of five years. But, by the outbreak of the Second World War, the number of apprenticeship schemes had fallen partly because of the changes in dental practice.

This situation received comments in 1940 by a Committee of Inquiry set up by the three professional dental associations: the British Dental Association; the Incorporated Dental Society and the Public Dental Service Association. The Inquiry looked into the training, conditions of service and wages of dental mechanics. At the same time the National Joint Council for the Craft of Dental Mechanics was anxious to revive apprenticeships, provided that the apprentices received adequate training and wages. This was noted by the Teviot Report (1946), which advised that apprenticeships should be supplemented by additional theoretical and practical instruction, in both dental mechanics and in the sciences related to them.

Formal training for dental mechanics was available in the British Army from 1921, when the Army Dental Corps was formed. The training included courses of lectures as well as practical classes. Outside the armed forces, the first systematic training was the dental mechanics course of the City & Guilds of London Institute (CGLI), which began in 1936 at the borough polytechnic in Southeast London. Courses were also available before the Second World War at Hull Municipal College and the North-Western Polytechnic. Glasgow Education Authority also began evening classes for dental mechanics, though these were limited to those who lived in the city.

The 1944 Education Act required young people leaving school to receive further education for one day a week. The Teviot Committee (1944) expressed the hope that the 1944 Education Act would cover further education for apprentice dental technicians, and the further education they received should not be limited to evening classes.

In 1951 CGLI replaced the dental mechanics course by a dental technology course. These courses, which were externally examined by the CGLI, were seen as craft level courses. In 1950, a draft bill was prepared to introduce registration for dental technicians, but it did not get through parliament. At the same time a voluntary register was begun by the National Joint Council for the Craft of Dental Mechanics, but later the responsibility for the register was transferred to the Dental Technicians Education and Training Advisory Board (DTETAB).

In the late 1960s, government concern about the unsatisfactory nature of training for technicians in all fields of work led to an attempt by the Haslegrave Committee (1969) to bring uniformity to their education and training. The Technician Education Council, established in 1973, fulfilled a recommendation of the Haslegrave Committee on Technician Courses and Examinations, which reported in 1969. In its report, the committee proposed a plan to administer and keep under review the development of a unified national system of courses for persons at all levels of technical occupation in industry and elsewhere. Its aims were to replace what had previously existed in the fields of higher technical education with rational and relevant programmes designed to meet the needs of students, industry, and other technician occupations in the community.

Furthermore, it was the Technician Education Council's intention that its awards would be acceptable to the appropriate professional and educational bodies. In 1973, the Secretary of State for Education and Science set up the Technician Education Council (TEC) and the Scottish Technical Education Council.

These organisations developed to form the Business and Technology Education Council (BTEC) and Scottish Vocational Education Council (SCOTVEC).

These changes led to arguments about whether education and training should remain linked to CGLI or whether it ought to become part of the new organisations. The Dental Laboratories Association (DLA), representing owners of commercial dental laboratories, complained that trainees coming from full-time courses, or courses involving colleges and dental hospitals were knowledgeable, but unable to work at the speed required by a commercially run business. It was said by many laboratory owners within the commercial sector that BTEC courses were much too academic.

Nevertheless, at the onset of TEC, all interested parties were invited to participate in the many consultative meetings to allow all shades of opinion to be expressed. It is a matter of great regret that not everyone took advantage of the opportunity to participate especially those laboratory owners within the commercial sector but were quick to deride claimed weaknesses in the subsequent programme. The argument about training remains unresolved today, because there are many who regard the dental technician more as a dexterous craftsmen rather than a technician whose skill is underpinned by a sound knowledge base. Although the decision to switch training courses and examinations to BTEC and SCOTVEC remained controversial, these courses provided an opportunity for dental technology to change direction. Instead of being regarded only as a craft skill, it would develop as part of engineering into a technical profession. Since the introduction of the National Health Service in 1948, the whole emphasis in the basic training of dental technicians had been founded on a thorough knowledge of the techniques required in the production of acrylic dentures.

Metal dentures, crowns, bridges and orthodontic appliances were regarded as matters for advanced courses and training.

The first TEC guidelines introduced in 1978 replacing those of the CGLI made an attempt to reflect the changing pattern of modern dentistry and to suit the training of technicians to the likely demands of the dental service in the 1990s. For example, simple metal dentures, orthodontic appliances and crowns were introduced into the course. The first BTEC and SCOTVEC courses began around 1979, but within five years, the problem of how to train and educate the general technical work force was being considered again.

In 1985 the government began a review of vocational qualifications sponsored by the Departments of Employment and Education and Science. The report of the review body was followed immediately by the White Paper Education and Training for Young People (DES/DE, 1985), and in 1986 by the setting up of the National Council for Vocational Qualifications (NCVQ) which was fully endorsed by the government in the White Paper Working Together - Education and Training (DE/DES, 1986). The Council's remit was to establish a national structure for vocational qualifications and relate them to the needs of industry. In dental technology, new guidelines were introduced for the BTEC National Diploma, which replaced the TEC guidelines published in 1978.

These new guidelines had two purposes; to bring dental technology courses into line with the policies of BTEC and, more importantly, to revise the content of the courses to reflect changes in clinical dentistry and dental technology since 1978.

All courses continued to be offered by BTEC and SCOTVEC: the National Diploma in Science (Dental Technology), Higher National Certificate (HNC) in Science, Dental Technology, and the Higher National Diploma (HND). In 1996, Edexcel was formed by the merger of BTEC and the University of London Examinations and Assessment Council (ULAEC). This brought about a rewrite of the BTEC qualification enabling everyone with an interest in dental education and training - the Dental Laboratory Association, the General Dental Council, educators, registered dental technicians, specialist technician groups - to contribute to the content and express their views throughout the rewrite process. This new Edexcel National Diploma in Dental Technology was expected to provide the vital broad-based knowledge and understanding which technologists generally require to develop their careers and vocational skills.

However, within five years of the rewrite of the new Edexcel National Diploma in dental technology a number of sources within the dental technology sector namely the Dental Laboratories Association (DLA), the Dental Technicians Association (DTA) and the education providers had suggested that unless urgent action was taken to address workforce and related education and training issues in dental technology, the ability of the health care sector, and the NHS in particular, to meet patients' oral health needs would be severely compromised.

There was a need to raise the status of the current baseline qualification (i.e. the lowest level of academic award) for dental technicians as the National Diploma was inconsistent in length and demand with other compatible awards.

2.21 Development of new qualification

Employers and others in the sector supported a rise in the academic level to recognize the knowledge and skill demands inherent in the work. In addition policy developments in health care, regulation, and in education and training, supported the need for change. As a result initial plans to build a new dental technology qualification by a wide-ranging consultation; to thereby meet the demands and needs of the profession were initiated. The requirements laid down by Government departments, Skills for Health, the GDC, Dental Technicians Association and the Dental Laboratories Association for appropriate qualifications for dental technicians were uppermost in the minds of those involved. After numerous meetings came some guiding influences that the new qualification must:

- Build on current best practice
- Meet the registration requirements when registration becomes compulsory
- Provide for various academic entry points
- Build opportunities beyond the registrable qualification and have academic value
- Recognise the high level technical skills held by professional dental technicians
- Be dental technology focused linked to Professions Complementary to Dentistry (PCD) developments and access new opportunities in team dentistry
- Recognise real workplace training and also academic achievement
- Be deliverable from the existing dental technology academic training centres within the UK

With such a demanding set of requirements, the consortium set forth to bring together the employers' needs, match the professional needs of dental technicians, drive forwards recognition by the higher education/university academics and to meet regulator's requirements. The use and recognition of the skills taught within the real dental laboratory workplace and guided by highly skilled dental technician mentors seemed the logical way to ensure 'fitness for work' of the trainees. Discussions and consultations occurred locally and nationally with employers, the DLA, the DTA, dental technicians, trainees, etc and press articles were distributed, ideas were discussed in forums and what emerged was a logical and common sense direction to formally recognise work place training as provided by dental technicians to their apprentices.

The new registrable Foundation Degree qualification must, said the development group, *'not over burden the real workplace with excessive training demands'* (Griffin, 2004). It should naturally link to the existing formal trainee development plans in the workplace and it must support the laboratory managers/owners who provide such dedicated training. Natural workplace training is always offered to 'apprentices' and now can be structured and recorded as higher educational modules when linked to set pieces of quality, competently manufactured, custom-made dental devices. This workplace element is an essential requirement of all validated foundation degrees.

The new registrable Foundation Degree qualifications have to have formal auditable links to 'real work' and the development of work-based competence is an essential component to the achievement of this academic qualification just as the dental laboratories have always wanted.

When Skills for Health (National Training Organisation NTO) working in the Department of Health's modernisation programmes indicated that the Foundation Degree should be its preferred vehicle of base level qualification for dental technicians, and the General Dental Council (GDC) also published the team curriculum for registrable qualifications, indicating the required competencies, the Foundation Degree Dental Technician Consortium (FD-DTC) development team went to work. Their remit was: (1) work together using input from groups such as the Dental Laboratories Association (DLA) the Dental Technicians Association (DTA) and individuals to develop the qualification in the time given. (2) be innovative and push at the academic boundaries and restrictions; and (3) see it through to validation as a consortium development team (FD-DTC).

The consortium was driven to find a university that would seriously take forwards a new form of dental technology foundation degree that matched the GDC's registration requirements, accepted the necessity to value the real work activities as normally provided by employers, and also meet the DLA, DTA and Skills for Health demands to end up with a 'win-win' new dental technician's qualification. This would then use the best of educational support with the normal guidance naturally being given to trainees in the workplace under the quality standards of the Medical Devices Directive (MDD), International Standards Organisation (ISO) or Dental Appliance Manufacturers Appliance Scheme (DAMAS).

Today this now provides a ‘step ladder’ from entry at either GCSE or A-level, recognising both work-based and academic achievement, and allows personal development beyond the Foundation Degree to the full BSc (Hons) Degree in Dental Technology, all this built by a wide-ranging consortium team of mainly dental technicians and providing a foundation degree to be offered in the current FE colleges dotted around the country.

2.22 Statutory registration

At the same time as the consortium were developing this new qualification the GDC were developing a policy for the statutory registration of dental technicians. In September 2003 the first meeting of the Gateway Group took place at the Gateway Hotel in Nottingham with representatives from the Dental Technicians' Association (DTA), the Dental Laboratories' Association (DLA), the Orthodontic Technicians' Association (OTA), the British Institute of Dental Surgical Technologists (BIDST), the Central Council for Health Authority Dental Technology (CCHADT) and the Clinical Dental Technicians' Association (CDTA).

The objective was to consider the policy that the GDC were putting forward for the statutory registration of Dental Technicians. All the major dental technology organisations supported the meeting and all agreed that the existing policy was fundamentally flawed if the GDC were to achieve their main objective, that being the protection of the patient. The flaw stemmed from the proposal to protect only the title of dental technician and not the actual work that was carried out. This would mean that anybody would be permitted to produce a dental appliance but only those calling themselves a ‘dental technician’ would be regulated.

This would result, in effect, in only qualified dental technicians having to pay a registration fee, undertake CPD, and face the possibility of disciplinary hearings. Those who were not qualified would not be subject to any of the above and would do more damage to public health. It became obvious to the dental technicians' organisations that comprised the Gateway Group that here was a very attractive loophole to avoid regulation. By not registering and working as a 'dental mechanic', for example, dental appliance manufacturers would escape all the rigorous protocol attached to statutory registration and this would NOT help protect the patient, NOT encourage education and training and NOT provide the status that dental technicians rightly deserve. At the meeting in September the Gateway Agreement was drafted and it was finalised at a second meeting in November 2003. The Gateway Group then formulated an action plan for making sure that the GDC and other influential organisations and individuals understood the problems posed by the existing policy.

Representatives from the Group met with representatives from the GDC and they were invited to prepare a supporting paper to explain the Agreement, so that it could be tabled at the GDC's Registration Committee meeting in February 2004. The paper was prepared and submitted, but the Group received a negative response. It appeared that the main problem perceived by the GDC, to taking the Gateway Agreement forward, was the capacity of the various education establishments to be able to cope with the anticipated increase in demand for education and training places, leading towards the registrable qualification.

This seemed to be a weak argument by the GDC when it is considered that colleges providing dental technology qualifications have been closing at an alarming rate over the last 20-30 years, due to lack of demand. The reasons for this are complex but seem to relate to the comparatively poor status of the present award (National Diploma) the amount of public funding attracted by the status of the award given the length of time it takes to complete and the impact of relatively low levels of reward within the industry for the investment that individuals make in their education and training (Skills for Health, 2002).

Undeterred and truly believing in what their agreement had to offer for the protection of the patient, a further strategy was agreed and this included a reply being sent to the GDC and a letter to the Chief Dental Officer. These letters had a positive effect and the subject was revisited at the following Registration Committee meeting in May 2004.

Leading up to this meeting support was enlisted from the Professions Complementary to Dentistry (PCD) representatives on that Committee and more and more support was gathered for the Gateway Agreement, from attending PCD Road shows, putting forward the pertinent points and raising awareness generally. The outcome of the May meeting of the Registration Committee was that two representatives from the Gateway Group were requested to attend the next meeting at the end of July to receive questions directly. The Gateway Group managed to show how a significant rise in demand could be catered for and, in addition, put forward the opinion that the economics of supply and demand would prevail.

It is further anticipated that by adopting the agreement, opportunities for learning, at all levels, will increase as more individuals are attracted to a career in dental technology and wish to continue to develop their professional competence through Continuing Professional Development (CPD).

This argument won over the GDC's Registration Committee in July 2004 and they agreed to recommend that the GDC adopt the Gateway Agreement as policy for the statutory registration of Dental Technicians at its next full Council meeting. In September 2004, less than a year after its inaugural meeting, DLA representatives were present to hear the Gateway Agreement being recommended for approval. Following much discussion in the GDC's Council Chambers, both for and against the recommendation, it was approved.

In July 2004 the Green Paper from the Department of Health setting out the proposed legislation for the Statutory Regulation of the Dental Team arrived. This Draft Order, under Section 62(10) of the Health Act 1999, would now undergo a three month consultation period and the Dental Laboratory Association would be compiling a response on behalf of its membership. The Green Paper, Strengthening the General Dental Council, outlines plans to bring enabling powers to the GDC to regulate all members of the dental team. This Green Paper represents a culmination of 30 years of discussions, consultations and lobbying by Associations representing Professionals Complementary to Dentistry (PCDs) to Government and their representatives.

It is now over 15 years since the Nuffield Enquiry and its Report that recommended statutory registration for the whole team. Following the consultation period and the confirmation of the legislation, the GDC began to implement the policy and procedures long awaited by dental technicians in the UK, such as, for example, the Gateway Agreement, which was accepted by the GDC's Registration Committee and ratified for implementation at the full Council Meeting in September 2004. The registers opened on 31st July 2006 with a transitional period until the end of July 2008. After this date statutory registration required that all individuals involved in the manufacturing process of dental technology, must be either registered with the GDC or enrolled on a course leading to a qualification that will enable them to register. The GDC's curriculum is contained in 'Developing the Dental Team, Curricula Frameworks for Registrable Qualifications for Professionals Complementary to Dentistry (PCDs). All registrable qualifications must meet the criteria set by this document and be validated against it on an ongoing basis in order for the qualification to be recognised for the purposes of statutory registration.

2.3 Interprofessional Learning: curricula, pedagogy and professional training

Most healthcare education (particularly in the preregistration university or classroom setting) is uni-professional, in which students learn together as a single group, e.g. nurses, doctors, dentists, midwives, allied health professionals or social workers, and do not learn with or alongside other professional groups. While the uni-professional context is an important arena in which learners develop knowledge, skills and behaviours relating to their own and other professional groups, it does not achieve the additional outcomes of interprofessional education.

As early as 1988, the World Health Organization (WHO) highlighted that if health professionals learned together, and learned to collaborate as students, they would be more likely to work together effectively in clinical or work based teams. The challenges of healthcare are increasingly complex and subject to frequent change. Meeting these demands requires that health professionals work in partnership with each other and the patient. Across the National Health Service today clinical teams from a variety of professions work together in delivering patient care, with traditional professional roles becoming increasingly challenged by new working practices.

Shared learning between health care professionals in the NHS has been advocated as a means to improve the ability of individuals to work together in optimising patient outcomes. The importance of inter professional working is a central theme in the Governments health and social care policy (Department of Health, (DOH) 2000; 2001). Nationally, the promotion of interprofessional learning at all levels is a key UK Government strategy to improve communication and collaborative working to enhance quality care for all service users. The delivery of the National Health Service's modernisation agenda requires robust and integrated working and learning by way of well established interprofessional practice (DOH, 2000; 2001). One way of contributing to this is for students from different professions being brought together to learn about each other's profession. Interprofessional Education is defined by the UK Centre for the Advancement of Interprofessional Education (CAIPE, 1997) as *'occasions when two or more professions learn from and about each other to improve collaboration and the quality of care'.*

This may include aspects on developing respect for other professions, trust and communication skills in working with other professions, appreciation of different ways of working, and the strengths of a diverse workforce. Barr (2002) defines interprofessional learning as *'members (students) of two or more professions associated with health and/or social care, engaged in learning from and about each other'* (p.6). This definition implies interaction between students of different professions during the learning process. Reynolds (2005) defined interprofessional teamwork as collaborative working and the sharing of common goals in relation to the patient/client care or therapy. Barr et al (2005) reports that within health and social care there is an ongoing change in practice, requiring collaborative and interprofessional working.

Several high profile health care investigations have criticised staff for not being able to communicate effectively, such as the Bristol Royal Infirmary Inquiry (2001) into the deaths of children undergoing cardiac surgery. The inquiry suggested that one of the most effective ways to foster an understanding about and respect for various professional roles and the value of multi-professional teams is *'to expose medical and nursing students, other healthcare professionals and managers to shared education and training'* (Para. 18). The Inquiry recommended that a number of pilot projects should be developed in universities to take forward the radical reform of pre-registration education by bringing students from differing professions to learn.

The need to promote effective team working across organisations and professions through interprofessional education was substantiated further by the findings of the inquiry into the death of Victoria Climbié (2003).

It recommended not only the establishment of a National Agency for Children & Families but that such an agency should require each of the training bodies covering services provided by doctors, nurses, teachers, police officers, officers working in housing departments and social workers to demonstrate that effective joint working between each of these professional groups features in their national training programmes. These inquiries identified the need for radical reform of the education and training of professionals and the need to promote patient/client focused collaborative working (Humphris et al, 2004, p.25).

The Department of Health response to these issues was:

> *'that there should be more opportunities for different health care professions to share learning and that more emphasis should be placed upon non-clinical aspects of care, such as communication skills, in the education, training and development of those working within the NHS'* (Department of Health, 2001).

This intention appears in the publication of *Working Together-Learning Together* the Department of Health's lifelong learning strategy. It highlighted a commitment to ensure the implementation of common learning in all pre-registration programmes across all universities in England by 2004. This was accompanied by a commitment to improve the regulation of health and social care education and training. In response, the bodies responsible for standard setting for the educators of doctors and nurses now require pre and post-qualifying curricula to provide students and trainees with interprofessional learning opportunities (General Medical Council, 2002; Nursing & Midwifery Council, 2004).

It has additionally been suggested that continuous quality improvement skills such as team working and communication should be learned as core skills and that interprofessional clinical placements can provide the appropriate environment in which this might occur (Heard et al, 2001; Wilcock et al, 2002; Morison et al, 2003). As a result, the education of health care professionals emphasises the importance of interprofessional learning; this has been supported by government policy advocating the importance of professionals understanding and respecting each other's roles (DOH, 2001).

Calls for better teamwork and better liaison between professionals and agencies are nothing new. The interprofessional education movement in the UK began in the sixties. More precisely, a series of discrete 'initiatives' occurred which, with benefit of hindsight, can be seen to have been the beginnings of parallel interprofessional movements in different fields of practice with the same objective, to overcome ignorance and prejudice amongst health and social care professions. By learning together the professions would work more effectively together and thereby improve the quality of care for patients. They would understand each other better, valuing what each brought to collaborative practice whilst setting aside negative stereotypes. The need for this was more apparent in primary and community care than secondary care. In primary care many GPs had formed group practices and were recruiting other professions such as district nurses, health visitors and sometimes social workers into their teams, as long-stay hospitals began to close. Highly vulnerable and institutionalised patients were being discharged (Jay, 1979), whose survival in the outside world depended upon flexible, responsive and well co-ordinated support from community mental health and mental handicap teams.

Rigid demarcations and hierarchical relationships which may have worked well enough in hospitals had no place in community-based services where boundaries between professions needed to be more permeable (Barr, 2004). As relationships became more flexible, risk of territorial disputes increased. For mental health, efforts to improve collaboration went hand in hand with those to promote a new model of care. The same was true in mental handicap (as the field of learning difficulties was then called) where moves were afoot to retrain staff to be re-deployed from hospital to community and to replace nursing awards by social care awards (Jay, 1979). In these and other fields of community care, e.g. palliative care, HIV/AIDs and the care for the frail elderly in the community, interprofessional education contributed to efforts to improve the quality of long-term care (Jay, 1979). Teamwork had arrived in both primary and community care, teamwork which could be either frustrated by rivalry and miscommunication or become a mutual learning experience through which each profession understood better what the others could contribute in a spirit of trust and mutual support.

Community and primary care were treated as one in the earliest reports about interprofessional education, but the distinction between them became an issue following the creation of social services departments in the wake of the Seebohm Report (1969). Conferences explored ways in which interprofessional education might help to heal the bureaucratic rift between GPs and social workers (see, for example, England, 1979; Barr, 2002). Pietroni (1994) remarks that the Griffiths Report (1988) drew a clear distinction between the provision of health care and community care, but recognised the critical importance of the responsible authorities to collaborate.

‘It is clear that, if this collaboration is to occur, joint training programmes will become a necessary part of any management plan’ (Griffiths, in Pietroni, p.82). Meanwhile, the enquiry into the death of Maria Colwell (Colwell Report, 1974), like others later, pointed to failures in communication between professions, health visitors, doctors, social workers, teachers and police officers in reporting warning signs and acting soon enough to prevent abuse and sometimes death of children. Concern led to the creation of Area Child Protection Committees whose brief included the promotion of joint training to improve communication and collaboration.

2.31 Curriculum models and mechanisms in professional education

This chapter will examine how curriculum models and mechanisms can be developed in professional education to teach interprofessional groups. Within the context of health science education health care work patterns are rapidly shifting towards being team-based (Cribb, 2000). Effective teamwork has been shown to improve the quality of patient care, and prevent the development of negative stereotypes which may inhibit interprofessional working (Tunstall–Pedoe et al, 2003) yet until recently this has not been included in preregistration curricula (Borrill et al, 2000). As a result, students in health care professions, including students of nursing, medicine, allied health and social work professions are entering the workforce poorly prepared for the inevitable teamwork in which they will be required to engage (McNair, 2005). The difficulties encountered in working with professionals from different disciplines arise from a lack of knowledge of different roles, lack of skills in teamwork and variable levels of respect, all of which are amenable to change through education (McNair, 2005).

However, interprofessional education is not easy to implement for a number of reasons, for example, the length of professional education; time-tabling differences and conflicts across professional programs (Gilbert 2005). Providing interprofessional learning experiences that promote and foster teamwork and collaboration is therefore difficult. Finding space in diverse curricula, and times at which students may engage in joint activities, needs creative thinking. For example, McNair (2005) describes a model for learning professionalism as it applies to interprofessional practice at a pre-registration level (Table. 1). The elements listed should be seen as a shared curriculum for health care professions, incorporating curriculum outcomes that are meaningful for future health care practice.

The curriculum material would be new to some health professional courses, or would partially replace a uni-professional curriculum that is the pursuit of goals for single health care professional disciplines to the exclusion of other disciplines. Rather than using competencies, which tend to measure a student's ability against a set of minimum standards, a capability framework has been chosen, which is more dynamic (Holmes, 1999). Fraser et al, (2001) inform us capability is *'the ability to adapt to change, generate knowledge and continuously improve performance'* (p.799). It includes principles of reflectiveness and lifelong learning, and uses immediate feedback about performance to enhance capability. The Sainsbury capability framework was used as the basis for the proposed model (Sainsbury Centre for Mental Health, 2001).

Table. 1 A framework for learning professionalism and interprofessional practice

Areas of capability		
1 Values	Interprofessionalism and interprofessional practice curriculum The elements of professionalism which form the joint value system (see Table 1)	Methods of evaluation of outcomes
	Attitudes towards collaboration	Observation of interprofessional behavior during shared tasks as measure of values
	Attitudes towards other disciplines	Longitudinal tracking by student reflective diary through course
2 Ethics	Interprofessional ethical principles (e.g. Tavistock: rights, balance, comprehensiveness, improvement, safety, openness and co-operation)	Self-appraisal Peer appraisal
3 Knowledge	Understanding of health care professional of perceived learning roles Principles of effective teamwork	Pre- and post-questionnaires
4 Skills for the process of care	Interpersonal communication between disciplines	Objective structured clinical examination involving interprofessional practice
	Skills for collaboration, and teamwork including dealing with error and joint decision-making	Observation and group appraisal of shared tasks such as problem solving and group presentation of learning task
	Skills for appropriate and respectful leadership Including change management decision-making	
	Reflectiveness	Reflective diary
5 Application (mostly post-registration)	Adaptability across a range of health care settings and health care teams	Patient satisfaction measures
	Ability to shift personal role in different teams	Teamwork: quality of meetings, leadership, division of roles, measured by peer appraisal and external observation Clinical audit cycle

*Adapted from the Capability Framework (Health, 2001)
(Includes measures of effective teamwork described by Borrill et al, 2000)

The model has five areas, starting with ethical practice, followed by knowledge, the process of care (which is largely about teamwork), interventions (which include biopsycho-social care), and, finally, application to various health care settings. The capabilities are listed in Table. 1, in order of acquisition. This is designed to be incorporated throughout the pre-registration course, alongside the necessary uni-disciplinary learning. The ultimate aim of a professionalism curriculum should be for students to adopt a value-based perspective (Cruess et al, 2002) that will then have a powerful influence on professional behavior; therefore, the model starts with values. Virtue ethics suggests that behavior is determined by internally adopted qualities or values (in this context, the shared elements of professionalism) rather than by concepts or external rules (Association of Teachers of Ethics and Law in Australia and New Zealand, 2001). It moves beyond a desire purely for attitudinal change as a learning outcome, which remains difficult to measure and highly vulnerable to the influences of the 'hidden curriculum'.

Ethics educators emphasize the dynamic nature of ethics teaching and learning: *'ethics offers a place for the consideration of values and for dialogue across boundaries and between different perspectives'* (Association of Teachers of Ethics and Law in Australia and New Zealand, 2001, p.205). Similarly, social identity theory suggests that group membership is dynamic and context-dependent, in that the group boundaries can shift. So it is possible for students to learn values applicable to their own distinct discipline, as well as those that apply to all health care disciplines, and in this way see their own discipline merely as a subgroup, broadening the group boundaries to regard themselves as members of the more inclusive group that is the health care profession.

Students may begin to learn elements of this shared curriculum within their uni-disciplinary courses; however, students from different disciplines must be brought together periodically to create a true interprofessional learning community. The IPE method used would vary according to the sophistication of student understanding and could include everything from class-based, common learning tasks, to combined clinical placements and shared patient-care activities. At regular points throughout their courses students would also ideally have opportunities to learn and apply the shared curriculum in an interprofessional clinical setting. Learning objectives and their linked assessment tasks would overtly include the interprofessional curriculum, with an emphasis on measurable outcomes. The assessment should be behavioural, in order to observe students enacting the values in their day-to-day practice with each other, their patients and professional colleagues. As part of this behavioral approach, students can be encouraged to recognize role models as negative or positive and to make active and reflective decisions about their own behaviours.

Another model of developing health science students into integrated health professionals comes from the University of Cape Town's Faculty of Health Sciences. Two multi-professional courses "Becoming a Professional" (BP) and "Becoming a Health Professional" (BHP) form part of the core curriculum and are compulsory for all first year medical, physiotherapy, occupational therapy, audiology and speech and language students (Duncan et al, 2005; Olckers et al, 2006). Both courses use a conceptual model for framing students' learning by focussing their attention on the three central qualities of professionalism namely; knowledge attainment, empathic practice and reflective thought.

The model (Fig. 3) is used to frame the dimensions, relevance and dynamics of professionalism as these pertain to each student's personal learning journey, not only in the BP/BHP courses but also across the other courses they take in becoming a professional healthcare practitioner.

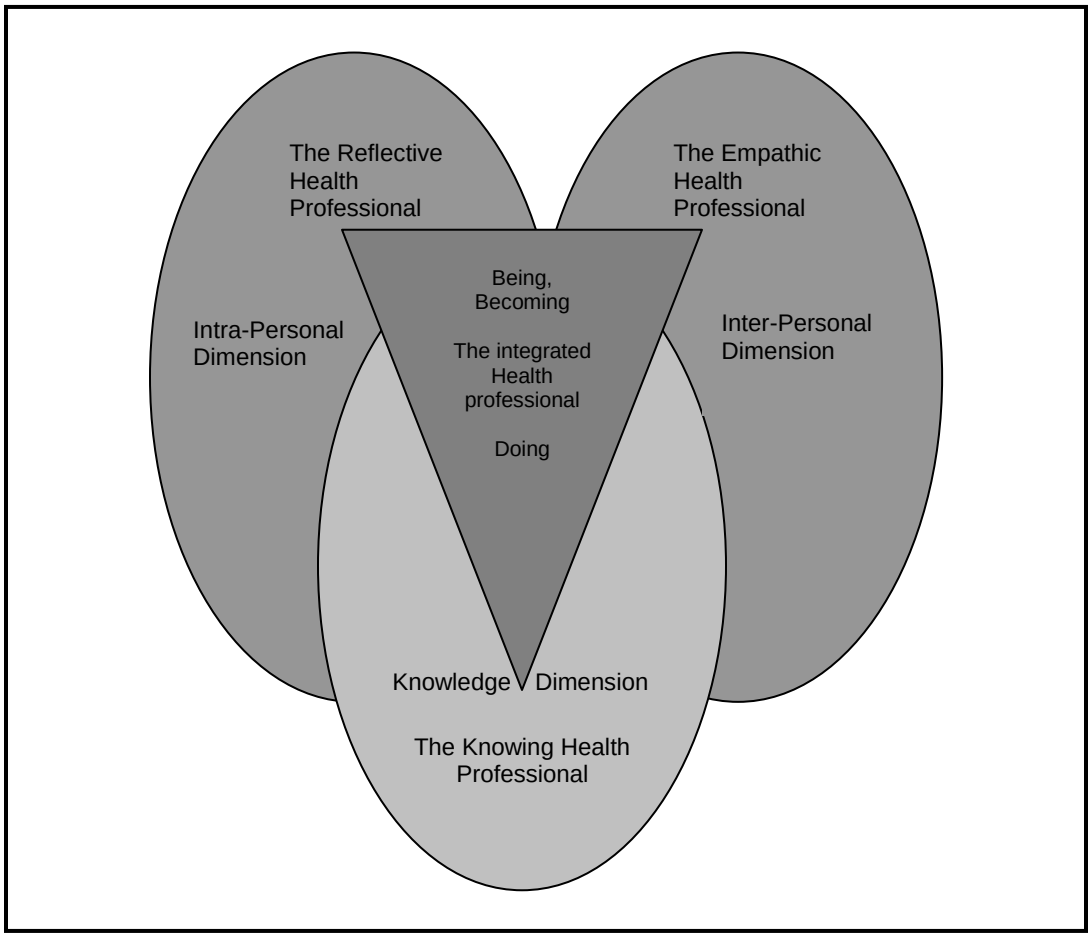


Figure. 3 Model of integrated health professional

The knowing health professional – relates to the knowledge and technical skill dimensions of professional practice.

The empathic health professional – the development of inter-personal skills based on social understanding and moral-ethical sensitivity and finally the reflective health professional – the development of the intra-personal dimensions of self-awareness and culturally sensitive attitudes. A sense of professional identity emerges as students engage iteratively with being able to do something through gaining knowledge, technical skills and problem solving abilities (**the knowing dimension**), to being able to do it with understanding within the context of self and others (**the empathic dimension**) to being increasingly self aware and culturally sensitive (**the reflective dimension**).

The Integrated Health Professional model is an innovative, dynamic and multi-layered visual and conceptual tool that can help frame students' development as professionals within their environments of learning. The three dimensions of this model are clearly delineated and deliberately equal in size so that students understand that the Integrated Health Professional focuses equally on all three areas of professionalism. Implicit in the model is the need for health professionals to be comfortable and competent in the dimensions of knowledge; empathic interpersonal skills and reflective practise. The model provides students with a conceptual tool for learning about professionalism by starting with the self, with focus on the reflective dimension, and moving outwards via small group experiential exercises through which the empathic and knowing dimensions are engaged and developed. Finally, the cycle is completed with a return to the reflective domain in which the student must ask: *"what does this experience mean for me as a future health professional?"*

Each iterative cycle of learning interrogates the unifying features of the integrated professional so that students come to recognise that professionalism is dynamic and multifaceted (Hager et al, 1993). Figure 4 depicts the unifying features of the integrated practitioner.

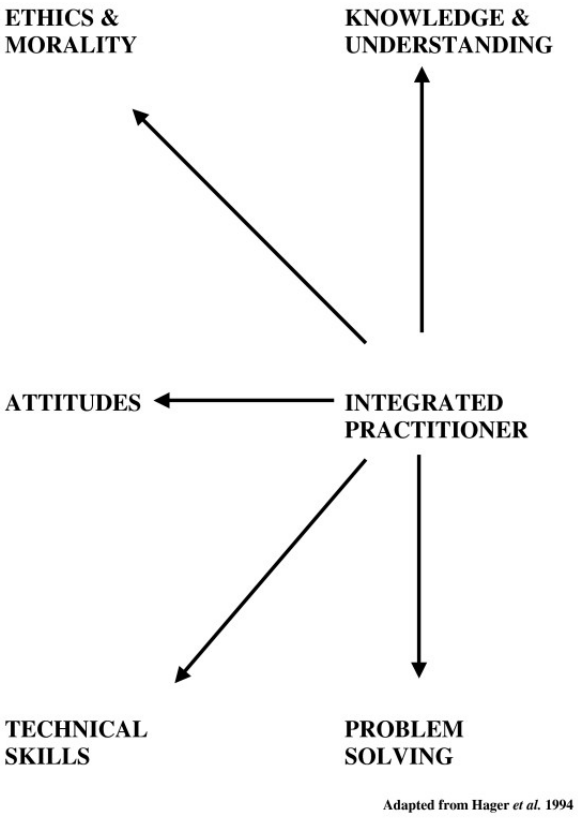


Figure. 4 Unifying features of the integrated practitioner

The knowing, empathic and reflective domains of the professional are integrated through the dynamic interchange between knowledge, technical skill, understanding, problem solving, attitudes and ethics. A further exemplar of a pre-registration interprofessional education model can be found in the Interprofessional Education (IPE) Curricula Models for Health Care Providers in Ontario.

The conceptual framework diagram appears in two parts, one for pre-registration and one for post-registration/continuing education. Put together (Figure 5), they represent a continuum from early exposure to life-long learning.

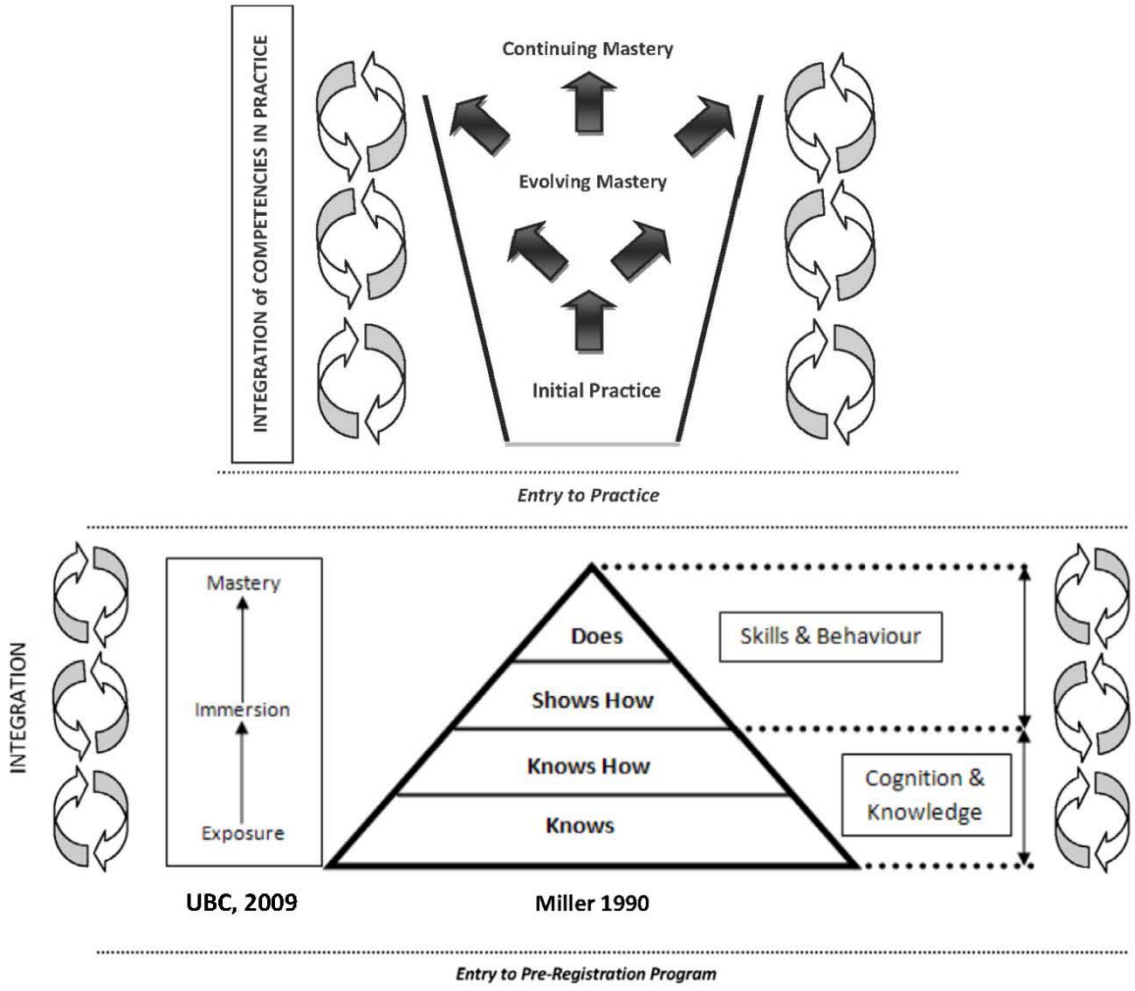


Figure. 5 Conceptual framework diagram (Health Force Ontario, 2009)

The student moves from exposure to immersion, and then to mastery. Exposure is defined as the initial stage of interprofessional learning, experienced by junior level students, with activities largely of a parallel nature, where students learn together, but with less interaction than future stages.

Immersion describes activities geared toward senior level students that are collaborative. Students now have a strong understanding of their own professional role and can be more open to the roles and views of their peers. Mastery is more complex and integrative, learning at the mastery level calls for a strong sense of professional identity. It is important to note that mastery is a concept that a health professional continually strives for, and represents the integration of judgments, attitudes, skills and values.

Within the context of dentistry, Evans et al, 2010 reports on a project currently being trialled at Griffith University in Australia. The university has established the first dental technology baccalaureate program which is run concurrently and collaboratively with programs in dentistry and in oral health therapy (Cripps et al, 2005; School of Dentistry & Oral Health, 2004). The three year dental technology program is structured to build theoretical knowledge that can directly contribute to experiential and contextual learning in both laboratory and a range of clinical environments, across all the oral health professional groups. The framework that underpins this approach is the Three Foci of Interprofessional Education (Barr et al, 2005): individual preparation (skills development and knowledge), collaborative team work and improving services. Consistent with the model proposed by Barr et al, 2005 all students enrolled in the first year of the Bachelor of Oral Health in Dental Science, Bachelor of Oral Health Therapy or the Bachelor of Oral Health in Dental Technology are provided with a solid foundation in health and human sciences, communication and one dental specific course as seen in figure 6.

At this stage students learn general knowledge and develop skill sets in their own discipline (individual preparation as discussed by Barr et al, 2005) and learn about communication.

This first year learning is undertaken in a multiprofessional education environment. Second year features oral biology, microbiology, public health and community research, where multiprofessional education continues from the first year. The community research course allows students to learn with, from and about each other. Also in second year, clinical and prosthetic laboratory practice is specific for each of the disciplines and incorporates team based learning opportunities that focus on collaborative practice and patient outcomes. The dental technology specific practical laboratory courses provide opportunities for interprofessional learning as dental technology students construct oral prosthetic appliances for real patients being cared for by students in the other dental clinical streams and/or professional clinicians (dentists, prosthodontists and clinical dental technicians/prosthetists). The third year of the program includes the conduct of a defined research project, oral health practice management, oral pathology, oral medicine and further theoretical and practical prosthetic technology and the laboratory practicum. In their final semester, dental technology students work collaboratively with dentistry students to complete a range of prosthetic cases. Such interprofessional learning opportunities enhance communication and facilitate meaningful interactions when each of these professionals enter the workforce. The Community research course continues throughout the three years and also promotes collaboration, built through team projects and assessment.

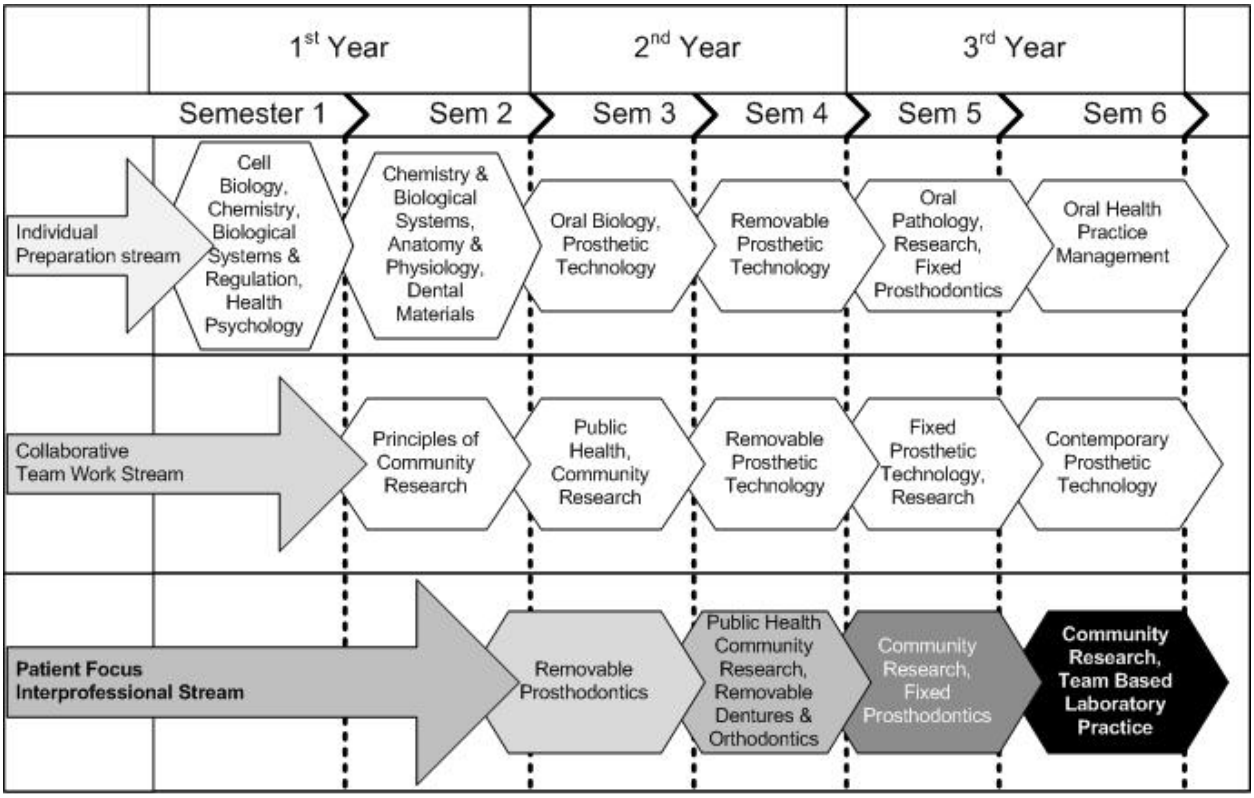


Figure. 6 Streaming of Interprofessional Education within the Griffith University Dental Technology Curriculum

With growing recognition, worldwide, of the benefits to be gained from better integration of professional work practices the above models provide a menu of possibilities for the creation of an interprofessional curriculum in the education of future health professionals. A core set of values for professionalism can provide an agreed framework through which our students can form respectful relationships not only with their patients, but also with the other health care professionals with whom they will work.

2.32 Constraints on professional training and examples of initiatives in interprofessional education

Shapiro & Stefkovich (2005) acknowledge the tensions in reconciling 'inner' and 'externally imposed' values systems and suggest that academics and teachers should critically compare their own values to certain ethical paradigms to see how best theirs fit, bearing in mind professional codes of practice and institutional accountability. This trend of institutional ethical awareness is underpinned by the increasingly central role that universities now play in the development of society and the cultural role that they play in the lives of people that take part in higher education in greater numbers than ever before. The Bucharest Declaration (2004) concerning Ethical Values and Principles for Higher Education in the Europe region frames this ethical and moral dimension of universities' work. In addition, such ethical reform agendas have begun to permeate frameworks for Academic Development and Training, and have recently emerged as being a critical concern to the whole way in which higher education academics practice (Stephen et al, 2008).

Certainly, early 'initiatives' in interprofessional education were isolated, reactive and often short-lived. Local initiatives were complemented by nationwide programmes (Charles et al, 2000), many were work-based and lost in the mists of time, but some are on record. Jones, for example, reported on 'novice days' in Devon where newly-appointed nurses, health visitors, social workers, GPs and therapists learned how to appreciate what each other brought to community-based practice (Jones, 1986). The first initiative took place in a medical setting and was built around log diaries. Outcomes were the opposite of those expected.

Confidence expressed by the other professions in doctors' ability to do everything reportedly increased. The doctors, however, placed less confidence in the other professions. Subsequent workshops were relocated to a nursing setting and the programme radically revised with reciprocal presentations. Feedback was more positive; doctors, health visitors and therapists reportedly appreciated the roles and skills of social workers better, doctors also appreciated the roles and skills of nurses better and social workers those of health visitors (Jones, 1986). Other initiatives were college-based, either before or after qualification.

Conventional wisdom had long held that interprofessional education was better left until after qualification, by which time workers would have secured their professional identities and have experience to share. Joint qualifying studies were nevertheless reported during the seventies (Mortimer, 1979). Hasler & Klinger (1976) described a residential course for trainee GPs and student health visitors designed to introduce each group to the other, modify attitudes, increase knowledge of each other's work and induce a positive approach to teamwork. Most of the three days were spent in discussion in small groups augmented by guest speakers. Assessment took the form of questionnaires completed by participants including the identification of situations where each profession could help the other.

Teachers at Moray House in Edinburgh found that students entering qualifying courses in community work, social work and primary education already held prejudices about each other, prejudices reinforced by the time they finished their courses.

They tried one interactive method after another to provoke exchange between the student groups in the hope that negative stereotypes would shift in a positive direction (McMichael et al, 1984; McMichael et al, 1984 a&b) with variable success. Two Moray House initiatives were evaluated. The first was a common course in psychology built around interactive workshops. Questionnaires before and afterwards compared attitudes held by the three professional groups towards each other. Only a quarter of the students reported any change in attitude towards the other groups. Student teachers became more positive toward student community workers and social workers, but this was not reciprocated. Staff attributed these disappointing findings to the limited duration of the learning together, the large group and the imbalance in numbers from each profession. The second included the same mix of professions. Students worked in small groups where they discussed a video about communication problems, a case study, work priorities, a do-it-yourself collaborative project and the management of conflict. Student teachers developed greater awareness of how social workers could help them in their work, but this did not extend to community workers. For their part, student community workers and social workers remained critical of primary education, but became more aware of some of the teachers' frustrations.

In Bristol medical and social work students came together in one initiative, medical and nursing students in another, during the latter stages of their pre-registration courses (Carpenter, 1995 a&b; Carpenter et al, 1996; Hewstone, 1996; Hewstone et al, 1994). Learning during the first of these initiatives included the joint assessment of patients and video case studies. Before and after questionnaires evaluated students' perceptions of the learning by their own group and the other.

Medical and social work students started by being more positive about their group than the other, but attitudes towards the latter improved. Learning during the second initiative was again based upon a video, pairs from each profession discussing what they had observed and reporting back. Attitudes towards the other profession changed for the better during the learning, but those of nurses towards doctors did so more than of doctors towards nurses. Comparing the two projects, the researchers noted that the doctors had improved their academic rating of social workers, but not of nurses.

Practice learning came to be seen as a promising setting for interprofessional education, notably in Thamesmead (Jacques, 1986) where student doctors, health visitors and social workers on placement took part during lunch time gatherings in role plays, case discussions and games that simulated collaboration. Convinced of its importance, the Central Council for Education and Training in Social Work, the English National Board for Nursing, Midwifery and Health Visiting and the College of Occupational Therapists launched a rolling programme to prepare practice teachers and clinical supervisors (Bartholomew et al, 1996; Brown, 1993; Weinstein, 1997). Throughout the 1980's and 1990's interprofessional education was becoming less reactive and remedial, more proactive and preventive.

The Health Education Authority (HEA), for example, mounted a travelling circus of nation-wide workshops attended by groups from primary health care teams, each of which chose a health promotion project to develop and implement (Lambert, 1988; Spratley, 1990 a&b).

Subsequently the effect was not only to reinforce health promotion in primary care, but also teamwork. Many of the freelance trainers who ran the HEA workshops were hired subsequently by primary care teams to facilitate development.

Interprofessional education was being invoked to help effect change, to implement policies and legislation, for example, in child care and community care, as workers from different professions and agencies learned together about proposals and weighed implications for their roles and relationships. Collective learning was reinforced in primary care by the Calman Report (1998) which recommended Practice Professional Development Plans to develop each primary care centre as a human resource for health care and to increase capacity for quality development. These provided a way to plan the integration of organisational development in general practice with the personal educational needs of team members (Carlisle et al, 2000). However, the current government agenda calls for a radical shift away from old style team working to new ways of working on an interprofessional basis. This need for a change in the way professionals work together has led to the identification of interprofessional education (IPE) or interprofessional learning (IPL) as a way of establishing interprofessional working (IPW). There is an ongoing debate about whether students need to become socialised into their chosen profession before they can usefully engage in IPL or whether early involvement in IPL prevents the setting up of barriers which oppose successful IPW.

2.33 Background and current policy

Since the World Health Organisation identified interprofessional education as an important component of primary health care in 1978, health sciences educators continue to debate when it might be best to introduce IPE into the training of health professionals, that is, whether it is more effective during pre- or post-qualifying education (Freeth et al, 2005). Government policy and literature suggest that this learning should take place at an early stage in professional education and is best done both in practice placements and within Universities (Higgs et al, 1999; DH, 2000; 2001; Freeth et al, 2002; Reynolds, 2005).

Alsop & Ryan 1996, Reynolds 2005 recognised that profession-specific placement learning can facilitate students' communication and team working skills. Noddings (1986) argues that real caring relationships develop, not only through taught curriculum but through the normal conversations and interactions which take place between people. Sometimes these may be lengthy conversations but other times they may be simple interactions that affirm and recognise students as valued people and their importance should not be underestimated (Watson and Ashton, 1995). Such 'off-task' interaction is more likely to enhance liking and feeling of community than purely task-related engagement (Klein cited in Clark, 1996).

Coster et al 2008, suggests that introducing interprofessional education at the start of the healthcare students' professional education can capitalise on the students' readiness for IPL and professional identities, which appear to be well formed from the start.

However, the study also suggested that students who enter with negative attitudes towards interprofessional learning may gain the least from IPE courses and that an unrewarding experience may further reinforce their negative attitudes.

Carpenter (1995) proposes interventions as early as the first year of training to inhibit the formation of negative attitudes by new students of each other's professions. Horsburgh et al (2001) undertook a study to quantify the attitudes of first-year medical, nursing and pharmacy students' towards interprofessional learning at course commencement. The Readiness for Interprofessional Learning Scale (RIPLS) questionnaire (University of Liverpool, Department of Health Care Education), was administered to first-year medical, nursing and pharmacy students. The differences between the three groups were analysed and the results showed the majority of students reported positive attitudes towards shared learning. The benefits of shared learning, including the acquisition of team working skills, were seen to be beneficial to patient care and likely to enhance professional working relationships. However professional groups differed: nursing and pharmacy students indicated more strongly that an outcome of learning together would be more effective team working. Medical students were the least sure of their professional role, and considered that they required the acquisition of more knowledge and skills than nursing or pharmacy students. The authors concluded that developing effective team working skills is an appropriate focus for first-year health professional students. However, the timing of learning about the roles of different professionals needs to be resolved.

Pollard et al (2004) presented the initial findings from a longitudinal quantitative study of two cohorts of students who entered the 10 pre-qualifying programmes of the Faculty of Health and Social Care, University of the West of England (UWE), Bristol, UK. The overall aim of the study was to explore students' attitudes to collaborative learning and collaborative working, both before and after qualification. On entry to the faculty, 852 students from all 10 programmes completed the UWE Entry Level Interprofessional Questionnaire, which gathered baseline data concerning their self-assessment of communication and teamwork skills, and their attitudes towards interprofessional learning and interprofessional interaction. Comparative analysis of this data was undertaken in terms of demographic variables such as age (i.e. older or younger than 21 years), experience of higher education, prior work experience and choice of professional programme. The results indicated that most students rated their communication and teamwork skills positively, and were favourably inclined towards interprofessional learning, but held negative opinions about interprofessional interaction. Some student groups differed in their responses to some sections of the questionnaire. Mature students, and those with experience of higher education or of working in health or social care settings, displayed relatively negative opinions about interprofessional interaction; social work and occupational therapy students were particularly negative in their responses, even after adjustment for confounding demographic variables.

Rudland & Mires (2005) in a study of students entering medical school found that first year medical students perceived nurses to be more caring despite similar life experience to doctors, but with the same perception that nurses had a lower academic ability, competence and status.

They felt that shared learning would help to develop an understanding of doctors and nurses roles and therefore improve team work, although they were concerned that in a shared setting they would be taught skills irrelevant to their role.

The body of evidence reported in this review of the literature however, is primarily concerned with nursing, medical and associated professionals and students, and there are few studies that include dental students and particularly where learning occurs with oral care professions (Cannavina et al, 2000; Reeson et al, 2005; 2009; Cameron, 2007; Morison et al, 2008; Ross et al, 2009; Evans et al, 2010, Maryan, 2011). These studies will now be discussed.

Cannavina et al (2000) undertook a study to identify the level of shared learning on a Bachelor of Medical Science in Dental Technology (BMedSci) course at the University of Sheffield, School of Clinical Dentistry. A summative evaluation of the course was carried out, using semi-structured nominal group interviews. BMedSci students, BDS students and recent graduates were questioned and their answers analysed to identify shared learning activities. The results revealed that different levels of shared learning opportunities occurred within the different departments which delivered the course modules. Shared learning was viewed favourably by the students. The authors felt it has the potential to maximise the use of resources and offered the opportunity for developing an integrated dental team.

Reeson & Jepson (2005) examined whether the training of dental technicians should be linked with that of the dental undergraduate. The purpose of this study was firstly to ascertain the number of dental teaching hospitals in Great Britain and Ireland currently involved with the training of dental technicians and to find out how many of these bring technician and undergraduate dental student together at some time during training. Secondly, action research was carried out in the form of a linking exercise in a University Dental School/Hospital in the North of England. This involved third year trainee dental technicians and third year undergraduate dental students working together to provide complete dentures for a patient within the formal undergraduate course in complete denture construction. The trainee technicians also attended a series of lectures relevant to this course alongside undergraduate dental students. The outcomes of the exercise were evaluated by means of focus groups, observations and semi-structured interviews. The main findings revealed that although a number of dental teaching hospitals were involved with the training of dental technicians and had encouraged links between undergraduate dental students and trainee dental technicians, few had formalised these links within the curriculum in any way. The outcomes of the linking exercise indicated that both trainee dental technician and undergraduate dental student benefited to some extent from closer collaboration during training. For example, the trainee dental technicians had the opportunity to observe the different stages of treatment in the clinic.

This allowed them to gain a better understanding of the significance of their own work, and, at the same time, it gave them the opportunity to improve their communication skills with the patient and other members of the dental team. Of equal importance, was the opportunity it gave to the dental undergraduates to discuss requirements face-to-face with the technician.

Cameron (2007) reported on a pilot scheme for vocational training of dental technicians within the Glasgow Dental Hospital and School. This involved 10 newly qualified dental technicians observing and working with BDS fourth year students in removable prosthodontics. This scheme provided the technicians with an introduction to the clinical environment and an opportunity to work closely with undergraduate dental students and clinical teachers thereby developing and fostering good communication between members of the dental team.

Morison et al (2008) investigated the attitudes of dental and dental care professional (DCP) students to IPE and highlighted some of the barriers to developing programmes for these students. Undergraduate dental students, student hygienist's along with student nurses took part in the study. Two questionnaires, the Readiness for Interprofessional Learning Scale (RIPLS) and a dental roles and responsibilities questionnaire were distributed. The results show that undergraduate dental students and DCP students had a positive attitude to IPE as a means to improve teamwork and communication skills but there are potential obstacles as demonstrated by the differing perceptions of each of the three groups about the roles of the other.

Some aspects of practice, involving personal care and advice to patients, were regarded by all groups as a shared role but the dental hygiene students regarded themselves as having a shared role in several tasks identified by dental and dental nurse students as the sole role of the dentist. Dental hygiene students in this study did not see their role as primarily to support the dentist but more as a partner in care. Professional identity and its development are issues that must be considered by dental and DCP educators developing IPE initiatives.

Ross et al (2009) undertook a study to relate final year UK dental undergraduates' experiences of team working-related training and their views of the clinical roles of dental care professionals. Results of the study showed that students who had received such training were more knowledgeable about the clinical remit of other dental care professionals and generally positive about the experience. The study suggests that acceptance of non-dentists providing patient care lags behind the comparable situation within the primary care medical team. The authors propose with the rise of multiple different oral health professionals other than dentists, teamwork and collaborative skills and communication skills within the dental team setting is critical. The authors concluded that if we are to succeed in the delivery of a modernized dental care system, it is crucial that dental education promotes awareness and acceptance of the professional status and ability of dental care professional colleagues. This needs to start during undergraduate training *'to promote awareness and acceptance'* of the professional roles and abilities of non-dentist oral health professionals.

Evans et al (2010) reported on a programme of interprofessional learning currently being trialled at Griffiths University Dental School in Australia. By providing students from each of the oral health professions with the same basic science knowledge content, and ensuring that both dental technology and dental students have comparable knowledge of the principles of dental prosthetics, enables them to discuss patient cases and communicate more effectively. The authors posit that formalised interprofessional education is an effective strategy to improve interaction among oral health professionals leading to improved patient care.

Maryan (2011) described a two year pilot programme into the development of team learning between Bachelor of Dental Surgery students (BDS) at Manchester University Dental School and BSc technology students at Manchester Metropolitan University (MMU). This pilot programme allowed BDS students the opportunity to pair with the BSc technology students in the fabrication of complete dentures. The dental technology undergraduates would observe and discuss the clinical stages at the dental school, and the BDS students would observe and discuss the technical stages at MMU. Because of timetabling issues in the first year of the programme, the pairing could only be done for half the BDS students. Feedback from the students at the end of year one was generally excellent. In the second year of the project timetable changes meant that all BDS students could pair with the BSc technology students. The second year of the project was again very successful with some outstanding work being produced by the students.

The success of the programme has attracted further funding which has included the appointment of more teaching staff to support the extension of the project into fixed prosthodontics (crown and bridge technology).

Inter-professional learning is in itself seen as one way of modelling the interdisciplinary skills required of the next generation of health professionals. The use of common curricula across health professions similar to the GDC's Developing the Team (2004) will help in the development of a common worldview including common values, language, and perspectives. Interprofessional learning has been said to improve communication and trust between different professions by improving collaborative skills, thereby enhancing professional relationships and facilitating more creative and integrative responses to healthcare.

O'Neill et al (2000) argue that meaningful interprofessional learning experiences can better prepare students for encountering the complexities of real-life interprofessional problems in the work environment. Inter-professional learning and education deals with the knowledge, skills and attitudes (that is, competency) required for collaborative inter-professional learning and clinical education. It provides students with the knowledge of the contribution of other disciplines, the skills to seek out, communicate with and work with other professionals, and the ability to value such contributions. However, there is still a need to provide evidence that shared learning does have the impact on practice and the benefits to patient care that it purports to (Mattick et al, 2003; Barr et al, 2005).

Interprofessional education has been criticized for lacking ‘conceptual clarity’ (Campbell et al, 1999) and, therefore, being merely a trend in medical education. In particular there is still a lack of evidence in relation to the effects of pre-qualification programmes (Page et al, 2004; Zwarenstein et al, 1999; 2004; Barr et al, 2005).

Finch (2000) suggests that training courses will continue to marginalize IPE until a clear and unified set of objectives are agreed upon. Campbell and Johnson (1999) also challenge proponents of interprofessional learning to develop a robust conceptual basis with agreed (and measurable) goals. In a climate of increasing pressure on all pre-registration health care curricula to deliver more content in less time, it is not surprising that, without a strong argument that IPE content is unique and essential, a significant proportion of educational establishments will continue to resist its incorporation.

Moreover, debate continues as to which elements of the undergraduate curricula benefit from health students learning together, whether the setting in which it occurs is important, and whether benefits can be sustained in the longer term (Finch, 2000; Freeth, 2001). The main advantage of introducing interprofessional education within undergraduate curricula is the opportunity it provides to quash negative stereotypes at an early stage in an individual’s professional socialisation (Barr, 1996; Barr et al, 2000; McMichael and Gilloran, 1984; Miller et al, 1999).

However, numerous authors consider it inappropriate to introduce interprofessional education at such an early stage, given that most students in this category have not acquired a sense of their own professional identity or sufficient practical experience to be able to take full advantage of the interprofessional initiatives offered (Carpenter, 1995; Fraser et al, 2000; Mariano, 1989; Miller et al, 1999). Similarly, many critics warn the premature introduction of interprofessional education is not only inefficient but negative, as it interferes with the establishment of distinct professional identities by preventing individuals from focusing on the uniprofessional elements of their role (Areskog et al, 1995; Miller et al, 1999; WHO, 1988). The predominance of such opinions delays the introduction of interprofessional education until students have reached a more advanced stage of their education, perhaps until they become postgraduates (Barr, 2000b; Carpenter, 1995; Miller et al, 1999).

Currently there are no studies demonstrating that early exposure to interprofessional education leads to the dilution of professional identity. Conversely Pollard et al, (2005, 2006) in their longitudinal multimethod study involving students from 10 undergraduate health and social care programmes provide evidence to suggest that interprofessional education does not interfere with the development of distinct professional identities. Perhaps more importantly they found those students exposed to interprofessional curricula held more positive perceptions of their own professional relationships than those exposed only to uniprofessional curricula (Pollard et al, 2006).

2.34 Challenges and constraints

Whilst the NHS currently promotes interprofessional teamwork as a means of providing more patient-centred care (Department of Health, 1998a; 1998b; 2000), this approach to health care is not without problems. Difficulties have been identified with shared learning between health professionals (Arlton et al, 1990; Ling et al, 1990; Zungolo, 1994). It has been found that professional and organisational barriers such as previous single-disciplinary training, differing educational experiences, and professional socialisation can negatively impact on the shared learning process (Ling et al, 1990). However, it is noted that such barriers can be overcome and students can share these differences and use them constructively in their learning (Zungolo, 1994). Health care professionals, by virtue of their training and professional socialisation tend to have professional allegiances that cut across institutional allegiances (Handy, 1993).

Status, identity and a sense of role security may be maintained by marking boundaries between professional groups that are defined as 'them and us', with negative consequences for collaboration (Turner, 1991; Brooks et al, 2002). Skilful, collaborative interaction with colleagues from diverse professional backgrounds requires not only respect for each others' roles but an awareness to adopt a holistic approach to treatment, and sound communication skills (Carpenter, 1995; Harbaugh, 1994; Leaviss, 2000; Mathias et al, 1997). Membership of a professional group is said to form part of a person's self concept (Ellemers et al, 1999), which helps explain why perceived threats to that group, or to membership causes hostility towards others (Spears et al, 1997; Hind et al, 2003).

The creation of professional identities is part of the socialisation process of health professionals, a process which begins with undergraduate education (Harter et al, 2001), but which continues in the workplace. A study of nurses, for example, suggested that their mentors (senior nurses) had more of an impact on their professional identity than their undergraduate training. Doctors are also said to model their professional behaviour on their mentors (Anspack, In Conrad et al, 1990). As Apker & Eggly (2004) note *"Research indicates that the occupational identity doctors develop during training has critical implications for their future professional relationships"* (p.414). This socialisation process quickly develops into professional boundaries and territories (Beattie, In: Soothill et al, 1995). Interprofessional rivalry, tribalism and stereotyping are known to operate (Mandy et al, 2004; Braithwaite, 2005) as is turf protection. These have significant influence on the ability of team members to work in multidisciplinary fashion, as professionals struggle to come to terms with differences in values, language, and worldviews (Becher, 1994). Add to this the differing accreditation and licensing regulations, which act as barriers to cross-disciplinary learning, then what has occurred, is the dominance of role over the meeting of patients' needs (Greiner et al, 2003). Moreover the stated objectives of multidisciplinary teamwork and interprofessional practice, including the sharing of power as well as expertise, means that this can be perceived as a threat to professional and personal identity, although a number of authors would argue that genuine collaborative practice actually leads to the empowerment of all the health professionals involved (Sullivan, 1998; Cowan et al, 1994). There may be for example, strong professional identities, creating barriers that have long been impermeable.

Atwal 2002, Barr et al 2005, Reynolds 2005 suggests the concepts and processes involved in interprofessional working are complex and can be influenced by many variables, such as a lack of understanding of, and respect for, different team roles, rivalry and the influence of team hierarchies. Therefore, it is important to acknowledge the risk of entrenching negative attitudes rather than fostering good ones. For inter professional learning to be successful, prejudices must be broken down, and there must be willingness among all involved to engage in the process. Of course, one of the aims of inter professional learning is to remove such prejudices, thus allowing effective collaboration.

For example, in the implementation of this study there are historical and social-status tensions between dentist and dental technician which unlikely as they are to be resolved without radical change must also be taken into consideration. Relatively low pay and low status have been problems shared by many dental technicians (Bower et al, 2004), who are aware that dentists are *'reluctant to accept technicians as equal partners'* (Nuffield Foundation, 1993). In contrast research by Gallagher et al, (2007) into the professional expectations of dentists found they chose dentistry because they perceived that it provides a financially lucrative, contained career in healthcare, with professional status, job satisfaction and the opportunity to work flexibly. It is also important to the good understanding of this study to know that there used to be strong emphasis on dental laboratory techniques in the training of dentists. Today, however, there is no expectation that dentists will ever have to carry out their own laboratory work. In fact, laboratory instruction for dental undergraduates has fallen in the last 25 years by 75% (Cameron et al, 2006; Reeson et al, 2005; Lynch et al, 2007).

McWhinney (1997) informs us there are a number of possible reasons why trainee dental technicians and undergraduate dental students might resist change. For example, they both might regard change as a threat to their sense of competence. Being comfortable with the status quo, they might fear that they will fail at new tasks. Tucker et al (2003) revealed that fear of failure in front of others is felt by students regardless of their professional background. Bringing about change can be difficult; Scott & Jaffe (1990) inform us that *"people do not normally change their behaviour simply by being given information"* (p.33). Others are not always willing to take on board the good ideas of others. If we are to bring about change, others must be encouraged to take ownership of the change itself. Partly this is due to Ajzen & Fishbein 'Theory of Reasoned Action' (1975) in that people rationalise their behaviour according to how they think they are behaving. It is far more common for people to change because of the support and encouragement given to them, in order to modify behaviour and values. Change, in any organisation can be difficult to bring about. Prejudice and entrenched working practices do not always facilitate change. Thus the agent of change runs the risk of *'upsetting the boat'*, and in an organisation such as the dental profession, barriers to change can be difficult to overcome. Interprofessional learning has the potential to improve the effectiveness of team working between healthcare professionals and ultimately the quality of patient care (CAIPE 2006). It does, however, require a high degree of commitment from all those involved in its implementation requiring careful planning and organisation.

Barriers that could be encountered, both in terms of practicalities and student attitudes, need careful consideration prior to the implementation of interprofessional learning, as an ineffective programme could potentially further ingrain negative stereotypes.

Increasingly, educational initiatives in which students from different health care professions follow a common curriculum for part of their course are seen as an important means of fostering mutual respect, understanding one another's role, and effective skills for working collaboratively in the multidisciplinary teams that they will encounter in the clinical context.

Leaviss (2000) investigated whether a two-day interprofessional course (including students of medicine, radiography, nursing, dentistry, occupational therapy and physiotherapy) in the final year of training, had influenced their practice on qualification. Respondents felt that their greater understanding of the professions had led to more appropriate referrals, increased their awareness of profession specific skills, and improved understanding of professional pressure and of holistic care. However, participants also reported negative professional attitudes which had not been changed by the inter-professional experience.

In Reeves et al's (2002) evaluation of an inter-professional training ward, focus group findings indicated that communication and team work skills had increased, but from practice observations, the researchers noted that medical students were not as engaged in team duties as the nursing, occupational therapy and physiotherapy students.

Most students felt that the intervention had been too short (two weeks) to form any lasting inter-professional effect, but on questioning a year later they reported that the training ward had given them a valuable insight into the roles of other professions and of inter-professional working. In a longer intervention over a seven week period, Lindqvist et al (2005) organised experimental group meetings between professionals to discuss inter-professional learning and working, finding afterwards that they were significantly more likely to view each other's profession as being 'caring' than students in a control group. It appears from these studies that students are generally positive about the concept of inter-professional learning and that there is a greater understanding of other professions and an improvement in communication and team work.

Effective inter-professional education (IPE) requires much more than students or practitioners from different professions simply listening together in shared lectures (Freeth et al 2002). Participants need to work actively together on tasks for which they take joint responsibility. Lucas (1990) suggests students learn by doing, making, creating and problem solving, passivity dampens students' motivation and curiosity. For that reason it is important to engage students in tasks that stress active participation. Therefore IPE arguably requires close attention to team-building among students (Gilbert et al, 2000). Social psychological theory and evidence suggests that group climate and cohesiveness can have major influences upon participants' behaviour, productivity and commitment within groups (Napier et al, 1999). Group climate tends to be characterised by the presence of engaged, avoidant or defensive behaviours (e.g. Stockton et al, 1992).

A defensive group climate in which participants feel judged, or in which they believe there are hidden agendas, tends to inhibit open sharing of ideas (Johnson et al, 2000). Respectful behaviours help to promote a positive group climate which in turn tends to encourage full participation and good quality decision-making (Mayer, 1998). Poor cohesion is another feature of group dynamics that can diminish the productivity of a group. It is usually manifested by fragmentation, cliques and dislike among some group members. Groups that suffer from poor cohesion, not surprisingly, usually generate little commitment from their members (e.g. Wech et al, 1998).

Any difficulties in forming cohesive groups during educational sessions (including any failure to settle interprofessional conflict) may encourage students to develop negative attitudes towards joint working in the clinical setting. A few studies suggest that interprofessional educational experiences can enhance participants' understanding of teamwork, although participants have mostly been professionals already working in the clinical setting. For example, Nash & Hoy (1993) reported that GPs and nurses believed that a three-day residential workshop on the interprofessional delivery of terminal care had enhanced their capacity to work collaboratively. Gilbert et al (2000), Hilton & Morris (2001) found that students were found to be highly motivated when given opportunities to participate in shared interprofessional learning experiences.

Hilton & Morris (2001) found for example that physiotherapy students rated positively the opportunities that they had for interprofessional working whilst on placement. A study of final year students of occupational therapy, physiotherapy and other allied health professions found that two-day interprofessional workshops had a positive influence on participants' understanding of teamwork (Parsell et al, 1998). Nevertheless, there have been rather few studies of undergraduate students engaging in IPE. A recent review of published evaluations of IPE has shown that less than 30% of the studies selected for the review had addressed the experiences of pre-qualification students, and that most of those had been concerned with students in the later phases of their courses, usually in the placement setting (Freeth et al, 2002).

There have been very few qualitative studies of students' experiences, and also very few that follow-up students over time to determine whether any of the attitudes and skills learned in IPE are taken into the clinical setting. According to Freeth et al (2002), the various studies reviewed suggested that learners are generally very positive about their experiences of IPE. However, there is relatively little information about how students learn through interaction with peers and tutors during IPE, particularly the processes whereby students apply skills and attitudes acquired in university-based education to collaborative team working in the practice setting. It is clear from the wide range of literature available on interprofessional learning that the potential benefits are great, not only to patients and clients, but also to learners, educators and other stakeholders. It would seem that the workplace, including the clinical environment, is an appropriate place to bring learners together in interprofessional groups or teams.

After all, they are working together collaboratively and so learning together would seem logical. Vygotsky (1978) argues that the highest level of learning comes through human relationships and this fits well within the current study. Vygotsky's assertion that cognitive development is embedded in the context of social relationships has become a widely held belief (Lave & Wagner, 1991; Newman, Griffin, & Cole, 1989; Rogoff, 1990; Wertsch, 1985). Vygotsky's theory is one of the foundations of constructivism. It asserts three major themes:

1. Social interaction plays a fundamental role in the process of cognitive development. In contrast to Jean Piaget's understanding of child development (in which development necessarily precedes learning), Vygotsky felt social learning precedes development. He states: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)." (Vygotsky, 1978).
2. The More Knowledgeable Other (MKO). The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, coach, or older adult, but the MKO could also be peers, a younger person, or even computers.

Within the current study the (MKO) could relate to how the undergraduate dental students have a better understanding of the clinical implications with regard to their patients work while the trainee dental technicians will have a greater knowledge of the technical aspects in the treatment process.

3. The Zone of Proximal Development (ZPD). The ZPD is the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability solving the problem independently. According to Vygotsky, learning occurred in this zone.

Once again the (ZPD) could refer to how both groups of students in the current study were able to resolve problems with their patients' work due to the fact they had the opportunity to communicate and collaborate with one another face-to-face. Vygotsky focused on the connections between people and the sociocultural context in which they act and interact in shared experiences (Crawford, 1996).

According to Vygotsky, humans use tools that develop from a culture, such as speech and writing, to mediate their social environments. Initially children develop these tools to serve solely as social functions, ways to communicate needs. Vygotsky believed that the internalization of these tools led to higher thinking skills. Many schools have traditionally held a transmissionist or instructionist model in which a teacher or lecturer 'transmits' information to students. In contrast, Vygotsky's theory promotes learning contexts in which students play an active role in learning.

Roles of the teacher and student are therefore shifted, as a teacher should collaborate with his or her students in order to help facilitate meaning construction in students. Learning therefore becomes a reciprocal experience for the students and teacher.

2.4 Literature and analytical framework overview

This review of the literature examines firstly the history of dentistry, and the historic and culturally specific working relationship between dentist and dental technician. Secondly, it identifies the changes in the training and education of dental technicians over the past 89 years, from the introduction of formal education in the Army Dental Corps in 1921, through the systematic training of the CGLI to the first TEC guidelines introduced in 1978 replacing those of the CGLI to the present day Foundation Degree qualification. It also examines the introduction of compulsory registration for dental technicians with the General Dental Council. Thirdly, it examines past and current concepts and practices in interprofessional learning.

In the literature review, I have established that the role of trainee dental technicians and undergraduate dental students can be disparate. Studying their contribution within an established framework would allow a more rigorous demonstration of their usefulness (or otherwise) within a team, and would help clarify what other team members contribute by way of their professional background. As such the theoretical framework for this study has been built around the professional identity formation of the student's relationships with one another and their reflective learning experiences and exposure to key professionals and their values during a shared learning experience.

Through these insights, a framework for shared learning between these two members of the dental team may well provide a benchmark for other institutions nationally. The next chapter provides details of how the theoretical perspectives and analytical frameworks were translated into practical methods and study procedures.

CHAPTER 3: DESIGN AND METHODOLOGY

3.1 Research design

Overview

This study is designed to examine the challenges faced by both trainee dental technicians and undergraduate dental students during a shared learning experience in a UK university dental school/hospital in the northern region of England.

The study had two purposes:

1. To gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities.
2. To examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages.

This study explored four main research questions:

1. What are the individual students' experiences and perceptions of their team working skills and group dynamics?
2. What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?
3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?

4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

In this section, I will address the research design.

3.12 Research design in practice

Professional identity formation concerns group interactions in the workplace and relates to how people compare and differentiate themselves from other professional groups. This helps students to gain a more informed view of the profession in which exploration of alternative perspectives and beliefs is central to identity development. Students are seen as active participants in the formation of their professional identity (Niemi, 1997). In the health care context, social identity theory suggests that the attitudes and behaviours of members of one professional healthcare group towards another group are governed by the strength and relevance of the members' identity in a wider social arena (Tafjel and Turner, 2001; Turner, 1999).

Healthcare teams have always been described 'at the centre' of both the clinical education of new healthcare professionals and patient care (Lingard et al, 2002). The information flow that team members engage in (the verbal and non verbal communication that they engage in during the course of both activities) is a key way in which new health professionals are socialised into teams (Sinclair, 1997; Haber and Lingard, 2001). During early participation, they obtain gradual responsibility and supervised involvement within the field, developing an overview of their profession, and an understanding of professional goals, values and limitations.

However, there are many challenges associated with professional identity formation, for example, encountering critical situations is part of the daily practice of medical students and when confronted by contradictory and ambiguous situations, these experiences may induce self-reflection and questioning of their personal views and as a result identity is reshaped (Ryynanen, 2001). Professional identity is constructed through communication between individuals, and identities are continually being constructed and altered and subject to competing discourses of power, politics and personal agendas (Bleakley, 2006). Power processes in team-based work are processes of meaning and identity formation (Bleakley, 2006). These induce the team members to consent to dominant organisational views even if these pose potential disadvantages (Doorewood and Brouns, 2003). Despite professional socialization and identity development being an implicit outcome of dental and medical education (Slotnick, 2001; Jaye et al, 2005; Masella, 2005 & 2007; Wagner et al, 2007), these education programs focus more on the systematic development of scientific knowledge and place very little emphasis, time and effort toward professional socialization and identity development (Lovas et al, 2008).

A study carried out by the researcher in 2005 (Reeson et al, 2005) assisted in the design and development of this study and identified many of the issues related to the difficulties of implementing shared learning between trainee dental technicians and undergraduate dental students. The research demonstrated that although a number of dental teaching hospitals were involved with the training of dental technicians and had encouraged links between undergraduate dental students and trainee dental technicians, few had formalised these links within the curriculum in any way.

The research also revealed that exposure of trainee dental technicians to clinical dentistry through placements in various clinical settings had been previously reported by a number of training institutions; however, the exact nature of these placements was unclear and could not be assumed to involve the examples of direct linkage described in this study. As a result, there were important methodological considerations in studying a concept that is often the subject of limited disclosure.

Historically and professionally, dental technicians have only had an identity as a 'lived' experience, not as a planned and systematic induction into a long-established 'profession'. As such, the implicit nature of the 'lived' experience is critical to understanding their role and identity. Bearing in mind these considerations, the research design chosen for this study is interpretative in nature and falls within the phenomenological tradition. Phenomenology has its roots in the philosophy of Husserl (1977), Heidegger (1962), Sartre (1956), Merleau-Ponty (1996) and others. The discipline of phenomenology may be defined as the study of structures of experience, or consciousness. Literally, phenomenology is the study of 'phenomena': appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience. Phenomenology studies conscious experience as experienced from the subjective or third person point of view. It has been influential in several social sciences as well as applied fields such as nursing and the health sciences (Nieswiadomy, 1993). It has also had a major influence on the general development of qualitative methodology, and provides the philosophical basis for interpretative research strategies (Holstein & Gubrium, 1994).

Interpretive research seeks to understand the lived experiences of people and to establish the everyday meanings of phenomena in their lives, thoughts, and ideas (Lowenberg, 1993). Meaning can be established by undertaking multiple data collections through interviews and observations, and by analyzing and understanding transcriptions (texts). Fundamentally, it is a mode of establishing meaning, and in a sense, all research is based on interpretive studies (Koch, 1995; Nystrom Dahlberg & Segesten, 2002). To understand a phenomenon, we need to probe for meanings unexpressed in a text or conversation (Denzin, 2002; Koch, 1995).

For that reason, this research fits into the phenomenological tradition. The phenomenon under study is the professional identity formation of dental technicians, specifically to interpret the meanings of phenomena that hide behind expressions of experience. Indeed, the different interpretations that can flow from the text which bring richness and variability to it, as well as revealing its emergent meaning. Interviews or observations may generate rich descriptions of the lived experiences. These descriptions provide substantive data for the researcher to identify main themes and key metaphors of the events and phenomena in question (Denzin, 2002; Koch, 1995). Based on the intact texts, interpretive research establishes the meaning of the texts and arrives at an understanding of the phenomenon to which it implicitly refers. Understanding the relevant relational structure and configuration of the context also enables the researcher to have a more complete interpretation of the significance that things have for a person (Walker, 1996).

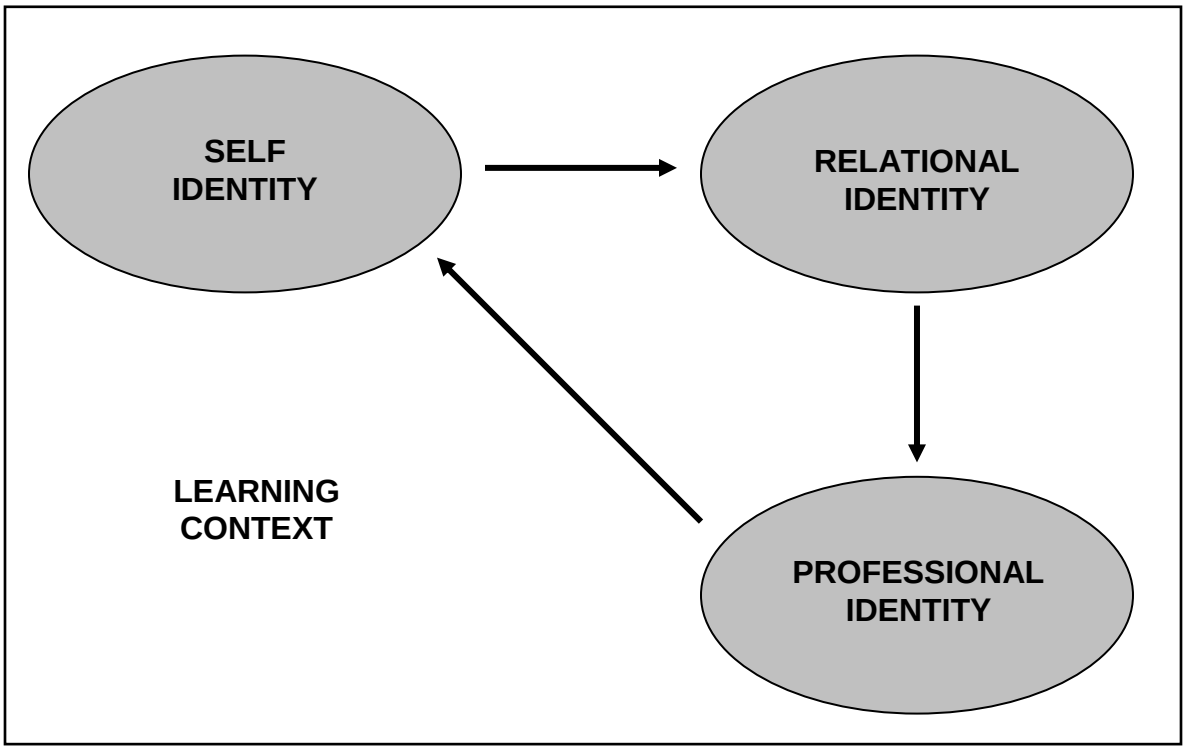
The goal of interpretative research is to understand properly the meaning of a phenomenon rather than to generalise or predict outcomes from data (Cranton, 2001; Walker, 1996). The interpretive approach can generate new knowledge and provide valuable information for future work and practice.

For example, in the current study, students' perspectives concerning their shared learning can be revealed and understood by asking them to describe their lived experiences during the steady progress of the learning experience. Such information expressed in terms of process, role socialization, and barriers to practice is also valuable because it can inform new understandings in dental education, and government regulation (Koch, 1998). Balkon (2000) advocates that the interpretive approach should be employed to reveal healthcare practitioners' role experience. Another way by which interpretive research can provide valuable information for future work is story telling. For most people, storytelling is a natural way of recounting experience, a practical solution to a fundamental problem in life, creating reasonable order out of experience (Moen, 2006). We continuously create and share stories of what happened, why, and what might happen next (Bruner, 1992; Weick, 1979). In life we create narrative descriptions about our experiences for ourselves and others, and we also develop narratives to make sense of the behaviour of others (Zellermayer, 1997). Bruner (1990) suggests that people make sense of their lives by thinking about themselves and the events around them in story-form; *"people narrativize their experience of the world and their own role in it"* (p.115). We all compare stories to incidents we have previously experienced and understand events in comparison to events we have already understood.

Narrative research is thus the study of how human beings experience the world, and narrative researchers collect these stories and write narratives of experience (Gudmundsdottir, 2001). Therefore the narrative approach is a frame of reference, a way of reflecting during the entire inquiry process, a research method, and a mode for representing the research study (Moen, 2006). Thus, it is maintained that a phenomenological study may have a narrative form of representation (Cresswell, 1998). This narrative phenomenological structure has been facilitated through the design and theorisation of the research questions and methods.

In pursuing Husserlian phenomenology, Husserl's starting point was our taken-for-granted every day world. In our everyday lifeworlds we do not question the existence of the world and its objects or the world of everyday experience. To study the lifeworld Husserl suggested two approaches. One involved unselfconscious immersion, the other reflection. Husserl was therefore against concentrating phenomenological investigation on the lifeworld as it is unselfconsciously experienced. This again emphasises the analytical framework (Figure.7) being an identity formation one of gradual socialization, accommodation of discursive norms and personal beliefs. In his quest for absolute truth, Husserl went from the lifeworld into systematic reflection upon it. Husserl's purpose in isolating the lifeworld was to move beyond it, to become aware of it by reflecting upon it, whereas everyday living is pre-reflective. Husserl (1975) suggests that for a phenomenological understanding of the nature of our experience, we must reflect on it. We must be self-directed, we must reflect on our own consciousness of experience.

Figure. 7 Representation of the narrative structure



Therefore, in pursuing Husserlian phenomenology, one ‘brackets’ out everything but our immediate experience, for example, in this study the students shared learning experience including any assumptions about that experience, I as the researcher, may have. Thus, in research, the ideal is to isolate, expose but then ‘bracket’ out our own assumptions and background knowledge thereby engaging in presuppositionless enquiry. It is the telling of stories that facilitates our entry to understanding our own lifeworld. In contrast, for example, Heidegger (1927) believed we and our activities are always “in the world”, our being is being-in-the-world, so we do not study our activities by bracketing the world, rather we interpret our activities and the meaning things have for us by looking to our contextual relations to things in the world.

As a result Heidegger would find meaning in the context of the relationship between the object of study, the phenomenon and the scientist. Both Husserlian and Heideggerian approaches ask questions related to meaning. However, their assumptions and conclusions are quite different. For this reason I feel it would be difficult to engage with Heidegger's viewpoint in the current study as it is not my intention to examine my relationship with the students. Therefore, Husserl's theory is the most appropriate for the current study as it allows me to understand the students' worlds before linking them to practices.

In the light of this, it can be claimed that interpretive research is an appropriate methodology for understanding the meaning of phenomena and human behaviour. The basis for using an interpretative approach in this study are its strengths as a mode of discovering the meaning of phenomena, the flexibility of its conceptions, and that it will hopefully provide valued information for future work directed at improving dental education and practice. For the current study, trainee dental technicians and undergraduate dental students who are involved in the day-to-day treatment of patients at the Dental Hospital/School provided rich contextual information about their own experiences and perspectives upon shared learning. The contextual and flexible nature of qualitative research methods allows the researcher to systematically consider experiences using themes from both the literature and the students' own narratives and develop a new practice based perspective on shared training between trainee dental technicians and undergraduate dental students. The study used reflective diaries and focus group interviews, the whole being located in a narrative (McLaren, 1993) within a longitudinal setting (Connelly et al, 1990).

The study was carried out over a period of 2 years focusing not only on individuals' changes, but also on the group's wider experience.

3.13 The researcher's role and beliefs

As an instructor of dental technology my personal and practical purposes for designing this study relates to many years working within a dental teaching hospital watching the explicit trend in the practical abandonment of the profession's relationship with dental technology. With decreasing educational exposure and training in dental laboratory procedures for dental undergraduates and the lack of exposure to clinical dentistry for trainee dental technicians I feel that the profession of dentistry needs to rededicate itself to its responsibility of supporting all aspects of dental laboratory technology from the education of dentists to the education of dental technicians. Dentistry also needs to create a climate of cooperation between dentists and dental technicians to provide the public with the quality dental services they deserve. Future dental technology demands a vibrant dental technology industry to partner with the dental profession. Fundamentally, within this research, I was an 'insider' (Merton, 1972); but an insider in two ways, as an individual instructor with a desire to care about all my students; and as an insider who processes a priori intimate knowledge of the community. Kvale (1996) argues that as an insider the researcher does not have to deal with culture shock, enjoys enhanced rapport with the subject, is able to measure the accuracy of the responses to questions, and is seen by the respondents as empathetic. However, there are potential difficulties with the issue of sharing 'insider' knowledge.

As Mercer (2007) points out, during a study of faculty appraisal: ‘I think I was usually seen as more of an insider when interviewing my fellow teachers than when interviewing members of management, although the power dimension was also affected by my pre-existing rapport with the specific person in question’ (p.4). But there were other, cultural reasons why I occupied such a privileged position in this research, and they centre upon the use of the phenomenological method. As students sharing at least, some common belief systems, that is, patient care, I hoped that these students would consider me appreciative of the issues that they faced in communicating their experiences of shared learning.

I know that trainee dental technicians and undergraduate dental students have information to offer dental school administrators, policymakers, lecturing staff, and researchers who may not always acknowledge the importance of students’ voices (Fielding, 2001; Mitra, 2003, 2004; Rudduck et al, 2000). I also felt privileged to have the opportunity to learn from students and to share their stories.

3.2 Selection procedures

According to Cole & Knowles (2001), in qualitative research, the researcher aims to collect and signify representative, rich and truthful information about people, settings, and social processes and discourses based upon the research questions, in order that an in depth analysis can be undertaken (Cole & Knowles, 2001). In describing how the setting, context and participants are selected we establish the scope and limitations of the research as well as the boundaries of which we enhance a study’s transferability (Rossman & Rallis, 2003).

Also being an ‘insider’ and my status as an instructor of dental technology may have allowed more disclosure by the undergraduate dental students than if I had been a clinical member of staff.

3.21 Setting of the research

The purpose of this study was two-fold – to gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities and to examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages. As such, the researcher purposefully sought trainee dental technicians and undergraduate dental students currently registered on a programme of training and who were currently involved in the day-to-day treatment of patients at the Dental Hospital/University Dental School. In the next section, I outline the University context in which the participants in this study, work and give a brief description of the institution and structure.

3.22 The University Dental School/Hospital in this study

The School of Dental Sciences is one of the most modern and best equipped of any in the country. The School is housed in the same buildings as the Dental Hospital and, together with the adjacent Medical School and acute teaching hospital, forms one of the largest integrated teaching and hospital complexes in the country. The School and hospital currently operate undergraduate degree courses in dentistry producing over 80 dentists every year.

The school and hospital also offer courses for the professions complementary to dentistry such as dental nursing, dental hygiene/therapy and dental technology.

3.23 The participants in this study

The potential participants in this study included two different third year and two different fourth year groups of undergraduate dental students, and two different groups of third year trainee dental technician students. As third year dental undergraduates work in pairs one trainee dental technician linked with two paired undergraduate dental students. Single fourth year undergraduates linked with one trainee dental technician.

A total of eleven trainee dental technicians (6 in year 1 and 5 in year 2 of the study) and thirty three undergraduate dental students took part in the study over two academic years (see Table 2). It should also be noted that there is no intent in the demographic data to co-relate or to place meaning on these variables, this could be the subject of further research.

3.24 Process of selection of participants

I will now describe the process and follow this with a description of the participants that were eventually selected. In the NHS, before a research project can commence, it is essential that permission to do so has been obtained from a research ethics committee. Ethical approval aims to maintain ethical standards of research practice, protect participants from harm, protect participants' rights, provide reassurance to the public, and protect researchers from unjustified criticism and harm. Failure to do this results in research misconduct. Prior to commencing the study, approval from the local research ethics committee and the Hospital Trust was sought.

The National Research Ethics Service application process ensures that all research meets rigorous ethical criteria and involves the completion of a 40 page document online. The ethics form comprises three parts: Part A, generic information, Part B, specialist information on the study, and Part C, site specific information. It was also necessary to include with the application detailed participant information sheets and consent forms. Following submission of the application it was necessary to defend the study and answer any questions regarding the research in front of the local ethics and research committee. Ethical approval was applied for in June 2007 with provisional acceptance granted in October 2007. Final approval was granted in January 2008 following the submission of revised documentation (Appendix A).

Following approval from the local research ethics committee, six different groups of students in total took part in the study. The first three groups of students were approached and informed of the opportunity to participate in the study at the beginning of the academic year 2007/08. The second three groups of students were approached and informed of the opportunity to participate in the study at the beginning of the academic year 2008/09. The following selection criteria were used, participants had to: be enrolled as a full time student at the participating Dental School/Hospital and agree to complete reflective diaries and take part in focus group interviews. All participants were advised participation was voluntary. Social research often requires participants to reveal personal information about themselves and therefore should not be forced to participate (Babbie, 2001). For those students who agreed to take part in the study a detailed information sheet was supplied (Appendix B) together with consent forms for both the reflective diaries and the focus group interviews (Appendix C & D).

Table 2. Demographic table showing gender and age group of participants.

3rd Year Trainee Dental Technicians		3rd Year Undergraduate Dental Students		4th Year Undergraduate Dental Students	
Gender	*Age Group*	*Gender*	*Age Group*	*Gender*	*Age Group*
Male	18-21	Female	18-21	Male	22-25
Male	25-28	Female	18-21	Male	22-25
Male	18-21	Female	18-21	Male	22-25
Male	25-28	Female	18-21	Male	22-25
Male	18-21	Female	18-21	Male	22-25
Male	25-28	Female	18-21	Female	22-25
Female	22-25	Female	18-21	Female	22-25
Female	22-25	Female	18-21	Female	22-25
Female	22-25	Female	18-21	Female	22-25
Female	18-21	Female	18-21	Female	22-25
Female	22-25	Female	18-21	Female	22-25
		Female	18-21		
		Female	18-21		
		Female	18-21		
		Female	18-21		
		Female	18-21		
		Female	22-25		
		Male	18-21		
		Male	18-21		
		Male	18-21		
		Male	18-21		
		Male	18-21		
TOTAL	11		22		11

I was aware that the students may have felt obligated to participate in the study to please their tutors, or to avoid any supposed risk of negative evaluation by them. As a result all prospective participants were assured of anonymity, and their right to withdraw or not to participate at any time without prejudice. The consent forms were completed on the understanding that participants were voluntarily participating in the study with a full understanding of the possible risks to them.

This understanding of consent is formalised in the concept of 'informed consent' (Babbie, 2001). According to Rossman et al (2003), informed consent should include four disclosures concerning the participant's rights in the research; full information concerning the purpose and audience, full understanding of their agreement to participate, willing consent, and ability to freely withdraw at any time in the study. All forms were written to meet the aforementioned conditions. Informed consent and permission forms can serve to protect participants of the study by assuring protection of privacy and identity of the participants of the study (Rossman et al, 2003). Furthermore, issues related to confidentiality would be discussed prior to each focus group and in relation to the use of personal material. Over two academic years two third year and two fourth year groups of different undergraduate dental students, and two groups of different third year trainee dental technician students were recruited.

3.25 Informed consent and permissions

In the conduct of this research there were many ethical considerations that required attention. In this section, the procedures relating to the conduct of research involving human subjects are presented. These procedures were necessary to ensure standards of morality in terms of what was right and wrong were addressed in the study. Prior to undertaking the study in my capacity as a qualitative researcher, there is an overarching awareness that I am the main instrument for obtaining knowledge (Kvale, 1996). As an employee of a NHS Hospital Trust in which the study takes place and therefore having vested professional and personal involvement in this work, there is an ethical obligation to all the participants to represent the participants' lived experiences in an ethical and trustworthy manner.

Appropriate procedures for obtaining informed consent and permission are crucial for the ethical conduct on the qualitative researcher (Rossman et al, 2003) and are a requirement of the Hospital Trust. Appropriate procedures for obtaining informed consent and permissions are critical for the ethical conduct of the researcher (Rossman & Rallis, 2003) and in addition are required by the University's Internal Ethics Committee Procedures. According to Rossman & Rallis (2003) all informed consent should rest on four principles:

1. Transparency of the purpose of the research, to the audience and the research community;
2. Full understanding of the participant's agreement to participate;
3. Willing consent;
4. Right to withdraw without penalty or consequence.

All of the forms and questions developed within the study were written with these principles in mind and the project and the forms were reviewed and approved by the local ethics and research committee and home (Sunderland) universities' ethics Committee in the academic year 2007-2008.

3.26 Assurance of confidentiality

Privacy and confidentiality are related but distinct concepts. Privacy is defined as "...*the state of being free from public attention, interference, or intrusion"* (O'Hara & Neutel, 2002, p.75) and confidentiality is defined as *"...being entrusted with another's' secret affairs"* (O'Hara & Neutel, 2002, p.75).

It is a useful distinction because it demarcates privacy to be the domain of the participants, while confidentiality refers to the researchers' responsibility to safeguard all information that is used for the purpose of the study. Maintaining confidentiality of private information entrusted by research participants is one way to protect them from harm (Hanson, 2006). The ways confidentiality was maintained in this study related to data management, storage and presentation of the thesis write up. Reflective diaries, audiotapes and interview transcripts were maintained in a locked filing cabinet on university/hospital premises at all times. In line with the local research ethics guidelines, following completion of the study transcripts and audiotapes will then be destroyed. The transcripts and thesis do not refer to participants by their real names, but instead use the term trainee dental technician and 3rd or 4th year undergraduate dental student to protect their confidentiality. The same techniques were applied to the location where the study took place; all geographic identifiers have been removed and no descriptive information about the location in which the study occurred is included in this work.

3.27 Gaining access and entry

The professional background of this researcher as an instructor within the Dental Hospital eased access and entry to the university undergraduate dental students for this study. The researcher has colleagues within the university and has colleagues in administrative and management divisions. All of the formal gatekeepers in the university were both supportive of and interested in the research project. Thorough preparation is necessary to facilitate access to the participants, and part of this process includes establishing a rapport with the gatekeepers, establishing reciprocity, and establishing and maintaining professional credibility and reputation.

In this study, the researcher had no difficulties with the latter due to having been involved in extensive research with other senior colleagues in the institution.

3.3 Data collection procedures

In this research design, there were three basic methods of collecting data or coming to know the participants' experiences that could illuminate the concept of 'shared learning': reflective diary's; focus group meetings and other textual material. Data were collected over a period of two academic years from the beginning of October 2007 and continued until April 2009. In the next section, each of the three major data collection procedures is described, and in addition, I make an exposition of their justification for use within this research study. Figure 8 displays the alignment of the research questions with the data collection methods.

3.31 The reflective diary

The use of journal writing as a means of promoting reflection and learning in educational settings has been widely advocated (Boud et al, 1985; Callister, 1993; Cameron et al, 1993; Landeen et al, 1992; 1995; Williams et al, 2000; Kessler, 2004; Gleaves et al, 2007; 2008). It serves two related purposes:

- to facilitate learning and development
- to provide a window on learners' thinking

Journal writing has been used as a tool to promote reflective thinking skills in the fields of nursing, medicine and allied health sciences (Paterson, 1995; Williams et al, 2002).

Reflective journals are seen to allow health care workers to record events, document their reactions to them and how this may affect their future practice (Williams et al, 2004); as well as explore changes in their attitudes and often identify what it means to be a professional (Winnie et al, 2004), facilitating them to become autonomous self directed learners (Harris et al, 2001).

The purpose of the diaries was two-fold;

1. As a window onto professionals minds; and
2. As a means of leading towards a pre-defined end.

The very nature of diary writing itself requires the writer to think back on events that have taken place and provides an opportunity for expression of personal thoughts.

Used in this context the reflective diaries provided an opportunity for the students not only to think back on the learning activities but to explicitly and purposely identify what they have learned, and more importantly, to relate what they have learned to their practice, allowing them to evaluate their practice, and formulate action plans for improvement. The diary also allows students to search for and express their learning in a personal way, a learning that makes personal meaning and is useful in the student's own context. Many professional education programmes engage students in writing reflective journals as one of the learning activities (Conner-Greene, 2000; Patton et al, 1997; Woodward, 1998). The literature indicates that reflective journal writing enhances reflection, critical thinking, integration of theory with practice, and promotes professional growth (Brown, 1993; Callister, 1993; Gleaves et al, 2007; Kea et al, 1999; O'Rourke, 1998; Patton et al, 1997).

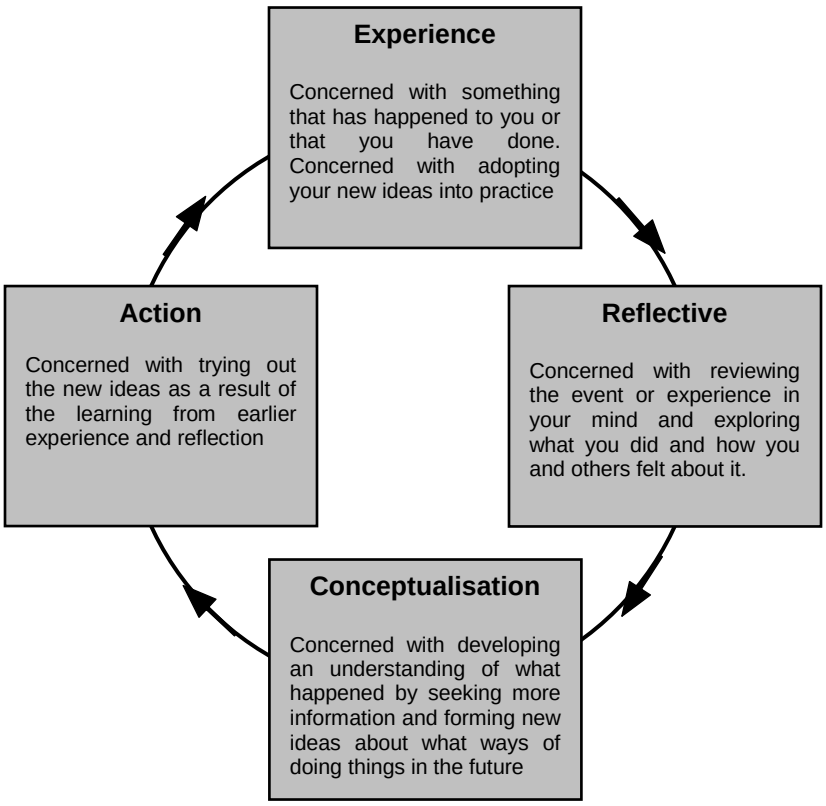
Figure 8. Study's research questions and data collection methods

Research Questions	Data Collection Methods	Time frame of study
1. What are the individual students' experiences and perceptions of their team working skills and group dynamics? 2. What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme? 3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork? 4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in the study?	1. Initial participant meeting 2. Reflective diaries 3. Focus group interviews 4. Personal communication 5. Participant feedback 6. Field notes	1. Reflective diaries – 2 academic years. 2. Focus group meetings – within one week of each shared learning exercise ending.

The literature also shows that critical reflection is a skill and must be taught through deliberate instruction and modelling (Beyer, 1987; Mannion, 2001; Spalding & Wilson, 2002; Cameron et al, 2006). This kind of personal reflection has been translated into more formal processes often called 'reflective practice' (Kolb, 1984). According to Boud et al (1985), effective learning will not occur unless you reflect.

To do this, you must think of a particular moment in time, ponder over it, go back through it and only then you will gain new insights into different aspects of the situation. Kolb (1984) and others have suggested that formal reflection and discussion around practice can lead to development and improvement in practice. This is shown through an experiential learning cycle illustrated below.

Figure 9. Kolb's learning cycle



McClure (2005) suggests that if you follow this cycle in a clockwise direction you will see that after having had an experience the student has to reflect on what he/she saw or did, by reviewing the whole situation in his/her mind. Eventually the student will probably come up with ideas for approaching the situation differently next time.

He/she will then try out their ideas to see if they are effective. He/she will thus complete the learning cycle and start over again with a view to refining his/her actions. This is an ongoing process, so we will never achieve perfection. We will always find other ways of doing things based on our learning from previous experiences.

This model of professional learning has as its strengths action research; however; its weaknesses are it is a restrictive model for 'inner' world research. There are many critics of Kolb's theory namely it is too strict and does not cater for what happens in reality. According to Jeffs and Smith (1999) in reality, these things may be happening all at once. Rogers, (1996) for example, points out that *"learning includes goals, purposes, intentions, choice and decision-making, and it is not at all clear where these elements fit into the learning cycle"* (p.108). The empirical support for the model is weak (Jarvis 1987; Tennant 1997). The initial research base was small, and there have only been a limited number of studies that have sought to test or explore the model (such as Jarvis 1987). Furthermore the learning style inventory 'has no capacity to measure the degree of integration of learning styles' (Tennant 1997, p.92). The results are based solely on the way learners rate themselves. It does not rate learning style preferences through standards or behaviour, as some other personal style inventories do, and it only gives relative strengths within the individual learner, not in relation to others. Nonetheless, Kolb's contributions cannot be underestimated. Whatever their limitations, by presenting a model of experience in a scientific form, he has helped move educational thought from the focus of the instructor back to the learner. In relation to my own work this theory is useful in re-assessing and developing my students and my own practices and experiences.

Whether it's the assessment of a group of students, or the identification of what has been learnt this system helps in its identification of a process of development. Although Kolb's cycle is the basis of many reflective activities and frameworks undertaken in a professional context, there are many others (Schon, 1983; Gibbs, 1988; Johns, 1995; Bolton, 2001).

Nursing practice for example has well established systems and processes, which encourage self reflection (Johns, 1995; 2000; Richardson & Maltby, 1995; Foster & Greenwood, 1998; Heath, 1998). Secondly as an assessment method, reflective journals do not only provide evidence of understanding of content knowledge, reflection, professional judgment and application, but also enhance critical self-reflection and self-awareness (Biggs, 1999; O'Rourke, 1998), and improve student assessment performance (Conner-Greene, 2000; Gleaves et al, 2007; 2008). Professional education in general should develop in students their own conceptions and theories of the profession which allow them to generate best practice. To achieve this aim, professional education involves not only developing students' competencies in content knowledge and professional attitudes, but also provides opportunities for students to reflect on their experience and practice in order that they might see how their practice could be improved. In fact, developing reflective practitioners has become the core element in many professional education programmes such as medical, nursing and teacher education (Tang, 2002). Although qualitative research is often criticized because of research assumptions that studies with smaller numbers of subjects lack generalisability, Kvale (1996) made the argument that each case contains an immense number of observations of single individuals.

In other words, the focus on single cases makes it possible to investigate linkages between the individual and the situation and to gain understanding of the relationship between the context and behaviour. As each student in the current study completed a reflective diary their experiences are reported using their own words, thus creating a 'story' that is rich and multidimensional.

I asked each student to keep a reflective diary of their learning in every session of the exercise. As this was a relatively new experience for most of the students, a prescribed format of the diary was given (See Appendix E). Students were free to write as much or as little as they wanted under each heading, the only stipulation being that at the end of each clinical/laboratory session they would complete the required page in their diary. All diary recording consisted of 1 day each week, corresponding to students' attendance on clinics and the technical laboratory each Wednesday. At the end of each session, students were expected to answer the questions; *what they had done during the session, the outcome of the session, the problems they encountered and how they were handled, what they would do again / what they would not do again / what was a mistake and any follow up action plan.* These questions were designed to assist students to revisit and reflect on what they had learned during the session, and to identify areas where they encountered problems and how they planned to resolve them. The last and most important part of the reflective diary was a self-reflection section in which the students were required to focus on their thoughts about the session, for example, *how they felt in the clinic/laboratory and how their patient felt,* again, students could write as much or little as they wanted to.

3.32 The focus group

By virtue of their flexibility, focus groups have emerged as a powerful tool in academic research (Davies, 1999) and are becoming an important method for conducting qualitative research in health care (Calderon et al, 2000). The focus group was chosen because it was thought to be a supportive environment that would encourage discussion and sharing of the student's experiences, therefore providing a rich source of data (Goodman et al, 2006). Kitzinger (1994) defines a focus group as "*discussions organised to explore a specific set of issues in which the group focuses on some kind of collective activity"*. (p.103). Similarly, Beck, Trombetta & Share (1986) describe the focus group as *"an informal discussion among selected individuals about specific topics relevant to the situation in hand"* (p.73). One big advantage of the focus group is the bringing together of participants for group interviews. It allows the facilitator to elicit often deeper and richer data from a number of participants in one session, thus avoiding time consuming individual interviews (Thomas et al, 1995). Krueger & Casey (2000), while describing in detail the advantages and disadvantages of focus groups, point out when to use focus-group interviews and when not to use them. The uniqueness of a focus group is its ability to generate data based on the synergy of the group interaction (Green et al, 2003). The members of the group should, therefore, feel comfortable with each other and engage in discussion. Krueger & Casey (2000) point out that for some individual's self-disclosure is natural and comfortable, while for others it requires trust and effort. Krueger (1994) believes rich data can only be generated if individuals in the group are prepared to engage in the discussion and, for this reason, advocates the use of a homogenous group.

Thomas et al, (1995) recommends that participants should not know each other, thus encouraging more honest and spontaneous expression of views and a wider range of responses. Kitzinger (1994) on the other hand, advocates the use of pre-existing groups when exploring for example, sensitive and personal issues as there is already an extent of trust amongst the members of the group, which will encourage the expression of views. This factor is particularly important when very little information is available on the topic under investigation as is the case in the current study. The idea was to learn from the experiences of both the trainee dental technicians and undergraduate dental students. The focus group seemed to have a strong advantage here; the interaction of the group can provide an explicit basis for exploring an issue in a way which allows the researcher to find out why an issue is salient, as well as what is salient about it (Morgan, 1988). As a result the gap between what people say and what they do can better be understood (Lankshear, 1993). If multiple understandings and meanings are revealed by participants, multiple explanations of their behaviour and attitudes will be more readily articulated. Robson (2002) suggests a number of advantages of using the focus group, such as the way in which participants tend to provide their own checks and balances. In this way extreme views tend to be weeded out. Loftland et al (1984) noted that focus groups allow people more time to reflect and recall experiences and something that one person mentions can spur memories and opinions in others.

Johnson (1997) argues from a critical realist perspective that they *"have considerable potential to raise consciousness and empower participants"* (p.517). Group dynamics help to focus on the most important topics and it is fairly easy to assess the extent to which there is a consistent and shared view.

Another advantage of focus groups is that they can be beneficial to the participants themselves. Fontana et al (1994) mentions briefly that focus groups are 'stimulating' to participants. However, the methodology for managing focus groups calls for skill and experience if they are to be done well (Basch, 1987; Kitzinger, 1994b). The facilitator or moderator running the focus group must balance between an active and a passive role in order to generate interest and discussion about a particular topic without leading the group to reinforce existing expectations or confirm a hypothesis. Clearly there are advantages in having an observer present who can be involved in the running of the group. Data collection is usually done by means of audio recording but good practice demands that a written record is made.

Group size is central to the success of the focus group method, yet opinions vary regarding the 'ideal size' for a focus group, with the literature pointing to an optimal number of 8-10 participants (Frey et al, 1991; Stewart et al, 1990) or 6-12 participants (Morgan, 1997). Fewer than 6 people may not be enough to stimulate dialogue, and more than 12 may be too many for all the participants to get a chance to express their points of view (Folch-Lyon et al, 1981). However, groups have been reported as small as 3 participants to naturally occurring groups as large as 20 (Morgan, 1997, Pugsley, 1996). In my research, focus group meetings took place within one week of completion of the patient's treatment.

Two groups of six 3rd year undergraduate dental students, one group of six 4th year undergraduate dental students and six trainee dental technicians took part in focus group meetings at the end of year one.

At the end of year 2, two different groups of five 3rd year undergraduate dental students, one group of five 4th year undergraduate dental students and five trainee dental technicians took part in focus group meetings. In total six focus group meetings were held over a two year period with two different cohorts of students. Separate focus groups between the undergraduate dental students and the trainee dental technicians were considered likely to be most productive. Greater homogeneity would encourage more free-flowing discussions and would facilitate comparison between the two groups (Kitzinger & Barbour, 1999; Morgan, 1997). It was felt that having mixed groups might inhibit the students from discussing their experiences openly.

I approached the focus groups with a view to generating questions that naturally emerged and that followed the lead of the participants' natural attention to topics within the conversation, although there were some questions to which I particularly wanted answers (Appendix F);

- What benefits if any did you gain from the shared learning exercise?
- Was there anything that wasn't of benefit from the exercise?
- Were you conscious of any barriers to learning during the exercise?
- Did you feel the patient gained benefit from the exercise?
- How could the exercise be improved?

In the focus groups I tried to facilitate the release of the students' stories, from these accounts of the experience I probed the subjects' dialogue for relevant depth in the hope of facilitating the telling of stories that painted detailed stories of their experiences. Initially my inexperience as a facilitator showed as I felt I could have encouraged the more reserved and quiet students within the group to participate more in the discussion.

However, this changed over the course of the first two focus groups as I became more experienced and confident in facilitating each group. Krueger, (1994) Burrows & Kendall, (1997) stress the important role of the group facilitator should not be underestimated. A skilful moderator can create an environment in which participants can feel relaxed and encouraged to engage and exchange views and ideas about an issue (Kitzinger, 1994; 1995). Talk can only become research data if it is captured, recorded and transcribed into a format that can be analysed. A combination of note taking and audio tape recording were used for the purposes of data collection. I also enlisted the help of a colleague who acted as an observer and took notes during the interviews. In the transcribing stage, I transformed data from oral speech to written text. This procedure enabled me to prepare the interview material from the recorded tapes for analysis. The transformation from oral to written mode involved judgment and was done carefully to reflect the interviewee's words verbatim the desire to correct 'errors' was avoided in the endeavour to preserve the sequence of whole, meaningful words (Silverman, 1993). I enlisted the help of a transcriber who typed up interviews in Microsoft Word.

3.33 Researcher's field notes

Field notes are key evidence of the researcher's activities in the field and are a means of faithfully documenting all types of conversations, observations and incidents at the research site (Rossman & Rallis, 2003). But in addition, field notes are important in recording contextual material that represents impressions about the process of the research.

During the data analysis stage of any research, a researcher's journal can provide unique insights. Reviewing the information in the journal can lead to new levels of reflexivity as emergent themes and subjectivities begin to emerge. Within this study, this last element was particularly critical during the phenomenological focus group interviews, where my attempts at 'bracketing' (Thompson, 2008) were critical to understanding the way in which the concept of shared learning was allowed to emerge. Furthermore, during analysis the field notes served as another data source to test consistency within the data.

3.4 Data quality procedures

Within a research study, data quality is achieved through trustworthiness of the transparent and systematic collection of data, using credible and ethical procedures throughout, and finally, allowing the findings and procedures to be openly and freely scrutinised by others (Rossman & Rallis, 2003). In this section, I examine the procedures for enhancing data quality in its widest sense.

3.41 Trustworthiness

Trustworthiness is achieved by the systematic collection of data, using rigorous and transparent research procedures, and allowing the procedures and findings to be open to systematic critical analysis from others (Rossman & Rallis, 2003; Lincoln & Guba, 1985). For me the process has been the most humanistic and probably the most honest approach to enable me to include all that I could in the data gathering part of the research. Trustworthiness thus necessitates attention to associated issues of credibility, triangulation, integrity, transferability and dependability.

The fundamental question that underpins the trustworthiness of qualitative research findings is: *"How can an inquirer persuade his or her audiences that the findings of an inquiry are worth paying attention to, worth taking account of?"* (Lincoln & Guba, 1985, p.301). This research will employ three mechanisms through which trustworthiness can be established, which are: engagement with the participants and data; triangulation; and not least, participant feedback. Engagement means that the researcher spends a significant amount of time in the setting with the participants to ensure an encompassing view of the issues under study, and so for the purpose of this study, the researcher observed and engaged with the students once a week during the period of the study, over two academic years.

Qualitative inquiry strives to achieve an understanding of how people co-construct their life-world as meaningful. Not only do humans possess consciousness, but this consciousness is also a creative participant in the relationship between people and their experience of the world. People are creative co-contributors to their life-world, and 'reality' is co-constructed between people. The term 'co-construct' refers to the way people construct their life-world (Husserl 1997), through their talk (narratives), through their actions, through their systems of meaning, through their memories, through their rituals and institutions and through the ways in which they physically and materially shape the world. The concept of reality as co-created implies that there may be many alternative or complementary definitions or understandings of reality (Valle, King & Halling, 1989; Slife & Williams, 1995; Drew, 2001; McLeod, 2001). McLeod (2001) suggests that there are three areas within which qualitative inquiry produces useful new forms of knowing.

These are knowledge of the other, involving a category of persons such as in this study, dental students; knowledge of phenomena categories of events and reflexive knowledge where the researcher turns his or her attention on to his or her own internal processes. Qualitative inquiry involves the exploration and mapping of meaning systems within all of these areas of human experience.

3.42 Credibility

There are many strategies for improving the credibility of findings and interpretations produced in qualitative research (Lincoln & Guba, 1985). Several strategies for enhancing credibility of the research process and the findings have been employed in this research, including adherence to ethical protocols, protection of the confidentiality and rights of participants, liaison with individuals providing access to the participants, prolonged exposure to the participants, deep immersion in the field, member checks and not least triangulation. Rossman & Rallis (2003) stressed that prolonged engagement in the field ensures that the researcher acquires an encompassing view of the phenomenon under study.

Member checks or participant feedback is one of the single most important aspects of ensuring credibility in research (Miles & Huberman, 1994; Rossman & Rallis, 2003). These allow for interpretations of the participants' viewpoint by ensuring a good fit between the interpretation placed on the data by the researcher and the precise content of the feedback. Participant feedback occurred during the analytical phase (Lincoln & Guba, 1985).

Through the cyclical process of data collection and analysis participants were engaged in conversations concerning the researchers' interpretations and emerging insights. This allowed the group to judge the accuracy and fidelity of the data, the analyses, my interpretations and conclusions. Note taking was used to record these conversations. Triangulation is another mechanism by which research credibility may be enhanced. There are four types of triangulation: methods, data, investigator, and theory (Rossman & Rallis, 2003). Accordingly, two of these may significantly improve the credibility of any study – method and data triangulation.

Method triangulation is the use of multiple research methods to gain sources of information to study a particular phenomenon, whilst data triangulation is achieved by collecting data multiple sources with multiple participants, over a period of time. Within this research study, both forms occurred through the use of reflective diaries, focus group interviews, and multiple exposures to the participants, and, not least, other methods such as observation and metaphor. All these were carried out over the period of two academic years from October through to July.

3.43 Justification of the sampling strategies

It is necessary to justify the sampling procedures that were used in this study. Qualitative researchers that rely on small samples to study the diversity and complexity inherent in human phenomena are sometimes criticized (McPherson & Thorne, 2006). In total, there were 44 participants in this research, representing (22 third year undergraduate dental students, 11 fourth year undergraduate dental students and 11 trainee dental technicians).

There are several ways a small research sample can be justified in qualitative research. Researchers often cite explicit numeric suggestions, such as Kuzel's (1999) suggestion that five to eight participants are sufficient for homogenous groups or Morse's (1994) estimate that six is a reasonable number for a qualitative study. These numbers are cited as if they represent a general justification for the value of studies with small samples. However, it is a practice that essentially isolates them from the methodological context in which they were intended (McPherson & Thorne, 2006). In this study, the sample reflects the reality of the numbers of dental technicians in training compared to undergraduate dental students.

3.44 Transferability

Transferability refers to how well a researcher exposes their findings and provides sufficient detail in order that other subsequent researchers may determine the utility of the findings for their own research (Houston, 1990). According to Geertz (1973) analysis is a determination of the significance of findings that may be enhanced with thick, rich description of culture, and as a result, this is a mechanism that ultimately aids transferability. Every effort was made to write and analyze using thick descriptive frameworks within this research. Purposive sampling within research also assists with trustworthiness, integrity and credibility (Patton, 2002). With purposive sample, the context, the events and the participants are chosen based upon their ability to provide a wealth of research information concerning the research question (Miles & Huberman, 1994).

The interpretations and analysis of data in this study was dependent on specific contexts and interactive dynamics between many individuals. In a quantitative study this aspect of the study might be regarded to impede the possibility for external validity.

In qualitative research, however, interpretation is reliant on thick description (Patton, 2002). From comprehensive and detailed descriptions of the language used by the undergraduate dental students and trainee dental technicians it was possible to improve the studies transferability. Others for example, may be interested in applying the findings of this study to their own work. To assist with this decision the thick description of the experiences of the undergraduate dental students and trainee dental technicians involvement in the shared learning exercise are provided. The fact that another may interpret the same data set differently depending on the choice of theoretical perspective should be recognised. However, the more interpretations researchers can make of complex phenomena the more knowledgeable society becomes. Indeed, it is through this system of proposal and critique that it will be possible for theories of identity to progress and develop. Interpretations of the influence that shared learning has on the way undergraduate dental students and trainee dental technicians develop their professional identities should resonate with other readers who are involved with the education of these two professional groups. Further investigations of the influence of the effects of shared learning on undergraduate dental students and trainee dental technicians identity formation will make a valuable contribution to these interpretations.

3.45 Dependability

This concept addresses the consistency of data and processes over time within the research study (Kvale, 1996). Methods for establishing dependability in qualitative research include the triangulation of data, the transparency of research, and the maintenance of systematic and transparent records, databases and audit trails. Triangulation of data occurred through the use of reflective diaries, focus group interviews, and multiple exposures to the participants, and, not least, other methods such as observation and metaphor. All of these were carried out over the period of two academic years, from October through to July. Transparency occurred through the extent to which the researcher has described precisely how the raw data were collected, how the data analysis was carried out, and finally, how the findings were derived from the data analysis (Miles & Huberman, 1994). Keeping detailed records and establishing a clear audit trail is another method of establishing dependability (Rossman & Rallis, 2003).

In this research study, records have been meticulously maintained throughout, with archives of recordings, field notes, personal writings and transcriptions. In addition, databases containing details of dates, times, places and other information have been maintained and backed up for safekeeping and the researcher's desire to make them available for auditing purposes. All researchers need to establish high standards for integrity, trustworthiness, credulity and rigour in their work. I have aimed to do this throughout my project, making every effort to be highly self-critical and transparent in all my practices, and spending a great deal of time in cross checking every procedure and process carried out.

3.46 Issues of generalizability

It must be acknowledged that the findings of this study do not seek to be generalizable. The small sample size allowed for the rich thick description of shared learning. It did not however, allow for generalisable claims to be made about shared learning. No claims about generalizability or truths are made in this thesis. In qualitative research, the adequacy of the sample size is determined by the depth and richness of the data (Hanson, 2006). The focus is on the generation of rich, thick descriptions of the phenomena of shared learning rather than the pursuit of truth or generalizable arguments.

3.5 Data management and analysis

In any research project, data management and analysis is informed by the research questions of the study. In the case of this particular study they are:

1. What are the individual students' experiences and perceptions of their team working skills and group dynamics?

2. What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?

3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?

4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

3.51 Data management

Data needs to be coded according to the source of information, since this is important within the later analysis process (Miles & Huberman, 1994). Coding was an important initial phase that preceded the in depth data analysis. The coding procedures used for each of the texts are described in this section. A multileveled approach, incorporating inductive and deductive methods was used to code and analyse the texts. The total volume of text generated by the reflective diaries and focus group interviews was copious. Forty four separate diaries were returned along with the transcripts from six focus group interviews.

3.52 Data analysis

There were four coherent data sets within this study; the reflective diaries from the shared learning exercise; focus group interview data, field notes and multiple exposures to the participants. The constant comparative method was chosen for the overall data analysis (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Maykut & Morehouse, 1994), although some data, for example, phenomenological, was analyzed primarily in terms of particular processes fitted for the sensitivity of the data gathering methodology. According to Maykut and Morehouse (1994), the constant comparative method is an "inductive category coding with simultaneous comparison of all units of meaning obtained" (p. 134). This approach assists in identifying codes and patterns in the data and then in categorizing the findings (Anfara et al, 2002). The constant comparative method enables the researcher to determine similarities and differences through each new unit of analysis from which categories can be created.

This iterative and incremental data analysis process allows for clarification and honing of categories during the analysis process. Interrogation of the categories may reveal patterns and relationships across categories that can be integrated to gain a greater understanding of the phenomenon of interest. For this research study, there were four primary sources of data: the reflective diaries; focus group interview data, field notes and multiple exposures to the participants. All of the data were thus in word form. The primary source of data for each participant was the reflective diaries and the transcripts from the focus group data. Open coding was the first process in the analysis of this data, according to Strauss and Corbin (1990); open coding is the process of breaking down, examining, comparing, conceptualizing, and categorizing data. In open coding, the researcher examines the text of memos, field notes and transcripts from interviews for salient categories of information. In order to begin the open coding process, I read all transcripts thoroughly for accuracy and selected a random sample of focus group interviews to verify by listening to the audio tape while reading the transcriptions. After all the reflective diaries and transcripts from the focus group interviews had been carefully read, I formulated tables to collect the data (See Appendix G & H). The tables incorporated the questions from the reflective diaries and focus groups, the quotes/narratives, the context in which they were reported and by whom and finally the date. Following this I started to interpret the concepts and domains arising from the quotes and narratives given by the students. As a result, an initial list of start codes were developed which consisted of words or phrases. Miles & Huberman (1994) recommended a provisional list of start codes, which can be expanded, refined, modified, and discarded, if needed, during the coding process.

The initial codes or categories that surfaced in the data represented the first level of analysis. According to Miles & Huberman (1994), inductive coding involves the use of provisional codes during initial data collection. New concepts emerged throughout the process of open coding. In order to incorporate a new concept, I had to revisit text from the reflective diaries and focus group interviews. This back-and-forth process helped me to feel immersed in the data and generated categories which created a stratified list allowing me to move on to axial coding. LaRossa (2005) states that open coding is not just about grouping concepts together but also about arraying concepts. This process involves taking similar concepts and placing them under a higher level heading. According to van den Hoonaard (1997), this first approach to the data is systematic and time consuming.

3.53 Axial coding

The second stage of the data coding process involved axial coding. Based on theoretical insights developed through coding, the researcher generates sensitizing concepts. Sensitizing concepts are usually closely tied to participants' thoughts and words. During this level of analysis, codes were constantly compared and contrasted, then categorised. Initial sensitizing concepts were dropped as more definite concepts emerged through the research process (Marsiglio, 2003). During this level of analysis, domains emerged from the student's quotes/narratives such as decision making and professional judgement with the emerging themes of learning and communication. Other domains included collaboration, patient care, awareness, treatment plan and professional identity/role definition. These domains became part of a tree node system with a number of themes.

For example, themes for collaboration included cooperation, and teamwork. The same process was repeated for the data from the focus group interviews. In axial coding, new connections are made between categories and subcategories defined in open coding and as a result many domains and themes were written, discarded, or reformulated during this process until saturation of the categories had been achieved. According to LaRossa (2005), the difference between open coding and axial coding is that in open coding, the researcher is essentially developing the categories while in axial coding, the relationship between or among categories is explicitly examined. Strauss and Corbin (1990) defined four features of relating categories: causal conditions, context, intervening conditions, and consequences. Conditions of time, culture, economic status, history, and individual biography must be managed through the axial coding process. This four-featured process of axial coding enabled me to relate subcategories to a category and verify statements against the data.

3.54 Selective coding

In the third and final phase, selective coding, data were interpreted to build a ‘story’ that connects the categories defined through open and axial coding (Creswell, 1998). Understanding a story line involves giving the central phenomenon a name. According to LaRossa (2005), the central phenomenon or core variable is the one variable generated during coding that is theoretically saturated and centrally relevant. In other words, it is the variable that pulls the others together to form an explanatory whole.

Based on all coded categories, the variables for the trainee dental technicians and undergraduate dental student's experiences of these shared learning opportunities were subsumed under the central domains and themes from the reflective diary quotes/narratives and focus group interviews.

The final level of data analysis represented the building of evidence and coherence of the data and involved application of the data to theoretical constructs and theories (Anfara et al, 2002). During selective coding, I also invited a select group of participants to review the findings. As a qualitative researcher, I was prepared to find how the data supported or negated my assumptions. In order to complete the analysis, I needed to check with the participants whose stories I was going to tell. I brought them a list of central concepts and excerpts of my results. No names were used to protect the confidentiality of all participants in the study. From the analysis and reduction of the data from the reflective diaries, six major domains were identified that accurately and faithfully characterized the participants' beliefs, thoughts and practices:

- Decision making and professional judgement
- Collaboration
- Patient care
- Awareness
- Treatment plan
- Professional identity, role definition

These closely aligned with the research questions. Figure 10 (p.142) is a Diagrammatic Representation of the Relationship between Research purposes, Research questions, and the Major Domains emerging from the data.

Table 3 (p.144) is a chart of the reflective diary questions, the corresponding major domains that each addresses, and the 12 themes arising out of the saturated interrogation of the data.

These themes were:

- Learning/Communication
- Cooperation/Teamwork
- Reflection/Problem solving
- Familiarity/Proactive
- Involvement/Interaction
- Relationship/Confidence

From the analysis and reduction of the data from the focus group interviews, five major domains were identified that accurately and faithfully characterized the participants' beliefs, thoughts and practices:

- Understanding one another's role
- Apprehension
- Awkwardness
- Awareness of responsibility to patients
- Preparation

Table 4 (p.156) is a chart of the focus group questions, the corresponding major domains that each addresses, and the 10 themes arising out of the saturated interrogation of the data.

These themes were:

- Collaboration/Team work
- Concern/Anxiety
- Attitude/Uneasiness
- Communication/Understanding
- Information/Equality

Within Chapter Four – the Findings – the 11 domains as outlined above are used to structure the raw data elicited from the individual participants. Subsequently, in Chapter Five, the eleven themes are used to analyze the key overarching elements of the research. In the Findings Chapter, presented next, these domains are presented in the context of sections. After a great deal of thought concerning how best to represent both the themes that emerged out of the rich lived narratives of the phenomenological reflective diaries and the transcript data from the focus group interviews, it was decided that the best narrative structure was as narrative stories. The participants speak through their lived experience of being a trainee dental technician/undergraduate dental student mediated through the eleven domains that emerged out of those very experiences themselves.

CHAPTER 4: FINDINGS

4.1 Introduction

The findings of an investigation into the benefits to shared learning between trainee dental technicians and undergraduate dental students are reported in this chapter. Two purposes defined this study. One purpose was:

- To gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities.

The research questions guiding this purpose were:

- What are the individual students' experiences and perceptions of their team working skills and group dynamics?
- What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?

The second purpose was:

- To examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages.

The research questions guiding this purpose were:

- Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?

- How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

A narrative is used to frame the findings from the participant's within this study. An exemplar quote is used to represent the participant's practices and experiences of the shared learning experience. Each narrative is presented in two sections. Section One, is a descriptive analysis of the participant's practices and experiences from their reflective diaries and addresses the research questions tied to the first purpose of the study. In examining the relationship between the student's practices and experiences, the discussion in this section draws heavily on the participants' experiences that were offered to the researcher from the reflective diaries. Section Two, examines the second purpose of this study, which is an analysis of how shared learning promotes a better understanding of each others' professional roles and effective interprofessional teamwork, and examines prior beliefs and life experiences as well as identity formation issues. The first purpose of this study, understanding the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities is addressed by the domains, *decision making and professional judgement, collaboration, patient care, awareness, treatment plan, professional identity, role definition*. The second purpose, whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits is addressed by the domains, *understanding one another's role, apprehension, awkwardness, awareness of patient responsibility, preparation*.

In order to clarify the narratives, Figure 10 represents the relationship between research purposes, research questions, and domains from the analysis of findings. Table 3 illustrates the emerging themes from the questions in the reflective diaries and the relationships between the domains and the saturated and interrogated data, to reveal themes within. Table 4 illustrates the emerging themes from the focus group questions and the relationships between the domains and the saturated and interrogated data, to reveal themes within.

4.2 Reflective diaries

4.21 Decision making and professional judgement

The first question in the diary asked the students what they did during each session. From this question the domain decision making and professional judgement emerged with the themes of learning and communication. Evidence of learning came from one trainee dental technician who reported on his experiences of working with the undergraduate dental students. His diary entry was very encouraging; he describes how he was learning from the undergraduate dental student and at the same time being directly involved in decisions regarding the patient's treatment plan:

"… This session went well again. I was able to get involved sharing opinions and discussing information before reaching agreement on the best way forward with the patients work. When the clinical tutor spoke he directed questions to both of us making me feel involved. The undergraduate is easy to get along with and I find it easy to ask him questions, I am learning quite a bit. I think this proves this experience is worthwhile". (Trainee dental technician 29/10/2008)

Further evidence in support of the students learning from each other came from one of the 3rd year undergraduate dental students who described how the trainee technician had assisted them trimming their special trays and also how he had explained to them the reasons why he had made the trays larger than necessary:

"… The trainee technician assisted in trimming the excess off the special tray and explained the reasons why the tray had been made larger than necessary". (3rd year undergraduate dental student 7/11/2007)

One of the trainee technicians also described how he encouraged the 3rd year undergraduates he was working with to undertake some of the technical procedures themselves:

"… When I was working with the 3rd years I tried to encourage them to trim their trays themselves – not because I didn't want to be involved but because I thought as they had never done it before it would be good for them to try it themselves. I also showed them how to hold the hand piece and where they should trim. I think they found it quite helpful". (Trainee dental technician 7/11/2007)

Diary entries also supported evidence that communication was taking place between the students and the patient. This was reported by one trainee technician who explained how he had spoken with both the patient and the undergraduate dental students as to what the proposed treatment plan would be for the patient over the coming weeks:

"… Spoke with both patient and undergraduate as to what I would be doing in the next couple of weeks. Patient seemed happy that I was onboard as problems she had experienced previously when having dentures made in the past". (Trainee dental technician 17/09/2008)

Figure 10. Representation of the relationship between the research purposes, research questions, and the major domains emerging from the data.

Research Purpose	**Purpose 1:** To gain an in-depth understanding of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities.	**Purpose 2:** To examine whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any professional and occupational specific disciplinary developmental benefits or disadvantages.
Research Questions	1. What are the individual students' experiences and perceptions of their team working skills and group dynamics? 2. What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?	3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork? 4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?
Domains from Coding	• Decision making and professional judgement • Collaboration • Patient care • Awareness • Treatment plan • Professional identity, role definition	• Understanding one another's role • Apprehension • Awkwardness • Awareness of responsibility to patients • Preparation
Themes from Coding	• Learning/Communication • Cooperation/Teamwork • Reflection/Problem solving • Familiarity/Proactive • Involvement/Interaction • Relationship/Confidence	• Collaboration/Team work • Concern/Anxiety • Attitude/Uneasiness • Communication/Understanding • Information/Equality

Further evidence from the student's diaries supporting the theme of communication was reported by a 4th year undergraduate dental student who said he had discussed the options on the shade and shape of the teeth with both the technician and the patient:

"… Both the technician, patient and I discussed the options on the shade and mould of the teeth". (4th year undergraduate dental student 22/10/2008)

The above diary entries support the themes of learning and communication, as an essential link in collaborative team work.

4.22 Collaboration

In terms of what the outcome of their treatment sessions had been; the main domain to arise from the data relating to this question was that of collaboration, that is the development of the relationship between the two groups of students with the emerging themes of cooperation and team work. Evidence of cooperation taking place was reported by one of the 4th year undergraduates in her diary entry, this student reported that by having the opportunity of working with the trainee dental technician she now had a much better understanding of the terminology used in partial denture construction:

"… I now have a much better understanding of the technical terminology used in partial denture design". (4th year undergraduate dental student 21/09/2008)

One trainee technician reported how as a result of working alongside the undergraduate dental student his confidence had grown:

"... I now feel more comfortable in voicing my opinion with both the undergraduate dental student and the patient". (Trainee dental technician 10/12/2008)

Table 3. Emerging themes from reflective diaries

Question	*Domain*	*Themes*
What you did	• Decision making and professional judgement	• Learning • Communication
Outcome	• Collaboration	• Cooperation • Team work
Problems encountered / handled	• Patient care	• Reflection • Problem solving
What I would do again / what I would not do again / what was a mistake	• Awareness	• Familiarity • Proactive
Follow up / Action plan	• Treatment plan	• Involvement • Interaction
Additional comments; possible comments about ***How I felt in the clinic / laboratory*** ***How the patient felt***	• Professional identity, role definition	• Relationship • Confidence

A diary entry made by another 4th year undergraduate dental student reported that both he and the trainee dental technician now understood exactly what their patient wanted:

"… Both I and the trainee technician have a thorough understanding of what the patient wants from her dentures, her likes and dislikes. It also helped me appreciate the vital role of each one as well as the importance of sharing and discussing information". (4th year undergraduate dental student 24/10/2007)

Team work was the other theme to emerge and this was supported by one of the trainee dental technicians who gave this brief narrative on his experience working alongside the undergraduate dental students:

"… Today went very well. I felt relieved and pleased that everyone was happy with the finished look. The undergraduates asked if I could continue working with them as they found it extremely helpful having a technician at the chair side. This made me feel I had been helpful throughout the exercise and it had definitely been worthwhile, benefiting both myself and the undergraduates. Overall my opinion has changed from start to finish, from feeling useless and awkward at the start to feeling very helpful and comfortable to voice my opinion. This experience has been very worthwhile". (Trainee dental technician 15/01/2009)

This sentiment was echoed further in an excerpt from another trainee dental technicians diary entry describing her overall experience of the shared learning exercise:

"… The patient's dentures fitted well, although a little trimming was required. The patient was very happy about the appearance and function of her dentures. Both the undergraduate and I received a Christmas card and box of chocolates from the patient. Overall I have enjoyed the experience and will definitely continue to work with the undergraduate. It was interesting to see the work that I had done in the lab used in a clinical context. From these insights I'm now better able to visualise what is needed for specific jobs such as trays and try-ins. Hopefully, this will reduce chair side time spent modifying my work". (Trainee dental technician 10/12/2008)

The above diary entries provide evidence that cooperation and team work had taken place through shared learning and the development of skills by joint participation. Diary entries also supported evidence that communication was taking place between the students and the patient. This was reported by one trainee technician who explained how he had spoken with both the patient and the undergraduate dental students as to what the proposed treatment plan would be for the patient over the coming weeks:

"… Spoke with both patient and undergraduate as to what I would be doing in the next couple of weeks. Patient seemed happy that I was onboard due to the problems she had experienced previously when having dentures made in the past". (Trainee dental technician 17/09/2008)

Further evidence from the student's diaries supporting the theme of communication was reported by another trainee technician who said he had discussed the options on the shade and shape of the teeth with both the undergraduate dental student and the patient:

"… Both the undergraduate the patient and I discussed the options on the shade and mould of the teeth". (Trainee dental technician 22/10/2008)

The above diary entries support the themes of learning and communication, as an essential link in collaborative team work.

4.23 Patient care

With regard to the issues the students had encountered regarding their patients care during their sessions and how they were handled. From this question the themes of reflection and problem solving emerged. The theme of reflection was reported by one of the trainee dental technicians who commented on the fact that he should have trimmed his special trays shorter, having seen what the undergraduate had to work with in the clinic, he now understood why he would trim the trays shorter in the future:

"… From a technicians perspective I would in the future trim my trays slightly shorter in order to save time at the chair side as I usually leave them slightly overextended, yet by seeing what the dentist needs to work with it has made me more conscious of my tray extensions". (Trainee dental technician 7/11/2007)

Further evidence of reflection came from another trainee dental technician who reported that now he had experienced working in a clinical environment he understood what needed to be done and he would be better prepared next time:

"… I would make myself more aware of the actual procedure before I go on the clinic so I would be more efficient and confident, but now I've experienced it once, I think my pace and ability will be better next time". (Trainee dental technician 14/11/2007)

Further evidence from diary entries to support the theme of reflection was also voiced by one of the 3rd year undergraduate dental students who commented on how she had asked the trainee dental technician to make some alterations to the patients trial dentures, however, the trainee technician felt that the alterations he had been asked to make to the denture at the chair side had taken too long as he did not have the necessary experience and as a result the patient was kept waiting:

"… Next time I would suggest that for such a large number of teeth to be moved the patient didn't wait but came back for another appointment". (*3rd year undergraduate dental student 28/11/2007)*

Problem solving was the other theme to emerge from this domain and this was reported on by one of the trainee dental technicians who said as this had been the first time on clinic for both himself and the undergraduate a lot of time was spent working out exactly what was to be done:

"… As it was the undergraduates first time on clinic, a lot of time was spent working out exactly what was to be done. But between us we worked through the problems". (*Trainee dental technician 24/10/2007)*

Further evidence to support the theme of problem solving was voiced by one of the trainee dental technicians in his diary entry. He describes how he shared opinions with the undergraduate dental students on what had taken place during one of the clinical sessions:

"… Worked together today with the undergraduates sharing opinions on various factors such as lip support choice of mould and shade of teeth required". (*Trainee dental technician 21/11/2007)*

One 3rd year undergraduate dental student shared her concerns whilst undertaking a jaw registration with her patient and how it had been helpful having the trainee technician present as he had been able to make a note of what the problem was which would help him when it came to setting the teeth in position in the laboratory:

"… The patient has a heavy bite causing the lower block to slide to the right. The trainee technician made a note of this which he said would help when he came to set up the teeth". (*3rd year undergraduate dental student 21/11/2007)*

Further evidence supporting the theme of problem solving was reported by a 4th year undergraduate who was faced with a problem seating the patient's denture in the mouth and described how the trainee technician was able to identify the problem and correct this at the chair side:

"… Framework would not seat on the right hand side the trainee technician adjusted the clasp so the framework would seat properly". (*4th year undergraduate dental student 15/05/2008)*

Overall quotes from both the undergraduate dental students and the trainee dental technicians diaries provided evidence that both sets of students had supported each other with regard to their patients care and overcome most of the problems they had encountered.

4.24 Awareness

In response to what they would do again/what they would not do again and what was a mistake. From this question the domain of awareness emerged with the themes of familiarity and being more proactive. Evidence to support the theme of familiarity was reported by one technician who stated that he would make sure for future appointments to familiarise himself with the materials he was using as this would save time and face in front of the patient:

"… Need to familiarise ourselves more with the materials before we start so we look more efficient and confident. Once again though it's just practice and I'm confident with time these errors will disappear. I found today's session productive and I feel I worked well with the undergraduate dental student. We achieved what we set out to do in good time". (*Trainee dental technician 31/10/2007)*

Further evidence to support the theme of familiarity came from another trainee dental technician who felt that the undergraduates should have an opportunity to get to know some of the materials they were to use prior to seeing their patients:

"… Maybe the undergraduates should be given more opportunities to get to know the materials before allowing them to see patients". (*Trainee dental technician 24/10/2007)*

Evidence to support the second theme of being more proactive was reported by a number of students in particular the trainee dental technicians. One trainee technician felt that being more proactive and getting more involved might help him when it came to actually making the patients dentures:

"… Next time I will try to get more involved by looking in the patient's mouth to see what there is to work with". (*Trainee dental technician 24/10/2007)*

Another trainee technician echoed this sentiment stating that he must become more proactive in the treatment process as he was beginning to appreciate the difficulties the undergraduate was faced with and if he could involve himself more, both he the undergraduate and the patient should benefit:

"… Green sticking the tray was interesting, and made me realise how tricky a job it can be. More participation like this will be helpful in the future for me and hopefully for the patient and the undergraduate student". (*Trainee dental technician 15/10/2008)*

Further evidence supporting this theme came from one of the 4th year undergraduates who stated he had discussed with the trainee technician the need for him to become more involved at the chair side and said it was his intention to try and involve the trainee technician more at the patient's next appointment:

"… Discussed with the trainee technician that he must get more involved. At next visit we will aim to go through each stage of the registration process together and I will get advice from him at each stage". (*4th year undergraduate dental student 15/09/2008)*

Based on the above evidence such interprofessional learning raised the awareness of the student's professional roles.

4.25 Treatment plan

In terms of what follow up/action plan the students had. The domain arising from this question were the patient's treatment plan with the themes of involvement and interaction emerging. Evidence to support these themes was reported by one trainee technician who understood what he had to do; however, he needed the undergraduate to involve himself with the laboratory work so they could help in the design of the patients special trays:

"… The follow up session is for me to cast the impression and arrange for the undergraduate dental student to come to the lab and draw a design on the cast in order for me to make the trays". (*Trainee dental technician 31/10/2007)*

Another trainee technician also reported how she had involved herself discussing the patients treatment plan with the undergraduate dental student to make sure the design of the dentures were correct:

"… Both the undergraduate and I consulted the x-rays and discussed the bone loss, resorption and design of the patient's new denture". (Trainee dental technician 17/12/2008)

With regard to the theme of interaction one trainee technician explained how working with the undergraduates had improved his confidence and allowed him to get to know exactly what problems the patient was having:

"… I felt more confident on clinic as the patients treatment progressed. The exercise allowed me to get to know the undergraduates and the patient better, it made it easier to talk about and explain any problems with both the student and the patient". (Trainee dental technician 17/12/2008)

Further evidence to support this theme was echoed by one of the 3rd year undergraduate dental students who described how valuable it was having the trainee technician present as it was an excellent opportunity to ask questions with regard to the lab work:

"… It was a huge help for us on the technical side having the technician present, he was able to help and advise as well as answer questions more fully, especially with respect to the lab work. I would definitely recommend having lab technician present again". (3rd *year undergraduate dental student 19/12/2007)*

A 4th year undergraduate dental student gave further evidence supporting this theme commenting that the patient appeared pleased that such a great deal of effort was being put into the making of her dentures:

"… Patient felt happy to see that so much effort from so many people is being shown to produce their new dentures. With the student technician being present if any important points were left off the lab sheet, he/she could still remember". (4th year undergraduate dental student 19/11/2008)

The above diary entries provide evidence that both groups of students were involved and interacted with each other with regard to their patient's treatment.

4.26 Professional identity, role definition

Finally the students were asked for any additional comments they may wish to add such as how they felt in the clinic/laboratory and how their patient felt. The main domains to emerge from this question were that of professional identity and role definition. The main themes to emerge were relationships and confidence. One trainee technician reported on his personal experiences during his first weeks of the exercise, initially his diary entries were lacking in self-confidence as can be seen from the following narrative:

"… First day on clinic. I felt a little apprehensive, because it seemed the undergraduate dental students were not expecting us and I felt a bit of a burden. The two students were friendly, although they were concerned that the whole experience might impede on their studies, and cause extra stress. I also wasn't sure how my presence on clinic could help. Perhaps in later stages I will be more useful as a technician, but at the moment I seem only to get in the way". (Trainee dental technician 13/10/2007)

However, over the following two weeks there was a noticeable change in this particular student's diary entries as there was evidence to support the student was gaining in confidence as can be seen from the following diary entries:

"… This week (Week 2) I felt as though I had a reason to be there, I was able to offer advice from a technicians stand point on whether a good impression had been taken, or how much the tray needed to be trimmed. I still feel as though I may be a bit of a hindrance, although both undergraduate students assure me this is not the case". (Trainee dental technician 20/10/2007)

"… Week 3, I am starting to feel more at ease and part of the team. I felt very involved by the patient, the undergraduate dental students and the clinical tutor and felt valued and a part of what was going on". (Trainee dental technician 27/10/2007)

As the weeks progressed it was obvious from the diary entries a relationship was developing between the trainee dental technician the undergraduate dental student the patient and the clinical tutor. The student's self-confidence had grown as shown by the following diary entry:

"… I and the undergraduate dental student make a very good team and I really enjoyed the session today. I felt very involved by the patient, the undergraduate dental student and the clinical tutor. I felt valued and a part of what was going on. I am finding the exercise valuable and learning things I can take back to the lab and apply to my practical work". (Trainee dental technician 27/11/2007)

Other students also described similar feelings of self-confidence and the development of relationships, one undergraduate dental student remarking:

"… My confidence with both patient and the student technician has increased, which makes me feel more comfortable on clinic. This week it looks like we are more of a team. I asked the student technician for help in marking the mid-line, and he was also able to advise me on adding wax to the rim". (Undergraduate dental student 26/11/2008)

Evidence of relationships forming was supported by one trainee technician who had initially been a little apprehensive about the possible social divides that might exist between her and the undergraduate dental students she was working with, however, her concerns were unjustified as she explains in this brief narrative on her experiences:

"… I enjoyed working alongside the dental students, but I must admit I was dubious at first because I was aware of social divides and I initially felt intimidated through my own insecurity. Luckily, I was proved wrong and it's been a truly enjoyable experience in which I've met some lovely interesting people. I feel the experience has boosted my social and academic confidence. I feel the whole exercise has been very positive and I am pleased to have been given the opportunity to have taken part." (Trainee dental technician 28/11/2008)

Another trainee technician also reported on her overall experience of the exercise:

"… Last appointment today. Overall the experience has been fun and enlightening. Now that I have seen firsthand every stage of denture construction from a clinical perspective I feel I have a greater understanding of why we do some of the things we do. For instance after seeing the undergraduate dental students spend 10 minutes trimming excess tray material from a special tray, I now realise the importance of not overextending the tray when making it. I now no longer add so much wax to registration blocks, knowing that ultimately this material will be removed". (Trainee dental technician 28/03/2008)

One 3rd year undergraduate dental student commented on how it had improved her confidence receiving positive comments from the patient:

"... Really pleased and feeling more confident since the patient informed us she was happy with her new dentures. She told us they are really nice and fit well". (3rd year undergraduate dental student 28/03/2008)

In general, the student diaries provided valuable information on a variety of emotions and reflections that characterize the student learning experience. Overall diary entries made by both groups of students provided strong evidence to suggest that the exercise had afforded the students with a better understanding of the role each can play in patient care.

4.3 Focus groups

Focus group discussions were conducted with the aim of facilitating free and full discussion regarding the students' experiences of the shared learning exercise. A structured approach was used as there were some questions to which I particularly wanted answers. Table 4 shows the questions the domains and the themes to arise from the focus group interviews.

Each focus group meeting was conducted with individual groups of students. It was felt that if mixed groups were used this may deter students from openly discussing issues relating directly to those they had worked alongside.

4.31 What benefits did you gain from the exercise?

Firstly, I asked the students to define what benefits they had gained from the exercise and encouraged them to talk about their experiences. From this first question the main domain to arise was that of understanding one another's role with the themes of collaboration and team work emerging. The theme of collaboration was echoed by many students, one of the trainee technician students described the benefits of being able to see and understand what you have made on the clinic:

"… I thought it was very beneficial in understanding the role of the dentist in comparison to the role of the dental technician and also to understand what you are making and how it is going to be used in the clinic. Also being able to see what the patient wants themselves because sometimes the dentist doesn't always listen to what the patient says, but at the end of the day that denture is going in the patients mouth so if you can hear what the actual patient wants and take it into consideration then I think that is beneficial to the patient". (Trainee dental technician. Focus group meeting 01/04/2009)

A 4th year undergraduate dental student described her experience when she visited the lab to discuss her patients work with the trainee technician she was working with. She was able to watch the technician make the denture look as natural as possible for her patient. She explained that this experience had increased her knowledge of the technical procedures in preparing the denture for the patient and she was able to appreciate this when the denture was fitted in the clinic:

"*... One example, was one of my patients had a big gap anteriorly and it wasn't big enough to put two teeth in but too big for just one and it was really good to be able to go to the lab when they actually cut the tooth. It was good to see a tooth being completely changed to fit the patient and then trying it in on clinic with the technician there so that the technician can actually see. It looked completely different on the model to what it looked like in the mouth and it looked brilliant in the mouth. Seeing both the technical and clinical stages really worked for me". (4th year undergraduate dental student. Focus group meeting 01/04/2009)*

Table 4. Emerging themes from focus group interviews

Question	*Domain*	*Themes*
What benefits did you gain from the shared learning exercise?	• Understanding one another's role	• Collaboration • Team work
Was there anything that wasn't of benefit from the exercise?	• Apprehension	• Concern • Anxiety
Were you conscious of any barriers to learning during the exercise?	• Awkwardness	• Attitude • Uneasiness
Do you feel the patient benefited more?	• Awareness of responsibility to patients	• Communication • Understanding
How could the exercise be improved	• Preparation	• Information • Equality

This experience had made the student appreciate the advantages of good collaboration being able to get involved and see the technical work undertaken in the laboratory and the results in the patient's mouth. Further evidence to support the students collaborating came from a trainee dental technician who described that having had the opportunity to work alongside the undergraduate dental students he now had a better understanding of how special trays and registration blocks should be made:

"… Having the opportunity to work alongside the undergraduate dental students has given me a better understanding of how the special trays and registration blocks should be made". (Trainee dental technician. Focus group meeting 01/04/2009)

Another trainee dental technician echoed these sentiments stating that being able to see the patient from the beginning was a big advantage:

"… Seeing the patient at the initial appointment is good because you get to find out what problems they have had and what they actually want, it's not just written down on a prescription so if the patient wants a natural set of teeth you know exactly what to do". (Trainee dental technician. Focus group meeting 01/04/2009)

In every focus group discussion virtually all the participating students acknowledged the advantages of team work. One of the trainee technicians explained why:

"… Working as part of a team, I felt that I and the undergraduate dental student worked well together. We discussed the design of the denture and spent some time surveying the dental cast looking for areas of undercut. We both discussed what the treatment plan would be to make it clear in our heads before the next visit". (Trainee dental technician. Focus group meeting 01/04/2009)

This sentiment was echoed by a 3rd year undergraduate dental student who said:

"… We felt it really useful to have the technician present going through the various stages with you because we were learning. They seemed to know a bit more about things than we did at times so that helped us." (3rd year undergraduate dental student. Focus group meeting 01/04/2009)

4.32 Was there anything that wasn't of benefit from the exercise?

Asked if there had been anything that wasn't of benefit from the exercise. After much discussion the main domain to emerge was one of apprehension with the themes of concern and anxiety. Concerns were raised by one 4th year undergraduate dental student who felt that the trainee dental technician he was working with might have been a little left out initially:

"… Sometimes I felt bad for the technician student just standing there 'just hanging around'. If I was talking to my patient for a while I thought they may have been a bit bored. There are times during the clinical stages where there is not really anything they can do and it appears that they just have to stand and observe - you try and involve them as much as you can but it's just really chatting to the patient checking that the patient is happy. There are times when there is nothing for them to physically do". (4th year undergraduate dental student. Focus group meeting 01/04/2009)

However, other students within their focus groups reported that this lack of involvement normally changed after the first few weeks once each student got to know one another better. This was supported by a 3rd year undergraduate dental student who stated:

"… Not knowing the technician at first was a little strange and I felt maybe everyone was a bit Shy at voicing opinions in the first session, but that soon sorted itself out once we got to know each other". (4th year undergraduate dental student. Focus group meeting 01/04/2009)

Further concerns and anxieties came from the trainee dental technicians focus group interviews, a number said at times they felt left out or their opinion was disregarded. One trainee technician describes feeling left out initially:

"... Initially I did feel left out; however this all changed as the patients treatment progressed and I got to know the undergraduates better" (Trainee dental technician. Focus group meeting 08/04/2008)

Another shared his concerns over how his opinion was disregarded on the way something should be done when he said:

"… It can get quite frustrating trying to work as part of a team, where some members have very different opinions on things. When somebody says that this is how you have to do something and you know that it is just not going to work and you are going to have to put in twice as much work to fix it – maybe that's the biggest point. The reason why we are doing this exercise is to have a little bit of input into it and being able to say would it not be better to do this way".
(Trainee dental technician. Focus group meeting 08/04/2008)

One of the 3rd year undergraduate dental students commented on how anxious she felt about how much she should let the trainee technician do so as not to be considered lazy by the clinical tutors:

"… I was unsure of the technician's role – how much they were allowed to do at each stage and how much they wanted me to do. I was also concerned that the clinical tutors might think that I was being 'lazy' if the technician did a lot of the work". (3rd year undergraduate dental student.. Focus group meeting 08/04/2009)

The general consensus of opinion coming from all participating students was that they all were initially a little apprehensive at the start of the exercise, however, as the weeks went by their anxieties and concerns disappeared as they became more engaged with each other and their patients work.

4.33 Were you conscious of any barriers to learning during the exercise?

Next I asked each group whether they were conscious of any barriers to their learning during the exercise. This question initiated a lively debate the main domain to emerge was awkwardness with the themes of attitude and uneasiness.

Some of the undergraduate dental students voiced concerns over how uneasy they would have felt to criticise any work the trainee technician had prepared due to the fact they had built up a working relationship with them, one 4th year undergraduate dental student gave this brief narrative:

"… I would have felt quite bad criticising the technicians work after they had put so much time and effort into doing it and it was less than satisfactory – I would have struggled to say that it was not up to scratch and criticise their skills as a technician. It's a bit different when you haven't got a working relationship. If you are not working face-face it is easier to criticise. If you had bad work from a technician and you didn't have a working relationship with them you would find it easier to criticise whereas when you work with them every week and get chatting with them it is harder to say something to them". (4th year undergraduate dental student. Focus group meeting 01/04/2009)

A number of trainee technicians commented on the attitudes of some of the clinical tutors towards them. One trainee technician shared his concerns, namely that any opinion he had to offer was often disregarded by the clinical tutor:

"… Sometimes I felt that my opinion was disregarded especially by the clinical tutors". (Trainee dental technician. Focus group meeting 08/04/2008)

Another reported on how she wanted to *"... feel she belonged in the team". (Trainee dental technician. Focus group meeting 26/02/2009)*

This sentiment was echoed by an excerpt from one of the 3rd year undergraduate dental students who said:

"… I think sometimes the clinical tutors tend to ignore the student technicians. They were probably more involved when the case required a technical opinion". (3rd year undergraduate dental student. Focus group meeting 26/02/2009)

However, one 3rd year undergraduate commented it may have been the trainee technician not getting involved that gave the appearance they were being ignored;

"… Yes I do agree with the above sentiments but not all the time – it may have been the technician's fault not getting involved enough at the chair side rather than being ignored". (3rd year undergraduate dental student. Focus group meeting 26/02/2009)

A number of the trainee technicians felt that some of clinical course tutors were often unapproachable and sometimes rude to the patients. One trainee dental technician commented on one clinical tutor who she thought was very rude to the patient appearing to expect the patient to open their mouth without being asked politely. It also appears from discussions with the trainee dental technicians and the undergraduate dental students that some of the clinical course tutors appeared more amenable to the shared learning exercise than others. With regard to barriers to learning between the students themselves, a few trainee dental technicians mentioned a feeling of uneasiness with the 4th year undergraduate dental students. They felt they acted more like *'qualified dentists'*. The trainee dental technicians felt a greater rapport between the 3rd year undergraduate dental students as opposed to the 4th year students as reported by one trainee technician:

"… I felt there was a better social interaction with the 3rd year undergraduates as opposed to the 4th year students who asked more questions". (Trainee dental technician. Focus group meeting 26/02/2009)

A number of trainee technicians also voiced opinion on how they found it more difficult to encourage the 4th year undergraduates to attend the laboratory to discuss their work compared with the 3rd year undergraduates they had worked with:

"… The third year undergraduates were more amenable to come along to the lab to discuss their work compared to the 4th year undergraduates". (Trainee dental technician. Focus group meeting 26/02/2009)

This may have been due to the fact the third year dental undergraduate's first experience of treating a patient is at the very beginning of their third year, so those 3rd year undergraduate dental students who had agreed to take part in the shared learning exercise would see their first patient with the trainee dental technician present. In comparison the fourth year undergraduate dental students had been working with patients for over a year and may not have liaised with a dental technician during that time; therefore, they may not have felt it as important to visit the laboratory. During the course of discussions in one focus group with the 4th year undergraduate dental students one of the group questioned whether shared learning was a good idea, as once she was qualified she would be working independently:

"… I can't really see much point in visiting the laboratory as I'm never going to be expected to undertake any technical work myself. I will eventually be expected to be able to fit the dentures and resolve problems on my own – working as a team perhaps caused me to rely on my team too much at times". (4th year undergraduate dental student. Focus group meeting 26/02/2009)

However, this student did acknowledge the time and effort the trainee technician she had been working with contributed to the success of her patients' work.

Focus group meetings with the trainee dental technicians also evoked issues relating to what they termed the *'university culture'*. In discussions a number of trainee technicians mentioned how the majority of undergraduate dental students were predominantly from middle class backgrounds, having attended private school and exhibited what they called a *'private school mentality'*.

However, they did admit this was not attributable to all the undergraduates, but they had observed that the attitudes of certain individuals' did display an air of unswerving confidence and possibly arrogance at times, an example of which was reported by one of the trainee technicians:

"… On one occasion I felt the undergraduate handled the patient in a very unprofessional manner and if this had been in practice I don't think he would have been paid. It was our mistake and he was acting as if it was hers! The patient felt as though she could talk to me and I listen, whereas the undergraduate doesn't show any empathy". (Trainee dental technician. Focus group meeting 26/02/2009)

However, one trainee technician felt these stereotypes would be common in all professions:

"… I think it is dependent on the personality of the person. In any profession there is always going to be a hierarchy and you may find you have a manager that either respects you or doesn't – it happens everywhere in every profession". (Trainee dental technician. Focus group meeting 26/02/2009)

4.34 Awareness of responsibility to patients

I asked both groups of students; did they feel that their patient had benefited in any way. The main domain to arise from this question was awareness of patient responsibility with the themes of communication and understanding. In every focus group discussion all the students agreed there had been benefit to their patients. Through face-to-face communication with each other and their patients both the trainee dental technicians and the undergraduate dental students had a better understanding of their patients requirements. One third year undergraduate dental student described how their patient had more choice in their treatment:

"… Yes my patient felt that she was getting a lot more choice in her treatment, the patient could tell the technician directly what he or she wanted without it having to be explained in writing". (3rd year undergraduate dental student. Focus group meeting 23/06/2008)

This sentiment was echoed by one of the trainee technicians who stated:

"… The patient was able to voice opinion on the shade of their teeth and the general appearance of their dentures". (Trainee dental technician. Focus group meeting 23/06/2008)

One of the trainee dental technicians also commented on the time they had saved their patient from having to come back for further appointments by being able to make modifications at the chair side while the patient waited:

"… If there were problems we could rectify it there and then instead of the patient having to return for an extra appointment". (Trainee dental technician. Focus group meeting 23/06/2008)

This was further supported by one of the 4th year undergraduate dental students who explained how time could be saved having the technician present:

"… If there was something wrong with the patient's teeth i.e. the shape or the size I could discuss the problem with both the technician and the patient and it could be sorted out while the patient waited. I definitely think it benefited the patient in the number of appointments they had". (4th year undergraduate dental student. Focus group meeting 23/06/2008)

Overall all the students who participated agreed that their patients had benefited in some way from the exercise and this further supports what the students reported in their reflective diaries.

4.35 How the exercise could be improved

The final question I asked both groups of students was in what ways they feel the exercise could be improved. From this question came the domain of preparation with the emerging themes of information and equality.

A number of students felt they should have perhaps been given more information before the start of the exercise perhaps a talk on the purpose of the exercise instead of just being asked in the clinic if they would be interested in taking part. This they said would have given them the opportunity to get to know each other prior to meeting their patients. This sentiment was echoed by one of the 3rd year undergraduates who said;

"... The only thing that I would suggest is at the start of the exercise it should be made clear what each person is expected to do. The link-up at the start was on clinic, it would have been better if they could have asked us first about the exercise than just saying we are starting this exercise today would you be interested. I think it is important to lay down the idea first'. (3rd year undergraduate dental student. Focus group meeting 4/004/2009)

One of the trainee dental technicians commented on difficulties in accessing 'blackboard' to download lecture notes etc;

"... The only comment is about the lectures and being able to have access to blackboard. It would be beneficial if we could have access to blackboard to have the lecture notes with us'. (Trainee dental technician. Focus group meeting 4/03/2009)

With regard to issues of equality some of the trainee dental technicians commented as they did in their reflective diaries about the difficulties some had trying to arrange for the undergraduates to visit the laboratory to discuss their patient cases. One reported;

"... Not all the students came back to see our side of the process so that would be nice. We observe them but they don't observe us'. (Trainee dental technician. Focus group meeting 4/03/2009)

Another commented;

"... I think the dental students would benefit from seeing more of our side. Some didn't seem to realise that this was about them as well and not all about us'. We are learning about their job role and they are not seeing our entire job role as we are seeing theirs. We are not going to be dentists and they are not going to be technicians but why should they not see our role'. (Trainee dental technician. Focus group meeting 4/03/2009)

4.36 Summary

The main findings show the contribution (or otherwise) the students have made working as part of a team through the development of their relationships with one another and their reflective learning experiences. In the following chapter the discussion, the discourse from both the student's reflective diaries and focus interviews will now be related back to the analytical framework and considered in relation to the literature before conclusions are drawn and recommendations made.

CHAPTER 5: DISCUSSION

5.1 Overview

A discussion of the research findings is presented in this chapter. The methodology of phenomenology prevailed as an appropriate framework for this study, in order to examine the nature and implications of an interprofessional learning programme, and includes specific research exploring:

1. An examination of the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities.
2. Whether interprofessional learning between trainee dental technicians and undergraduate dental students offered any specific professional and occupational disciplinary benefits or disadvantages.

The present discussion examines the challenges faced by groups of trainee dental technicians and undergraduate dental students during a prolonged shared learning episode in a UK Dental Hospital/University Dental School. The findings are discussed in relation to the existing literature on the principles, practices and implications of interprofessional learning. The chapter is divided into two major sections. The first section, The Students' Experiences, has as its purpose, the in-depth analysis and understanding of the challenges faced by both undergraduate dental students and trainee dental technicians as they endeavor to participate in shared learning experiences. As such, this section is a discussion of the findings from the reflective diaries concerning the participants' lived experiences and perceptions based on the research questions:

1. What are the individual students' experiences and perceptions of their team working skills and group dynamics?
2. What are the possible consequences for future team working in both clinical and laboratory settings as a result of the shared learning programme?

In the second major section of this chapter, an examination of the professional significance and implications arising out of these shared learning opportunities, there follows a discussion of the findings regarding the participants' narratives from the focus group interviews, based upon the research questions:

3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?
4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

5.2 Personal experiences of interprofessional learning

5.21 Overview

Interprofessional education has been invoked internationally (WHO, 1988) and nationally (Glen & Reeves, 2004) by policy makers, health and social care professionals and educators as a means to improve collaboration and service delivery in fields such as child protection (UK Department of Health, 1995), community care (UK Department of Health, 1990) and mental health (Sainsbury Centre for Mental Health, 1997).

In addition, interprofessional learning has also been cited as an occupational predicate for deploying the healthcare workforce more flexibly (UK Department of Health, 1997 & 2000). It is asserted that if individuals from different professions learn together they will work better together, improving both the care of patients and clients and delivery of service (Barr et al, 2000; Barnsteiner et al, 2007). However, strong professional identities are a long-standing feature of many professional groups in the healthcare environment and those identities are laid down from the first days as students. Nurses, pharmacists and doctors for example, each have their own unique knowledge, skills and perspective (General Medical Council, 2005), and in each group there are strong identity reinforcing attributes such as the notion of caring nurses or doctors as all-powerful 'life savers' and equally strong professional 'protective' behaviours, such as 'closing ranks' in the GMC, or the virtue made of nurses as central to the patient experience is the only power of certain professions. Healthcare students such as midwives, nurses and physiotherapists go through a process of 'professionalisation' which consists of an adoption of the attitudes and working culture associated with a particular profession as well as acquiring the knowledge and skills essential to practice (GMC, 2005). Later on, in the workplace, professionals may have little understanding of the roles of the other healthcare professionals and may overlook or undervalue the other professions' contribution to care for the patient, making interprofessional teamwork difficult. This study posits that shared learning opportunities may lead to awareness raising of each others' problems and professional issues which may lead to deeper understanding, respect and empathy for each other which may lead to more insightful and responsive care for patients.

This argument has a strong appeal for those working in the context of significant organisational and attitudinal barriers, encouraging them to create interprofessional learning opportunities. Internationally, health professionals' education is addressing this change in health service delivery through the provision of interprofessional learning when two or more professions learn from and about each other to improve collaboration and the quality of care (CAIPE, 1997). Pirrie et al (1999) reveal a belief that the provision of effective patient care places an emphasis on collaboration and teamwork, within and between health care teams in community settings and in the care provided in hospitals. Parsell & Bligh (1998) note that the need to produce practitioners who are adaptable, flexible, collaborative team workers with highly developed interpersonal skills such as communication and team working skills is providing both the impetus and justification for the introduction of more shared learning opportunities. This section offers a discussion of the challenges facing the participants to shared learning as they have emerged from this current research study, in terms of the following domains from the data: *Decision making and Professional judgment, Collaboration, Patient Care, Awareness, Treatment Planning, Professional identity-Role definition.*

5.22 Decision making and Professional Judgement

From this domain themes emerged from the student's diaries which provided evidence that effective communication and learning was taking place. Both groups of students reported how they were engaged in constructive dialogue as they worked together and examples were given on how the students were learning from each other.

For example, one trainee dental technician working with two undergraduate dental students reported on how they "*shared opinions and discussed information before reaching agreement on the best way forward with their patient's work".* These findings are consistent with research by Craddock et al (2006) who suggests that the principles of interprofessional learning should encourage students not only to learn with one another but also from and about one another. Learning to work together is fundamental to effective teamwork. According to Barr, (1998, 2002) learning about, from and together with other professions in the health care team is crucial in the formation of an identity as a professional as it allows health professionals to rethink their roles, identities and purposes as well as their relationship to each other within the traditional health care team. Gafa et al (2005) and Taylor (2002), cited in Hall, (2005) argue that effective interprofessional learning should address the attributes, skills and knowledge required for mutual respect and effective communication between members of the team. Good communication is fundamental to effective interactions (Miller et al, 2001; Rudland et al, 2005) and patient outcomes (Duff & Hollingworth, 1968) and is seen as an area where skills should be learned with other students (Horsburgh et al, 2001). Without effective communication it is impossible to develop the relationships required for collaborative practice. Effective communication in the current study created the space for the students to discuss constructively with each other issues relating to their patient's treatment, thus drawing on the contributions of everyone of the team to develop better thought out solutions to problems thus increasing the professionals' case knowledge. Both groups of students reported that working together had been beneficial in the delivery of their patient's care.

For example, one trainee dental technician reported that the patient seemed happy that I was involved due to the *"problems she had experienced previously"* when having dentures made in the past. This finding is corroborated by research undertaken by Payne and King, 1998; Keleher, 1998; Chaboyer and Patterson, 2001; McPherson et al, 2001, who advocate that patient care given by any one professional on their own can never be as good as care given by a full team. Therefore, by bringing health professionals together in this way the opportunity arises to enhance patient care as it allows better clinical judgments to be made as people question each other more; but also improved clinical judgments can occur because there is a common knowledge base. This view concurs with Zwarenstein & Reeves (2006) who examined the impact of interprofessional education and collaboration interventions on interprofessional relationships, health care processes (including evidence-based practice), and patient outcomes. They concluded that improved patient care can be realized if teams work together with each other on a regular basis. However, they also add the proviso that the coverage of this latter evidence is 'patchy' being especially weak in primary care due to budgets being ring fenced. Further evidence to support the benefits of working together is provided by Horsburgh et al (2001) who looked at interprofessional learning between first-year medical, nursing and pharmacy students. Results showed that the majority of students reported positive attitudes towards shared learning, specifically the acquisition of team working skills, were seen to be beneficial to patient care and likely to enhance professional working relationships. The main role of interprofessional education is to improve teamwork, overcome functional barriers and improve healthcare (CAIPE, 1997; Miller et al, 1999; WHO, 1988).

Interprofessional education has the potential to achieve greater collaboration between healthcare professionals; by creating greater understanding through the creation of a common knowledge base (Areskog et al, 1995; Barr, 1994; Barr et al, 1998; WHO, 1998). Therefore, by bringing together learners from different disciplines it is possible to enhance understanding between the professions, enabling practitioners to work towards common clinical goals (Areskog et al 1995; Barr et al 2000; WHO 1988).

5.23 Collaboration

From this domain the themes of cooperation and teamwork emerged. Students described a greater awareness of the benefits of collaboration and an increased understanding of and respect for other professionals' roles and responsibilities. In the current study both groups of students shared stories of their personal experiences during the exercise and how they cooperated and worked with each other as part of a collaborative team. Most modern research on individuals and organisations draws attention in one way or another to the importance of language as a medium for information about reality. In the current research a narrative approach is the main medium through which individuals convey their interpretations of reality (Czarniawska-Joerges, 1994). The narratives about the personal journeys through work life can thus fill a sense-making function for both individuals and their social contexts. Lawler (2000) suggests we all tell stories about our lives, both to ourselves and to others. Putting more or less articulated experiences together into a coherent narrative is a way of clarifying how individuals relate to their environment over time.

One might say that the narratives fulfil a pragmatic function, insofar as the individuals concerned try to organise their life stories by finding reasons for their actions in different situations, and a sense-making function when different episodes are to be explained on a basis of some sort of meaningful philosophy or value (Czarniawska, 1997). A multi-dimensional view of professional socialization, incorporating not only new role behaviours but new views of the self, is echoed by Olesen and Whittaker (1968) in their study of professional socialization in nursing. They believe that these changing views of the self are directly related to external factors or particular objective events, which help shape the individual's changing self-concept. The social environment and the individual's interactions with this environment are therefore central to the process of professional socialization, in which the individual is an active participant. For example, in the current study one trainee dental technician reported how as a result of the exercise *"I now feel more comfortable in voicing my opinion with both the undergraduate dental student and the patient".* This method of collaborative learning appeared to foster new respect for each other as colleagues and professionals, and provided an opportunity to demonstrate the valuable role dental technicians provide to both patients and the oral health care team. Students reported on their experiences and how their skills were developing as a result of joint participation. For example, one undergraduate dental student working with a trainee dental technician reported how he now had a better understanding of *"the technical terminology used when constructing partial dentures".*

Current findings are consistent with research undertaken by Reeves (2000) who evaluated the effectiveness of interprofessional education for first and second year medical, nursing and dental students on a community based placement. Results showed that students felt that this type of education had the potential for enhancing cooperation and team working. Further evidence in support of collaborative learning comes from Tucker et al (2003) who evaluated the feasibility and effectiveness of shared learning of clinical skills for medical and nursing students in the University of Manchester. The researchers concluded that collaborative learning opportunities for nursing and medical students are important and add value to the learning experience. Additionally, qualitative research by Geissler et al (2002) revealed that the workplace is currently the environment where the majority of professionals learn about collaborative team-based approaches to problem solving concerning patient care.

It is recognized that workplaces can be rich learning environments and that in working towards a formal qualification individuals can also make a contribution to the development of the organization (Barnett, 1999; Boud et al, 2001; DOH, 2001; Flanagan et al, 2000). Work-based learning values active involvement in learning, and supports the view that the learning must be perceived as constructive in the development of a professional identity and useful by learners if they are to engage with and benefit from that learning (Clarke & Copeland, 2003). In the current study the students became far more aware of their strengths and development needs as they were exposed to detailed professional conversations. Salvatori et al (2006) suggest the use of a common language within health professional programs would contribute to team effectiveness and this should be a mandatory requirement within the curriculum for all students.

Many students became naturally more reflective during the exercise and this was evident in their diary entries. One undergraduate dental student reporting "*It helped me appreciate the vital role of each one as well as the importance of sharing and discussing information".* Students reported on how they were able to discover things about themselves both on a professional and personal level which they could use to develop their expertise. For example, a number described the importance of collaboration which was imperative in the delivery of their patients care. Reports from the students diaries suggested they had become better at asking each other for and accepting help. According to one undergraduate dental student in the current study, *"both myself and the trainee technician now have a thorough understanding of what the patient wants from her dentures".* From these experiences the students have shown that developing a collaborative relationship is an ongoing process, however, once it has been achieved, the satisfaction and improvements it brings to both the students and the quality of care for their patients are well worth the effort. For example, understanding for the first time that the patient lies at the heart of their relationship rather than themselves.

The narrative accounts the students relate in the current study suggest they are identity-related (Bruner, 1960). Bruner's theoretical framework (1960) is based on the theme that learners construct new ideas or concepts based upon existing knowledge. Learning is an active process. Facets of the process include selection and transformation of information, decision making, generating hypotheses, and making meaning from information and experiences.

In seeking to address the challenges to professional identity encountered by both groups of students in this study two apparently contradictory, but in fact entirely complementary, approaches seem to be called upon. The first is proper acknowledgement of existing knowledge that of the trainee dental technicians and undergraduate dental student. The second is forging of a new form of professional identity for both groups of students which depends not merely on existing knowledge, but on the capacity to generate new professional knowledge; an identity which includes a role as a learner, not merely one as a trainee dental technician or undergraduate dental student. Therefore, it is important to understand that knowledge is not 'terminal' and that this shared learning process forced them to acknowledge this. Taking this into account, collaboration can act as a means of bringing healthcare professionals together thereby enabling them to work towards personal outcomes in a more meaningful and productive manner.

5.24 Patient care

The next domain was patient care with emerging themes of reflection and problem solving. Students reported on how they went about resolving problems with their patients work and in doing so reflected on what they had done and what perhaps they would have done differently. For example, one trainee dental technician reported on how as a result of seeing his technical work in the patient's mouth he would in the future "*trim my trays shorter in order to save time at the chair side"*. According to Boud (1993), Eraut (1994) the advantage of learning that takes place in a clinical placement is generally regarded as a critical setting where knowledge can be cultivated through exposure to practice-based issues.

Unlike, the classroom, where knowledge is acquired and then used at a later date, learning in practice allows knowledge to be gained and applied while working in this setting and adjusted and amended immediately? This is vital because it develops 'Contingent' knowledge (Fleck, 1997) which can take a long time to develop in practice. This concurs with the findings of Nicol & Chaput de Saintonge (2002) who suggest that learning clinical skills together can potentially improve teamwork and ultimately patient care, by promoting a better understanding of each other's role. This can result in an improved form of learning that can contribute more effectively to the development of the necessary skills and knowledge students require becoming competent practitioners. Therefore, by bringing professionals into close contact with patients gives them much more of a 'Consequentialist' approach to care, where they become a lot more aware of ethical and moral implications of their work. It is common for us to determine our moral responsibility by weighing the consequences of our actions. The principle of fidelity requires that health care professionals act in such a way as to demonstrate loyalty to their patients (McCarthy, 1996). A type of bond or promise is established between the practitioner and the patient. This professional relationship places on the health professional the burden of acting in the patient's best interest. Health care professionals have a fidelity obligation to all their patients, regardless of the length of the professional relationship. Problem solving using reflective dialogue appears to be the main method within the current study the students used to analyse and evaluate their practice. Most students discussed problems or issues with one another regarding their patient's work, primarily as a means of reassurance to confirm the actions they were going to take were appropriate.

This finding is consistent with Bolton (2001) who concluded that reflection using dialogue is important as a means of confirming actions and discussing ideas. Scanlon et al (2002) suggests that reflection enables practitioners to tap into knowledge gained through experiences. The practitioner gains a deeper understanding of the meaning of the experience by bringing to consciousness tacit knowledge. The importance of tacit knowledge is well acknowledged (Polanyi, 1966). These knowledge claims are understood as interpretations (Heidegger, 1962; Merleau-Ponty, 1962) rather than representations of reality. According to Polanyi (1966), tacit powers of the mind are decisive and predominant at all levels of human cognition, they represent people's ability to acquire and hold knowledge.

Polanyi (1966) argues the fact that people know more than they can tell in various situations of everyday life, bears witness to the existence of 'tacit' knowledge. There is now a significant body of literature identifying the skills and attributes claimed to be developed as a result of reflective practice (Johns, 2000; Charon, 2001; Rolfe et al, 2001; Bolton, 2001). However, the approaches to reflective practice are not without their critics. Taylor (2003), Cotton (2001) and Hannigan (2001), amongst others, outline the grounds for skepticism in terms of ethical problems in relation to confidentiality, poor practice (Hannigan, 2001), power relationships (Cotton, 2001), problems relating to the production of reflective accounts in terms of anxiety, inaccurate recall, hindsight bias and poor memory (Jones, 1995). These, however, tend to be acknowledgements of challenging issues, as opposed to reasons why the approaches should not be used.

Within the current study student responses suggest that reflection was important to their learning as it allowed them to reflect on their own action and participation and this helped identify gaps in their knowledge and enabled them to discuss problems and issues regarding their patients. For example, one trainee dental technician reported that having now experienced working in a clinical environment he would be better prepared next time, *"I would make myself more aware of the actual procedure before I go on the clinic".* The most common experience of reflection was through dialogue in one-to-one conversations or written reflection in their reflective diaries. Responses from the student's reflective diaries showed the most frequent experience of reflection was as an individual followed by individuals reflecting with other individuals from the same team. In general the experiences of the students needed to be more 'situated' so that they understood the impact of context on their practices (Lave and Wenger, 1998)

5.25 Awareness

From this domain came the themes of familiarity and being proactive, students in the study reporting they would have liked to have familiarized themselves more with, for example, the materials they were using prior to undertaking a particular procedure with their patients on the clinic, one undergraduate dental student reported *"Need to familiarize ourselves more with the materials before we start so we look more efficient and confident",* students also reported on the need for them to be a more proactive member of their respective teams. Initially some students focused on working as part of a proactive team in the best sense of the word, i.e. that joint working adds to the outcome of integration.

For others, the principle of integrated teamwork was more like a division of work, a democratic way of solving a practical task in terms of equal workload, and this focus tends to lose sight of the spirit of integration (Fallsberg & Wijma, 1999). According to Parsell et al (1998) for learning to be optimal, active participation is desirable. Readiness for collaboration results from a number of factors, such as maturity and prior experience of working in similar situations (Henneman et al, 1995; Larson, 1999).

A multi-dimensional view of professional socialization, incorporating not only new role behaviours but new views of self, is echoed by Olesen and Whittaker (1968) in their study of professional socialization in nursing. They believe that these changing views of the self are directly related to external factors or particular objective events, which help shape the individual's changing self concept. The social environment and the individual's interactions with this environment are therefore central to the process of professional socialization, in which the individual is an active participant.

Within the current study the relative clinical inexperience of the third year undergraduate dental students and the trainee dental technicians together with a lack of clarity regarding their roles within the team may have accounted for their initial low level of participation, especially in a clinical situation. This was also reported on by the 4th year undergraduate dental students, who were aware they needed to involve the trainee technicians more. For example, one 4th year undergraduate dental student reported on how he *"discussed with the trainee technician that he must get more involved".*

However, over a period of time both groups of students did become more engaged with each other and their patients and in turn this raised the awareness of their professional roles.

5.26 Treatment plan

From this domain the themes of involvement and interaction emerged. Students reported on how they interacted together in both a clinical and laboratory situation. As a result of their experiences the students indicated that they had benefited learning about the roles and responsibilities of the other profession. This echoes the work of Rodehorst et al (2005) who asserts the willingness of a professional to learn about other professional roles leads to a broadening and an enrichment of the knowledge required to collaborate with other team members in providing effective healthcare. Insalaco et al (2006) claims interprofessional teamwork allows healthcare professionals to identify unique differences in and to understand, the roles and contributions of other team members. For example, one undergraduate dental student reported that working with the trainee dental technician was *"a huge help for us on the technical side".* Students also indicated that they understood more about how a team might work together and the importance of interaction and sharing views. Current findings are consistent with research by Morrow et al (2005) who points out that active interaction on an ongoing basis is required for effective interprofessional teams and this plays a significant part in improving interactions and reducing professional anxiety. This involvement and interaction between the students meant that existing knowledge could be shared and joint responsibility taken for identifying and exploring the problems with their patient's work (Carlisle & Ibbotson, 2005).

Within the current study, both groups of students were able to discuss and plan their treatment options relating to their patients work with each other both in the clinic and the laboratory. There were also improvements to their confidence as reported by both groups of students. One trainee dental technician reported how he now felt more confident on clinic as the patient's treatment had progressed and this had made it easier for him to "*talk about and explain any problems with both the student and the patient".*

According to Sinclair (2004) and Parsell & Bligh (1998) one of the benefits to interprofessional learning is increased personal and professional confidence which ultimately results in enhanced job satisfaction. There was also no doubt from reading the students diaries that both groups of students were also appreciative of each other's role with regard to their patients care. This may also be attributable to how professionals now have both a fear of the consequences of their actions, and they never have the opportunity to face them (Oermann & Lukomski, 2001). The growing awareness for litigation underpinned by ethical and legal rights of patients and clients highlights the need for radical reform in which all professional groups embrace their own legal accountability and responsibilities. In the complex arena of health and social care there is a need for professionals to co-operate, co-ordinate, communicate and collaborate with each other to improve clinical effectiveness (DOH, 1996).

5.27 Professional identity, role definition

Finally the students were asked to reflect on how they felt in the clinic/laboratory and any comments they had on how their patient felt. From this domain the themes of relationships and confidence emerged.

Student's reported on their experiences of working together and how relationships had developed both with themselves and their patients and how their confidence had improved over the period of the exercise. One trainee dental technician reported how she felt very involved by the patient, the undergraduate dental student and the clinical tutor and felt "*valued and a part of what was going on".* Other studies have also underscored the importance of the development of relationships with patients, Suikkala & Leino-Kipi (2001) highlighted that relationships with patients are connected with student's personal and professional growth, confidence and self-esteem.

In the current study it was apparent that comments from their patients were valued and recognized by the students as a building block in the development of their confidence. One undergraduate dental student reflected on how it had raised her confidence receiving positive comments from the patient *"pleased and feeling more confident since the patient informed us she is happy with her new dentures".* Students were also able to identify strategies that they themselves found helpful such as preparation, self-awareness and recognition of their confidence.

Findings from a variety of interprofessional initiatives suggest that interprofessional learning especially at pre-registration level for health and social care students can contribute to increasing understanding of other professionals' roles, cooperation and respect; encourage positive attitudes and enhance professional development, facilitate team working and encourage reflective practice (Pirrie et al, 1998; Cooper et al, 2004).

Overall, in this study the students' experience of the shared learning exercise was positive. The majority of students recognized the benefits of shared learning and that the acquisition of team working skills is useful for their future working lives, beneficial to the care of their patients and likely to enhance professional working relationships. Reasons for this were both groups of students had the opportunity to develop their own professional role, for example, the trainee dental technicians became more involved in the care of the patient and both groups of students learned about the other profession and how to work as part of a team. Secondly both groups of students described situations where they used their knowledge and skills to collaborate and communicate, for example, in discussions regarding the design of their patient's dentures.

5.3 Professional identities and shared understanding

5.31 Overview

The second overarching purpose of this research project was to examine learners' experiences of these shared learning opportunities together with any perceived barriers to learning. An underlying assumption of the current study was that barriers to learning may exist between both groups of students (Arlton et al, 1990; Ling et al, 1990; Zungolo, 1994). Students in the study reported some issues that could be perceived as potential obstacles to learning as demonstrated by the differing group responses towards questions in the focus group interviews. However, some impediments were also regarded as positive opportunities. Some of these concerns related to a possible lack of communication and understanding one another's role.

Pethybridge, 2004; Reeves, 2004; Skjorshammer, 2001, have shown that effective interprofessional learning can be undermined by a lack of understanding of one another's roles, limited communication and poorly coordinated teamwork. However, such barriers can be overcome and students can share these differences and use them constructively in their learning (Zungolo, 1994). As such, this section is a discussion of the findings from the focus group interviews concerning the participant's experiences and perceptions based on the research questions:

3. Does shared learning promote a better understanding of each others' professional roles and effective interprofessional teamwork?
4. How far are these aims successfully accomplished as a result of the opportunities afforded by the programme in this study?

This section offers a discussion of the challenges facing the participants to shared learning as they have emerged from this current research study, in terms of the following domains: *Understanding One Another's Role, Apprehension, Awkwardness, Patient Care, Preparation.*

5.32 Understanding one another's role

The first question asked both groups of students what benefits did you gain from the exercise. The main domain to arise was that of understanding one another's role with the themes of collaboration and team working. Both groups of students agreed that their knowledge of the other professional group had increased.

For example, one 4th year undergraduate dental student explained how she benefited by being able to go to the laboratory and see the technical work for her patient *"Seeing both the technical and clinical side really worked for me".* These findings mirror Nisbet et al's (2008) work on interprofessional learning for pre-qualification health care students who concluded that a collaborative, team-orientated approach has the potential to expand students' understanding of the contributions made by other professionals/colleagues to effective patient care. Within the current study the trainee dental technicians were able to gain a better understanding of the role of the dental student and the undergraduate dental students were able to appreciate the technical support and opinion the trainee technicians could provide. This type of collaborative learning is also supported by Areskog et al, 1988; Barr, 2001; McNair et al, 2005; WHO, 1998, who highlighted that interprofessional education has the potential to promote better understanding between the professions by encouraging students to engage in detailed exploration of health and social roles. This improved understanding results in increased self-confidence, for example, in the current study one trainee technician reported how his confidence with both the patient and undergraduate dental student had increased *"this week I feel part of a team".* This increase in confidence enhances an individual's recognition of the contribution of others and helps to abolish ingrained stereotypes (Cooke et al, 2003; Fraser et al, 2000; Guest et al, 2002; Jones, 1986). Within the current study both groups of students also reported on how team working had been of benefit with regard to their patients care. Working as a team they had been able to see exactly what their patients required.

One trainee dental technician reporting how it was of benefit to see the patient from the very start of their treatment "*seeing the patient at the initial appointment is good because you get to find out what problems they have had and what they actually want".*

Current findings are further consistent with research by Barr (2001), Gill & Ling (1995) who found that by encouraging professionals to share knowledge and work collaboratively lays down solid foundations on which to integrate professional expertise which can result in improved patient care. These data concur with Glen and Leiba's (2002) point, that interprofessional learning increases the likelihood of students engaging in collaborative working once qualified. Findings from the current study suggest the aim of fostering collaborative working was achieved by facilitating appropriate attitudes (Barr, 1996) and the motivation to work with allied professionals by collaborating with them confidently and competently.

5.33 Apprehension

The next question asked the students whether there was anything that was of little benefit with the exercise and this raised the domain of apprehension with the themes of concern and anxiety arising. Some of the trainee dental technicians articulated how they were concerned and anxious on how they had felt left out initially. Some expressed concerns about being a burden and felt they were '*just hanging around'* without a purpose or direction. Others raised concerns over their input and whether or not their contribution to the patients care was being taken into consideration.

Research by Campbell et al (1994), Windsor (1987) into nursing students' perceptions of clinical experience found that both negative attitudes of staff and a negative atmosphere created in a clinical environment caused feelings of vulnerability and inadequacy. Bloomfield (1997) also emphasised that learners in unfamiliar environments do experience some reduction in self-confidence and increased anxiety. This is further supported by Gray & Smith (1999) who reported that students experience some degree of 'anticipatory anxiety' and find the idea of clinical experience intimidating (Maben et al, 2006).

Research undertaken by McAllister et al (1997) suggests that while mild levels of stress may enhance student performance, excessive levels of anxiety are more likely to produce negative outcomes. According to Hughes (2005), "Stress contributes to anxiety, which can in turn interfere with students' performance by leading to the development of poor coping skills" (p.22). Beddoe and Murphy (2004) stated, "High stress and anxiety impede concentration, memory, and problem-solving ability, which in turn, adversely affect performance and learning" (p.305).

The trainee dental technicians in the current study wanted to create a smooth journey for themselves and recognised the importance of being interested and inquiring when participating in the clinic and realised that in doing so this helped broker a positive relationship with both the undergraduate dental student and the clinical tutors. A parallel can be drawn here with teachers and teaching assistants. For example, establishing a positive and mutually respectful relationship between a class or subject teacher and a teaching assistant or support teacher, is the key to successful working (Evans, 2008).

This sometimes happens quite naturally, with each individual instinctively knowing what to do and how to fit in with each other's way of working. At other times however, there can be a tension between teacher and teaching assistant and in the worst cases, each one feels undermined by the other sometimes to the extent that any possible benefits of joint working are outweighed by the stress incurred, for example, where a relatively inexperienced teacher is paired with a more experienced teaching assistant who may well also be a parent, and who is inflexible and determined to 'do it my way'. Therefore, by running a training session/staff meeting about teacher, teaching assistants partnerships, this can help to establish a way of working that is professional and while being flexible, is also shaped by an agreed code of practice embodying expectations and responsibilities on both sides (Evans, 2009). This example of establishing a mutually respectful and positive relationship between teacher and teaching assistant can be related to the current study with similar issues facing both trainee dental technician and undergraduate dental student, such as understanding each other's role and working as part of a team.

Research has also shown that during the formal process of role acquisition students expectations about the professional role can remain idealised (Thornton & Nardi, 1975). Some studies report that students feel powerless and confused by the dichotomy between the ideals of the institute and the realities of the practice setting (Willis, 1996; Young et al, 1989). The trainee technicians wanted to be recognised as capable and competent as they progressed through the shared learning exercise. The students believed if they did not rock the boat or cause trouble the learning experience would be more positive.

When they were given the opportunity to demonstrate their abilities their confidence was enhanced. Several authors concur with the need to provide feedback, particularly positive reinforcement to support student confidence (Ferguson, 1996; Glover, 2000; Gray & Smith, 2000; Kelly, 1992; Mozingo et al, 1995). Conversely, while they longed to be acknowledged and appreciated, they often felt that their work was unappreciated and overlooked, which had a negative impact on their subsequent acceptance as a team member (Levett-Jones et al, 2009). However, the undergraduate dental students acknowledged that at times it was difficult for every team member to be totally engaged with the patient and this caused concerns and anxieties with them also on what each team member should be doing. This concurs with research by Cloke et al (1997) who reported that students are reluctant to rely on the supernumerary status in case they are regarded as lazy by other health professionals. Instead, they prefer to be seen as part of the workforce (Cloke et al, 1997).

5.34 Awkwardness

Students in the study were asked if they were conscious of any barriers to learning during the exercise, from this question came the domain of awkwardness with the themes of uneasiness and attitude emerging. Some of the undergraduate dental students reported on how they felt uneasy at the beginning of the exercise not knowing what was expected of them and it had taken a few weeks for a working relationship to develop between themselves and the trainee dental technicians.

Not knowing their scope of responsibilities, not knowing how to fulfil one's responsibilities and uncertainty about whose expectations to meet can therefore result in feelings of frustration and a lack of value and acknowledgement of the individual's knowledge and skills (Chang and Hancock, 2003; Kahn et al, 1964). Stapleton (1998) has asserted that trust develops over time as a result of multiple positive experiences with each other. Its development requires that people really get to know and understand each other and this requires time. Other undergraduate dental students reported on how once a working relationship had developed they would have found it difficult to criticise any technical work produced by the trainee technicians after they had put in so much effort, and felt if they had commented this may have had a negative impact on their working relationship, one undergraduate dental student reporting *"I would have felt quite bad criticising the technicians work".* This view concurs with Stapleton (1998) who points out that each person involved in collaborative practice must feel responsible for, and safe with, expressing his or her own opinions and feelings. An environment must exist in which this can be done without fear of retaliation or ridicule. Each person must accept and try to understand the others' opinion and feelings and not automatically dismiss them because they do not understand or agree, or because they do not fit with one's own view.

Turning to the next theme of attitudes some trainee dental technicians described tutor behaviours that evoked uncertainty and insecurity which had impacted on their sense of belonging and learning.

Trust is an integral part of higher learning, without the sense of trust – primarily between the student and teacher – neither is encouraged, and hence willing to question and overcome their understanding of their interrelationships in the world. Thus, students must trust the teacher that their projections of potentiality will be rewarded and encouraged. Without the sense of trust the learning experience will be restricted leading to marginalisation of the pursuit of unique potentiality (Curzon-Hobson, 2002). One trainee dental technician reported that *"Sometimes I felt that my opinion was disregarded especially by the clinical tutors".* These findings are supported by previous studies into staff-student relationships (Langridge & Hauck, 1998; Workman, 1998; Andrews et al, 2005; Levett-Jones et al, 2009). Another trainee dental technician reported on how she wanted to "*feel she belonged in the team".* The concept of belongingness is very relevant to the experiences of the trainee dental technicians in the current study working within a clinical environment. Belongingness has been recognised as a fundamental human need, exerting a powerful influence on cognitive processes, emotional patterns, behavioural responses and health and well-being (Hagerty et al, 1992; Baumeister & Leary, 1995). Nolan (1998) argues that students' need to fit in and be accepted by staff in order for them to actively participate and learn. Others have suggested that the fear and anxiety experienced during the socialisation process may negatively affect student learning (Kleehammer et al, 1990; Lindop, 1999; Lo 2002; Timmins & Kaliszer, 2002). A number of trainee dental technicians reported that the nature of the staff-student relationships determined whether they felt that they fitted into the clinical environment and were accepted by staff.

These findings are supported by Webb & Shakespear (2008) who described how tutors attitudes could undermine and ruin student's placement experiences. During the focus groups, it emerged that the students' in each professional group had experienced different trajectories of professional socialisation. The undergraduate dental students had experienced an 'elite' enculturalisation whilst the trainee dental technicians had become exposed to a more 'service' ethos. Trainee dental technicians in the current study described how without the sense of collegiality experienced when working with supportive staff, they often felt as if they were on the periphery of the clinical team (Myall et al, 2008). Emotional support from staff is essential for successful placements (Brown et al, 2005) this helps students to feel less alone and anxious when entering the clinical environment, and their opportunities for learning increase when they are able to develop supportive relationships with their tutors, particularly when these relationships continue over an extended period of time (Sibson, 2003). Watson (1999) suggests that when positive staff-student relationships are not established, students expressed concerns about being a burden.

The sense of belonging experienced in environments that facilitate positive placement experiences allows students to progress in their learning with confidence and motivation (Levett-Jones et al, 2009). Therefore, staff-student relationships are crucial for students to feel accepted, included and valued. Other issues raised within the current study were the working relationships between the trainee dental technicians and the differing year groups with whom they worked. The trainee technicians articulated they had a greater rapport with the 3rd year undergraduate dental students than the 4th year undergraduates.

They reported that they felt it easier to integrate with the 3rd year undergraduates, whereas the 4th year undergraduate dental students as a number of trainee dental technicians reported were more like *'qualified dentists'*. This suggests that the 4th year students had developed more of a professional identity and perhaps were less amenable in their approach to shared learning.

Professional identity, as one form of social identity, concerns group interactions in the workplace and relates to how people compare and differentiate themselves from other professional groups. Professional identity develops over time, and involves gaining insight into professional practices and the development of the talents and the values of the profession (Schein, 1978). It can be described as the attitudes, values, knowledge, beliefs and skills that are shared with others within a professional group and relate to the professional role being undertaken by the individual, and this, is a matter of the subjective self-conceptualisation associated with the role adopted (McGowen & Hart, 1990; Hall, 1987; Watts, 1987). These aspects of personal and professional identity emerged as the students acquired new views of self as they learned and adopted the professional role behaviours and attitudes. Ibarra (1999), Niemi (1997), argue this process eventually leads to students adopting a new professional view of themselves that meets their agent's expectations in relation to professional competence. For example, one fourth year undergraduate dental student questioned the need to visit the laboratory to involve herself with the technical work for her patient, '*I can't see much point in visiting the laboratory as I'm never going to be expected to undertake any technical work myself*'.

This raises the question of when is the right time to implement shared learning; much research has been undertaken into when is the right time for interprofessional learning to take place. Conventional wisdom suggests this should happen when students have a clear sense of their own identity and have experiences to share (Funnell 1995; Pirie et al, 1999). However, there are those who argue interprofessional learning should be introduced from the very start to prevent the formation of negative interprofessional attitudes which will later be resistant to change (Carpenter, 1995; Hojat et al, 1997; Tunstall-Pedoe et al, 2003; Rudland & Mires, 2005; Norman, 2005). With regard to the current study early exposure to interprofessional education might well help students find their professional role in relation to others and also help them comprehend the structure in which they will work as a professional. Perhaps early interprofessional activities could also counteract prejudices between the participating students thus promoting future collaboration. Research by Lindqvist et al (2005) reported that during a nine-week interprofessional learning programme for first-year students in medicine, nursing, occupational therapy, physiotherapy and midwifery, students' attitudes towards health professionals changed in a positive direction and the programme helped to challenge preconceived notions between healthcare professionals. Research has also shown that introducing collaborative working while teaching more practical topics allows students to develop positive attitudes towards each other before they become inflexible in their own professional identity (Ker et al, 2003). At this time they are most open to learning together (Cooper et al, 2005; Coster et al, 2008) and have more positive attitudes toward their own and other professional groups (Hind et al, 2003).

Finally issues were raised by the trainee dental technicians regarding the sometimes unswerving confidence and possibly arrogance displayed at times by some of the undergraduate dental students. This had resulted in them stereotyping the undergraduate dental students in negative ways. Predictably, at the beginning of the shared learning exercise the trainee technicians thought that the undergraduate dental students might be overly confident, detached and poor communicators. This mirrors the work of (Horsburgh et al, 2001 & Tunstall- Pedoe et al, 2003) who found that students enter their specific professional courses with pre-formed stereotypes about their own and other disciplines. These negative stereotypes regarding other disciplines can lead to professional arrogance and hamper effective collaborative relationships (Carpenter, 1995).

Social identity theory suggests that identifying with a particular group actively determines interpersonal attitudes and behaviour towards other groups (Turner, 1999). At the same time there was little evidence to suggest any pre-conceived stereotypical views were held by the undergraduate dental students regarding the trainee dental technicians. However, over the period of the shared learning exercise, the students began to undergo subtle shifts in their professional behaviour and attitudes, there was a noticeable change in the views of the trainee technicians, they agreed that teamwork was beneficial and afforded the advantages of learning, exchanging ideas, and focusing effort. Change in relationships, as this discussion is trying to emphasise, must be a two-sided process. If dental technicians persist in stereotyping dentists as arrogant it will be difficult for either party to behave differently towards the other.

Further, change in the relationship is more likely to happen if each group believes the other has changed its stereotypes about themselves, e.g. if dental technicians believe dentists perceive them as being more competent and more confident. In other words, it will not be sufficient for dental technicians and dentists to change their perceptions of technicians they both must also change their perceptions of dentists.

5.35 Awareness of responsibility to patients

Both groups of students were asked if they felt their patients had benefited from the exercise. The main domain to arise from this question was their patients care with the themes of communication and understanding. Students in the current study identified greater confidence in interactions with their patients, improved communication, greater awareness of patient care and greater empathy for both the patient and each other developed from working as a team. What did emerge from this current study was the majority of students agreed that their patients had received a better standard of care, for example, one 3rd year undergraduate dental student felt that her patient had "*a lot more choice in her treatment".* Students considered communication central to the success of their patients care. Successful communication essentially relies on communicators' ability to consider the other participants' viewpoints (Nuckles & Bromme, 1998), an aspect identified by students in the present study. One 4th year undergraduate dental student reported how problems with the patient's dentures could be discussed with the trainee technician "*I could discuss the problem with both the technician and the patient and it could be sorted out whilst the patient waited".* Students recognised successful collaborative incidents as those in which all participants' perspectives were considered.

They described how active face-to-face dialogue and joint decision making with both the patient and themselves enabled them to gain a better understanding of their patient's needs which in turn allowed them to provide more efficient patient-centred care. This supports previous findings that students consider interprofessional communication as central to successful teamwork (Morison et al, 2003), and is consistent with the evidence, which specifies active listening, negotiation and active dialogue as essential components of effective collaboration (Henneman et al, 1995). It is also important to note that in the process of learning to work collaboratively with each other; students learn that the patient also has an essential voice in problem solving and decision making. Increasing emphasis has been placed on involving patients in making decisions about their care (Bowling et al, 2001). Not long ago, when patients were instructed by their physician or pharmacist to have an operation, go for a laboratory test, or take medication, they did so without question. Medical paternalism the belief that the health care professional knew best was accepted as standard practice by most health care professionals and their patients (McCarthy, 1996). Today, patients have become true consumers of medical care (Weiss, 2007). Patients wish and have a right to be informed and to be asked for their consent. To do otherwise would be both unprofessional and unethical not to mention the legal ramifications. Patients expect a certain level of service, failure by health professionals to meet the demands of health care consumers may lose customers or experience legal problems (McCarthy, 1996c). As the students work together for the benefit of their patients, they also learn that the patient's role in providing input for their own care is just as important. Therefore, the patient becomes a partner in their own care delivery not simply a recipient (D'Amour & Oandasan, 2005).

Within the current study patients also came to understand and value the role of the dental technician and were able to provide direct feedback on laboratory procedures as well as clinical outcomes. As Saxell et al (2009) points out when the care plan for a patient is cohesive, the patient undoubtedly benefits, as the health team has worked together to best address the patient's needs, wants and values.

5.36 Preparation

Finally, both groups of students were asked how the exercise could be improved. From this question came the domain of preparation with the themes of information and equality arising. A number of students felt they should have been given more information prior to the commencement of the exercise, for example, one 3rd year undergraduate dental student felt "*it should be made clear what each person is expected to do",* some felt the exercise had not been fully explained to them. These findings are consistent with work undertaken by Carlisle & Ibbotson (2005) who found that students taking part in a problem-based learning exercise would have preferred more preparation; however, many students also recognised that this could only be done through the experience of participation in the exercise itself. Finally, some trainee dental technicians did comment as they had done in their reflective diaries on the difficulties some had encouraging the undergraduate dental students they were working with to attend the laboratory. Unfortunately, for the undergraduate dental students, there was competition in attending the laboratory because of their extant curricula activities (Albanese, 2000). This subsequently contributed to their non-attendance on occasions.

5.37 Summary

This study contributes to our understanding of the complexities of working in an interprofessional healthcare environment as perceived by both undergraduate dental students and trainee dental technicians. Results from the study show that both trainee dental technicians and undergraduate dental students regard the exercise useful in terms of communication and understanding each others' roles. All the students clearly developed more effective approaches to teamwork and overcame the difficulties associated with collaborative working. One question that the study raises, however, is whether shared learning matters to others within the Dental Hospital/University Dental School. It clearly matters to the students involved in the current study, as a means to improve collaboration and service delivery it clearly matters, in theory at least, to the institution. However, two big research questions stand behind this notion of whether shared learning between these two professional groups matters. First, if this study was conducted with other groups of students would the results be the same? And if the institution wants to improve communication and collaboration between these two professional groups, are those in the hospital/university willing to listen to those calls that acknowledge that shared learning does lead to improved communication, collaboration and better patient care of which the students in this study speak? The answers to these questions remain elusive.

But since it matters in almost every possible way, service delivery, students-experiential, institutional, and purely personal, that our students in hospitals and universities are the best they can possibly be, it is clearly essential that policymakers listen to the valuable evidence provided by the experiences of students engaged in interprofessional learning. Hopefully, this thesis has played a part in developing that understanding.

CHAPTER 6: CONCLUSIONS

6.1 Overview and contribution to knowledge

In this chapter, conclusions and implications of this study are discussed. The discussion is framed by three interrelated bodies of research presented in the literature: professional identity formation in the medical and dental profession; professional training in shaping professional practices and contexts of working and last, professional educational curriculum design. Implications of the conclusions are offered for university academics, university administrators, teachers of dental technology, and not least, future researchers.

This thesis set out to examine the experiences of trainee dental technicians and undergraduate dental students during shared learning opportunities and inquire into whether interprofessional learning between trainee dental technicians and undergraduate dental students offers any specific professional and occupational disciplinary benefits or disadvantages. A review of the substantive literature revealed a need for closer links to be developed between dentist and dental technician. Team work was seen to be important and a sound knowledge of team roles a determining factor in improving communication and collaboration (Nuffield Foundation, 1980; 1993; General Dental Council, (GDC) 1997; 2001; 2002; 2004; 2006). But the literature review revealed a significant conceptual gap in the relationship between the dental professionals (Nuffield Foundation, 1980, 1993; GDC, 1997, 2006; Lovas et al, 2008; Morison et al 2008; Ross et al, 2009; Evans et al, 2010).

Consequently, qualitative work was carried out within a phenomenological framework. Using a phenomenological approach within a diary framework allowed the students to record their personal experiences and observations in which concepts were allowed to emerge through participants' stories of their 'lived experiences' during the learning experience (Lowenberg, 1993; Cresswell, 1998), the emergent concepts fit within the context of the phenomenological framework. The thesis has demonstrated that both trainee dental technicians and undergraduate dental students are pragmatic but positive in terms of their expectations of shared learning. In particular, they regard the exercise useful in terms of communication and understanding each others' roles.

A fundamental supposition of the current study was that professional barriers to learning may be present between both groups of students. Specifically, that these may well centre upon the traditional and hierarchical natures of one professional group – dentist – over the other more vocational group – the dental technicians. For example, at the beginning of the exercise some students held stereotypical views of each other (Nisbet et al, 2008; Reeves et al, 1998; Hean et al, 2006), however, these views changed as a result of the exercise. This is consistent with research undertaken by Carpenter (1995) who found that before a programme of interprofessional education nursing and medical students held stereotypical views of each other, however, these views altered as a result of the programme, with both sets of students viewing each other's profession in a more positive light.

The process through which this occurred was threefold, firstly by building up a shared story of what it is to be a dentist/dental technician, secondly by building up a discursive situational picture of the difficulties faced by both groups of students and finally through the use of reflective diaries as phenomenological vehicles that caused reflection on their own behaviours. Students in the current study shared stories on how they worked together with each other and offered examples of their efforts. For example, in both a clinical and laboratory situation, students were able to develop a greater understanding of each other's roles developing their team working skills, sharing their knowledge and observations for the benefit of their patient's (Barnsteiner et al, 2007). Students in the current study also acknowledged the difficulties they faced in the context of patient care. Increasing emphasis is being placed on involving patients in decisions about their care (Bowling, 2001). This is a result of a number of socio-political factors (Gillespie et al, 2002). Patient expectations about their role in choice and decision making have been influenced by a consumer society (Holman et al, 2000). Ready access to health information via the internet has become the norm for many. Furthermore, highly publicised press-reported 'scandals' (Mail Online, 2007; The Independent, 2010; Dispatches, Channel 4, 2011) and widely reported concerns of under-funding have eroded patient confidence in the NHS and the medical profession leaving patients seeking more information and involvement in their care (Charles et al, 1999; Holman & Lorig, 2000; Coulter, 2001). Involving patients also helps meet demands for accountability as health professionals can be more open about decision making (Charles et al, 1999; Holman & Lorig, 2000; Coulter, 2001).

Additionally, the students also regard the processes of shared learning as having a positive impact on future interprofessional teamwork (Barr et al, 2005).

The current findings provide insight into the challenges facing both trainee dental technicians and undergraduate dental students as they endeavour to participate in shared learning. Very few existing studies have examined the specific ways in which these two professional groups interact in both a clinical and laboratory situation. The study concluded that both trainee dental technicians and undergraduate dental students believe there were benefits to engaging in a programme of interprofessional education. This involved developing more effective approaches to teamwork and overcoming the difficulties associated with collaborative working. Participants also reported increased understanding of the knowledge and skills, roles and duties of the other profession. The positive nature of these findings is supported by other interprofessional studies (Cook et al, 2001; Molyneux, 2001; Rutherford & McArthur, 2004). In general this work has indicated that the use of a practice-based interprofessional experience can improve participants' awareness and understanding of issues related to collaborative work (Fowler et al, 2000; Foy et al, 2002; Kilminster et al, 2004).

This thesis makes an original contribution to knowledge in three main ways. First, this research illuminates the shared learning experiences of trainee dental technicians and undergraduate dental students, and in so doing, contributes new knowledge and original insights into this complex and significantly under-researched area. The validity and fidelity of these findings is endorsed by the participants themselves who had an ongoing critical dialogue with the researcher as to how they were being portrayed within the study. The second original contribution of this study lies in the methodology adopted.

By incorporating a phenomenological approach, the study exemplifies the complex, multifaceted and rich representational qualities that allow the voices of the participants to be fully heard. Finally, data gathered as part of this study will be of importance to both academic and vocational educators involved with the training of both dental technicians and dentists, for example, if dental technicians are to demonstrate truly professional practice, their curricula must provide opportunities to develop effective communication skills and appropriate behaviour (Makely, 2005). Through shared learning and understanding of complementary knowledge; collaborative development of skills sets and joint participation in field work, the curriculum should involve all categories of oral health student. Furthermore this would foster knowledge of roles between the groups and encourage team working opportunities which Gallagher et al, (2003; 2009) states is pertinent to the future of the dental workforce. This needs to be systematically developed within dental technology and associated curricula if it is to achieve its desired goal.

6.2 Limitations and strengths

Although the current findings provide insights about the experiences of the students during the shared learning exercise, there are several limitations to this study. First, although I employed three techniques to establish trustworthiness of the data (e.g. engagement with the participants and data, triangulation and participant feedback) I was the sole interviewer and coder of the data from the reflective diaries and focus group interviews. It is possible that my biases contributed to the data and emergent concepts that are presented.

If a different researcher or research team conducted and analyzed the data, that individual or team may have come up with other major concepts or added concepts to those identified in this study. However, it is very important to point out that this possible bias is attenuated by the constant iteration in the transcripts and testimonies provided by the interviewees themselves. The validity and fidelity of the research is endorsed by the participants themselves who had an ongoing critical dialogue with the researcher as to how they were being portrayed within the study. Another limitation of this type of study is that it cannot completely rule out the possibility that a small part of the positive effect of the interprofessional learning program identified could result from some of the students responding that the learning exercise was more useful than it really was in order to support me as their tutor and researcher (Roethlisberger & Dickinson, 1939; Bowling, 2002). As with most qualitative based studies, this study is designed to examine a small group of individuals' lived experiences in a specific context (Rossman & Rallis, 2003).

The particular and unique characteristics of this setting and the selection and number of participants are recognized in that they may therefore limit the transferability of the findings. In this case a single and specific context was studied; i.e. a Dental Teaching Hospital in the North of England. Furthermore, the small group of participants was selected purposefully as they are students currently enrolled on recognized training courses within a University Dental School/Hospital. However, the study may be transferable (Marshall & Rossman, 1999) as a framework to guide future research. It is also important to point out that it was not the purpose of the study to research the effects of patient care; this will be the subject of a further research study.

6.3 Strengths

A major strength of this study in its use of qualitative design was that it invited participants to be critical members of a research team, empowering them to become potential change agents (Morrow & Smith, 1995). Students who participated in the study had the opportunity to share their stories, opinions and be heard. Students have important opinions on shared learning; therefore, this study should have important implications for future research and practice. Another strength of the current study was the use of three techniques to establish trustworthiness of the data, the qualitative research equivalent to reliability and validity (Lincoln & Guba, 1985). By using reflective diaries and focus group interviews I used the technique of triangulation that is I reduced the risk of bias by collecting data from a range of individuals in different settings. The final technique I used was member checking with all the students I could access who stated the excerpts I shared with them on the results of the exercise provided an accurate description of their experiences.

6.4 Implications for researchers, practitioners, and policymakers

This research has several important implications for researchers, practitioners and policymakers. It is important we learn more about the benefits to shared learning between these two members of the dental team. Dental educators need to develop more innovative programmes to build on existing approaches and strengths to shared learning between these two members of the dental team.

6.41 Implications for future research directions

The current findings have a number of implications for future research. First, data gathered as part of this study will be of importance to both academic educators and teachers involved with both the training and education of dental technicians and undergraduate dental students. In terms of curriculum design the results of this research suggest that such a module on reflective practice would be best placed at the beginning of the students learning before any potential stereotypical views become entrenched. The length of such a programme is open for discussion however; the current research suggests both groups of students benefited from working with each other at appropriate times throughout the academic year. Through these insights a framework for shared learning between these two members of the dental team may well provide a bench mark for other institutions nationally. Second, this study has indicated that there are benefits to be gained from bringing together trainee dental technicians and undergraduate dental students during training when appropriate. However, the current study did not seek to examine the benefits to patient care. Therefore, through the use of interpretative phenomenology in this study further research might use this framework to examine for example, the effects such learning may have on patient care. This might take the form of a longer term research study asking patients their views on whether having the opportunity to discuss their treatment options with more than one dental professional enhanced the quality of their care. Another area for future research could be the degree of shared learning that exists within European Dental Institutes.

It would be interesting to investigate the extent to which linked training opportunities exist between trainee dental technicians and undergraduate dental students in European Dental Schools/University's. Studies might also explore the influence of student characteristics such as for example, social class, educational/cultural background, gender and age. As indicated in the literature review, little research has addressed shared learning specifically between trainee dental technicians and undergraduate dental students. Current findings reveal a need for more in depth exploration into shared learning between these two professional groups which will serve to usefully inform the future development of both dental undergraduate and dental technician training programmes.

6.42 Implications for practice

Current findings have important implications for both dental technicians and dentists. Dentists and dental technicians need open communication to ensure that they make decisions which are in the best interest of patients. Students in the study shared many effective strategies for working together. For example, both groups of students held a realistic view of the benefits of shared learning and agreed the benefits of being able to communicate and work together was a big advantage. Many of the students who took part in the exercise also reported on how they now had a better understanding of one another's role than was previously the case. Given the students stories about the challenges of working together in the current study, there is a need to implement strategies for shared learning within dental teaching hospitals/schools nationally.

Research into UK dental laboratory technicians' views on the efficacy and teaching of clinical – laboratory communication suggests that dental laboratory technicians consider newly qualified dentists to have poor understanding of dental technical procedures and techniques and that Dental Schools may not be fulfilling the GDC requirements of '*The first five years: a framework for dental education'* with regard to dentists' technical understanding and ability to communicate (Juszczyk et al, 2009). Current findings suggest the need for the dental profession to create and maintain relations with dental technologists by way of more innovative approaches to shared learning. This should be developed with the ultimate goal of improving communication and collaboration between these two professional groups when both meet in daily practice.

6.43 Implications for policy

The ability of health professionals to work together collaboratively is critical to delivering patient-centred care. The suggestion that learning together may help people to work together more effectively is reasonable. Effective teamwork requires an education system, which helps to foster understanding between all those entering the health workforce. Research into the effects of interprofessional education is beginning to identify a favourable range of outcomes associated with this activity. These include enhancing team working skills and improving knowledge of different professional roles (Barr, 2002). Evidence to date also suggests that the greater integration of interprofessional education in the wider curriculum the more positive the effect on attitudes to interprofessional collaborative working (Barnes et al, 2000; Horsburgh et al, 2001). The UK Government's support for promoting collaboration between health professionals is evident in policy documents (DH, 1997; DH, 2000; DH, 2001).

With regard to dental education within the UK the General Dental Council is also committed to the development of interprofessional learning to improve team work and foster a better understanding of one another's role than has previously been the case (General Dental Council (GDC), 1997; 2001; 2002; 2004; 2006). However, if expectations and the allocation of funding discourage the evaluation of interprofessional education, policy makers and education providers will continue to make decisions from a relatively weak evidence base. It is vital that more investment in evaluating research into interprofessional learning in dentistry is provided as such research would contribute to our knowledge about the place and role of interprofessional education in the professional curricula. This will also provide valuable evidence regarding curriculum design and inform educators and policy developers on how to maximise learning outcomes.

6.44 Reflection

Upon reflection, I believe that the study has provided some useful and significant evidence from which to build future opportunities for collaborative and interprofessional education between these two professional groups. First, the study is unique within the dental literature as it is one of the first to investigate whether shared learning promotes a better understanding of professional roles and effective interprofessional teamwork. Second the study focuses on the students' experiences and perceptions of their team working skills; group dynamics and impediments for future team working. Third, it uses qualitative phenomenological methodology, allowing the data to emerge through the voices of the students themselves.

The current study suggests that interprofessional learning has the potential to facilitate more positive attitudes towards teamwork and collaboration. Consequently the timing, learning methods and length of the programme should be adapted according to the specific needs of the students. Further consideration needs to be given to the format of such collaboration, its timing and place within the dental curriculum, and the degree to which it becomes a regular and integral part of the programme. Indeed, a previous pilot study by the author (Reeson et al, 2005) has assisted in the development of such learning in a major UK Dental Institution (Maryan, 2011) by the implementation of a similar study. The pilot study has also been acknowledged by research undertaken by Evans et al (2010) into the development of a dental curriculum model that facilitates teamwork across the oral health professions in a University Dental School in Australia. Therefore, this current research may help assist future developments in those institutes who may be considering shared learning. This might take the form for example, of which year groups should be linked, when is the best time for such linkage and over how long a period of time this should be carried out. It is important that dental education providers learn more about and then engage in debate about the potential and value of interprofessional learning for their respective institutions. In terms of my own development as a practitioner in the field, I have had to overcome barriers, for example, persuading those responsible for the undergraduate programme that shared learning would be of benefit not only to the trainee technician but also the undergraduate dental student. I feel my confidence has grown as a result of having to overcome difficulties in order to see the project through to completion.

This applies particularly to the way in which shared learning itself fulfilled a long-felt need to introduce a change to the traditional way in which dental technicians have been trained in the Dental Hospital/School. With regard to the latter, the work has been especially rewarding.

The phenomenological approach used has provided useful information. It has also provided an opportunity for personal professional development by allowing me to consider my own practice. I have had the opportunity to change something I was unhappy with within my own practice and this has been most rewarding. Bringing about change in any organisation can prove difficult. Insularity and ingrained working practices do not always welcome change. However, the present study shows that when approached with care, the organisational hurdles that once seemed insurmountable are after all tractable to change.

In fact, I have been greatly encouraged by the sympathetic responses of those in positions of authority in the Dental Hospital/University Dental School. At the same time, however, lessons have also been learnt. Looking back, with the usual benefit of hindsight, it is clear where improvements could have been made. For example, the study required a considerable amount of commitment from all involved, as it was logistically complex and time consuming to plan. This is not unusual, as other authors have highlighted the need for commitment from all staff involved in developing interprofessional education in order for it to be successful (Fraser et al, 2000).

Not all the 3rd and 4th year undergraduate dental students had the opportunity of taking part in the exercise. This was due to the large number of undergraduate dental students and the relatively small number of trainee technicians currently in training.

A number of undergraduates failed on occasions to attend the laboratory to see work for their own patients being carried out. Unfortunately, for the undergraduate dental students, there was competition in attending the laboratory because of their extant curricula activities (Albanese, 2000). This subsequently contributed to their non-attendance on occasions. Despite these shortcomings, the study has given me confidence to continue working resolutely for changes to the training of dental technicians. Although that particular journey might be long and difficult, a start has been made in the right direction, and, however small the steps might be, I will be able to use the knowledge and experience, hard won in this study, to eventually reach my destination.

REFERENCES

Acland Report (1919) *The Extent and Gravity of the Evils of Dental Practice by Persons not Qualified Under the Act*. London, HMSO.

Adams, K. Hean, S, Sturgis, P. And McLeod Clark, J. (2006) Investigating the factors influencing professional identity of first year health and social care students. *Learning in Health and Social Care,* 5(2), 55-68.

Afsharzand, Z. Reshedi, B. Petropoulos, V. C. (2006) Communication between the laboratory technician and the dentist: Work authorisation for fixed partial dentures. *J Prosthodont,* 15(2), 123-128.

Albanese, M. (2000) Problem-based learning: why curricula are likely to show little effect on knowledge and clinical skills. *Medical Education,* 34(9), 729-738.

Allport, G. W. (1954) *The nature of prejudice.* Cambridge, MA: Addison-Wesley.

Alsop, A. Ryan, S. (1996) *Making the most of fieldwork education: a practical approach.* Cheltenham: Nelson Thornes.

Andrews, G. Brodie, D. Andrews, J. Wong, J. & Thomas, B. (2005) Placement matters: students' clinical experiences and their preferences for first employer. *International Nursing Review,* 52(2), 178-188.

Anfara, V. Brown, K. & Mangione, T. (2002) Qualitative Analysis On Stage: Making The Research Process Public. *Educational Researcher*, 31(8), 28-38.

Anspack, R.R. (1990) *The language of case presentation.* In: Conrad P, Kern R, editors. *The sociology of health and illness: critical perspectives*. New York: St Martin's.

Apker, J, Eggly, S. (2004) Communicating professional identity in medical socialization: considering the ideological discourse of the morning report. *Qualitative Health Research*, 14(3), 411-429.

Areskog, N.H. (1988) *Multiprofessional team training within the healthcare sector in Sweden.* In d'Ivernois, J.F. Vodoratski, V. (Eds), *Multiprofessional Education of Health Personnel in European Region*: Annex 7. World Health Organization, Copenhagen.

Areskog, N.H. Jones, B. Weibel, L. Pasternak, A. Sampaio, M.J. Geenen, L. (1995) *Multiprofessional Education of Health Personnel: Report and Recommendation.* http://www.coe.int/T/E/Social_Cohesion/Health/Documentation/02Documents.asp#294_10933, Accessed November 4th, 2008.

Arlton, D. Ernst, M. Sunderwirth, S. (1990) General education in the professional curriculum: faculty perceptions of contributions. *Journal of Allied Health,* 19(1), 49-47.

Association of Teachers of Ethics and Law in Australia and New Zealand (2001) Position statement: an ethics core curriculum for Australasian medical schools. *Med J Aust* 175(4), 205-210.

Atwal, A. (2002) A world apart: how occupational therapists, nurses and care managers perceive each other in acute care*. British Journal of Occupational Therapy,* 65(10), 446-452.

Babbie, E. (2001) The practice of Social Research, Australia, Wadsworth: Thompson Learning.

Balkon, N.A. (2000) *How acute care nurse practitioners in speciality practice interpret their role.* Unpublished Doctoral Dissertation, New York, Adelphi University.

Barnes, D. Carpenter, J. Bailey, Di (2000) Partnerships with service users in interprofessional education for community mental health: a case study. *Journal Inter Professional Care,* 14(2), 189-200.

Barnett, R. (1999*) Learning to work and working to learn.* In: Boud D, Garrick J (eds) *Understanding learning at work*. Routledge: London.

Barnsteiner, J.H. Disch, J.M. Hall, L. Mayer, D. Moore, S.M. (2007) Promoting interprofessional education. *Nursing Out-look,* 55(3), 144-150.

Barr, H. (2002) *Interprofessional education today, yesterday and tomorrow*. Occasional Paper 1 London, The Learning and Teaching Support Network for Health and Science Practice.

Barr, H. (2001) *Interprofessional Education: Today, Yesterday and Tomorrow.* http://www.caipe.org.uk/publications.html, Accessed December 10th, 2008.

Barr, H. (2002) *Social work in collaboration with other professions.* In: M. Davies (ed), The Blackwell Companion to Social Work. Oxford: Blackwell Publishing, 266-272.

Barr, H. (1996) Ends and means in inter-professional education. Towards a typology. *Education for Health,* 9(3), 341–352.

Barr, H. (1998) Competent to collaborate: Towards a competency-based model for interprofessional learning. *Journal of Interprofessional Care,* 12(2), 181-188.

Barr, H. (2000b) *Interprofessional Education*: 1997–2000.
<http://www.caipe.org.uk/publications.html>.

Barr, H. (2002) *Interprofessional education: Today, Yesterday and Tomorrow.* London: Centre for Health Sciences and Practice.

Barr, H. (2004) *Interprofessional Education Today, Yesterday and Tomorrow.* A review Commissioned by The Learning and Teaching Support Network for Health Sciences & Practice from The UK Centre for the Advancement of Interprofessional Education.

Barr, H. Freeth, D. Hammick, M. Koppel, I. Reeves, S. (2000) *Evaluations of Interprofessional Education: A United Kingdom Review for Health and Social Care.* http://www.caipe.org.uk/publications.html, Accessed February 10th, 2009.

Barr, H. Koppel, L. Reeves, S. Hammick, M. Freeth, D. (2005) *Effective interprofessional education – Agreement, assumption and evidence* (London, Blackwell).

Barr, H. & Shaw, I. (1995) *Shared learning: selected examples from the literature.* London.

Barrett, P.A. & Murphy, W.M. (1999) Dental auxiliaries: Dental technician education and training – a survey. *Br Dent J,* 186(2), 85-88.

Bartholomew, A. Davis, J. & Weinstein, J. (1996) *Interprofessional education and training developing new models.* Report of the Joint Practice Teaching Initiative 1990-1995. London, CCETSW.

Basch, C.E. (1987) Focus group interview: an underutilised research technique for improving theory and practice in health education. *Health Education Quarterly*, 14(4), 411-448.

Beattie, A. (1995) *War and peace among the health tribes.* In: Soothill, K. Mackay, L. Webb, C. editors. *Interprofessional relations in health care*. Edward Arnold, London.

Beaumeister, R. & Leary, M. (1995) The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin,* 117(3), 497-529.

Becher, T. (1994) The significance of disciplinary differences*. Studies in Higher Education,* 19(2), 151-161.

Beck, L.C. Trombetta, W.L. & Share, S. (1986) Using focus group sessions before decisions are made. *North Carolina Medical Journal,* 47(2), 73-74.

Beddoe, A.E. & Murphy, S.O. (2004) Does mindfulness decrease stress and foster empathy among nursing students? *Journal of Nursing Education,* 43(7), 305-312.

Bennington, I.C. (1995) Education and Training for 2000 and Beyond*. The Dental Technician,* 48(8), 5-6.

Beyer, B. K. (1987) *Practical Strategies for the Teaching of Thinking.* Boston: Allyn and Bacon.

Biggs, J. (1999) *Teaching for quality learning at university*. Society for Research into Higher Education & Open University Press.

Bleakley, A. (2006) You are who I say you are: the rhetorical construction of identity in the operating theatre. *Journal of Workplace Learning,* 17(7), 414-425.

Bloomfield, D. (1997*) Actuarial examinations: what can be learnt from the students' perspective* (PhD Thesis) London: Institute of Education, University of London.

Bolton, G. (2001) *Reflective Practice. Writing and Professional Development.* London: Paul Chapman, Sage.

Borrill. C. West, M. Sapiro, D. Rees, A. (2000) Team working and effectiveness in health care. *Br J Health Care Management,* 6(8), 364-371.

Boud, D. (1993) Experience as the base for learning. *Higher Education and Research Development,* 12(1), 33-44.

Boud, D. Solomon, N. Symes, C. (2001) *New practices for New Times.* In: Boud D, Solomon N (eds.) *Work-based learning: A new higher education?* Routledge, London.

Boud, D. Keogh, R. Walker, D. (Eds.), (1985) *Reflection: Turning Experience into Learning.* Kogan Page: London.

Bower, E.J. Newton, P.D. Gibbons, D.E. & Newton, J.T. (2004) A national survey of dental technicians: Career development, professional status and career development. *Br Dent J,* 197(3), 144-148.

Bowling, A. (2002) *Research Methods in health: Investigating health and health services.* Buckingham, Open University Press.

Bowling, A. Ebrahim, S. (2001) Measuring patients' preferences for treatment and perceptions of risk. *Qual Saf Health Care,* 10(1), 2-8.

Braithwaite, J. (2005) *Hunter-gatherer human nature and health system safety: an evolutionary cleft stick?* International Journal for Quality in Health Care: Published Online First: 20 June 2005. doi:10.1093/intqhc/mzi060, Accessed 29 September 2008.

Bristol Royal Infirmary Inquiry (2001) *Learning from Bristol: The report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary.* Kennedy I, CM5207 (1). London, Stationary Office.

Brooks, I. Brown, R.B. (2002) The role of ritualistic ceremonial in removing barriers between subcultures in the National Health Service. *Journal of Advanced Nursing,* 38(4), 341-352.

Brown, H.N. & Sorrell, J.M. (1993) Use of clinical journals to enhance critical thinking. *Nurse Educator*, 18(5), 16-19.

Brown, L. Herd, K. & Humphries, G. (2005) The role of the lecturer in practice placements: what do students think? *Nurse Education in Practice,* 5(2), 84-90.

Brown, R. & Hewstone, M. (2005) An integrative theory of inter-group contact In M. Zanna (Ed), *Advances in experimental social psychology*, 37, 255-343.

Brown, S. (1993) *Practice makes perfect: a review of issues and lessons from the Joint Practice Teaching Initiative.* London, CCETSW.

Bruner, J. (1960) *The Process of Education.* Cambridge, MA: Harvard University Press.

Bruner, J. (1990) *Acts of meaning*. Cambridge and London: Harvard University Press.

Bruner, J.S. (1992) *"The narrative construction of reality."* In H. Beilin and P. B. Pufall (Eds) *Piaget's theory: Prospects and possibilities*. Hillsdale, NJ: Erlbaum.

Bucharest Declaration, The (2004) The Bucharest Declaration Concerning Ethical Values And Principles For Higher Education In The Europe Region. *Higher Education in Europe*, 29(4), 503-507.

Burrows, D. & Kendall, S. (1997) Focus groups: What are they and how can they be used in nursing and health care research? *Social Sciences in Health* 3(4), 244–253.

CAIPE (1997) *Interprofessional education – A definition.* London, CAIPE.

CAIPE (UK Centre for the Advancement of Interprofessional Education) (2006) CAIPE reissues its statement of the definition and principles of interprofessional education. CAIPE Bulletin. 26 (accessed 12 June 2008).

Calderon, J.L. Baker, R.S. & Wolf, K.E. (2000) Focus Groups: A Qualitative Method Complementing Quantitative Research for Studying Culturally Diverse Groups. *Education for Health,* 13(1), 91-95.

Callister, L.C. (1993) The use of student journals in nursing education: Making meaning out of clinical experience. *Journal of Nursing Education,* 32(4), 185-186.

Calman, K. (1998) *A review of continuing professional development in general practice: a report of the Chief Medical Officer.* London, Department of Health.

Cameron, B.L. Mitchell, A.M. (1993) Reflective peer journals. Developing authentic nurses. *Journal of Advanced Nursing,* 18(2), 290–297.

Cameron, D. A. (2007) A Pilot Scheme for Dental Technician Vocational Training within the Dental School. *Dental Mirror, The Newsletter of the Glasgow Dental School,* Issue 3, 6.

Cameron, D.A. McKerlie, R. Matthew, B. (2006) A Comparison of teaching methods for teaching dental technology to undergraduate dental students: a pilot study. *Practice and Evidence of Scholarship of Teaching and Learning in Higher Education,* 1(2), 73-93.

Campbell, I.E. Larrivee, L. Field, P.A. Day, R.A. & Reutter, L. (1994) Learning to nurse in the clinical setting. *Journal of Advanced Nursing*, 20(6), 1125-1131.

Campbell, J. Johnson, C. (1999) Trend spotting: fashions in medical education. *BMJ,* 318(7193), 1272–1275.

Cannavina, G. Wood, D. Winstanley, R.B. Walsh, T.F. (2000) A retrospective study of shared learning on the BMed Sci Dental Technology course at The University of Sheffield. *Eur J Dent Educ,* 4(4), 160-164.

Carlisle, C. Ibbotson, T. (2005) Introducing problem-based learning into research methods teaching: Student and facilitator evaluation. *Nurse Education Today,* 2(7), 27-541.

Carlisle, S. Elwyn, G. & Smail, S. (2000) Personal and practice development plans in primary care in Wales. *Journal of InterprofessionalCare,* 14(1), 39-48.

Carpenter, J. (1995) Doctors and Nurses: Stereotypes and Stereotype Change in Interprofessional Education. *Journal of Interprofessional Care*, 9(2), 151-161.

Carpenter, J. (1995a) Interprofessional education for medical and nursing students: Evaluation of a programme. *Medical Education,* 29(4), 265-272.

Carpenter, J. (1995b) Doctors and nurses: Stereotype and stereotype change in interprofessional education. *Journal of Interprofessional Care,* 9(2), 151-162.

Carpenter, J. & Hewstone, M. (1996) Shared learning for doctors and social workers. *British Journal of Social Work,* 26(2), 239-257.

Chaboyer, W.P. Patterson, E. (2001) Australian hospital generalist and critical care nurses' perceptions of doctor-nurse collaboration. *Nursing and Health Sciences,* 3(2), 73-79.

Challoner, R. (2002) The changing roles of the dentist and dental laboratory. *J Am Coll Dent,* 69(1), 6-8.

Chang, E. & Hancock, K. (2003) Role Stress and Role Ambiguity in New Nursing Graduates in Australia. *Nursing and Health Sciences,* 5(2), 155-163.

Charles, C. Whelan, T. Gafni, A. (1999) What do you mean by partnership in making decisions about treatment? *Br Med J,* 319(7212), 780-2.

Charles, M. & Hendry, E. (2000) *Training together to safeguard children.* London: NSPCC.

Charon, R. (2001) Narrative Medicine: a model for empathy, reflection, profession, and trust. *Journal of the American Medical Association,* 286(15), 1897-1902.

Christensen, G.J. (1995) A needed remarriage: dentistry and dental technology. *J Am Dent Assoc,* 126(1), 115-117.

Christensen, G.J. (2002) The dental laboratory dilemma in America. *J Am Dent Assoc,* 69(1), 9-11.

Christensen, G.J. (2005) Dental laboratory technology in crisis. The challenges facing the industry. *J Am Dent Assoc,* 136(5), 653-655.

Christensen, G.J. (2005) Dental laboratory technology in crisis Part II. Potential solutions to the challenges facing the industry. *J Am Dent Assoc,* 136(6), 783-786.

Christensen, G.J. (2009) Improving Dentist – Technician Interaction and Communication. *J Am Dent Assoc*, 140*(*4*),* 475-478*.*

Clark, D. (1996) *Schools as learning communities: transforming education*. London: Cassell.

Clarke, D.J. Copeland, L. (2003) Developing nursing practice through work-based learning. *Nurse Education Practice,* 3(4), 236-244.

Clarke, R.K.F. Radford, D. R. & Juszczyk, A.S. (2010) Current trends in complete denture teaching in British dental schools. *Br Dent J,* 208(5), 214-215.

Cloke, P. & Little, J. (1997) *Contested Countryside Cultures: Otherness, marginalisation and rurality.* London, Routledge.

Cole, A.L. & Knowles, J.G. (2001) *Lives in Context: The Art Of Life History Research.* Walnut Creek, CA: Altamira Press.

Colwell Report (1974) *Report of the committee of inquiry into the care and supervision provided in relation to Maria Colwell.* London, HMSO.

Connelly, F.M. & Cladinin, D.J. (1990) Stories of Experience and Narrative Enquiry. *Educational Researcher,* 19(5), 2-14.

Conner-Greene, P.A. (2000) Making connections: Evaluating the effectiveness of journal writing in enhancing student learning*. Teaching of Psychology,* 27(1), 44-46.

Cook, G. Gerrish, K. Clarke, C. (2001) Decision-making in teams: issues arising from two UK evaluations. *Journal of Interprofessional Care,* 15(2), 141-151.

Cooke, S. Chew-Graham, C. Boggis, C. Wakefield, A. (2003) 'I never realised that doctors were into feelings too': changing student perceptions through interprofessional education. *Learning in Health & Social Care,* 2(3), 137-146.

Cooper, B. (2002) Teachers as moral models? The role of empathy in teacher/pupil relationships. Unpublished PhD Thesis, Leeds Metropolitan University.

Cooper, H. Braye, S. Geyer, R. (2004) Complexity and interprofessional education. *Learning in Health and Social Care,* 3(4), 179-189.

Cooper, H. Spencer-Dawe, E. McLean, E. (2005) Beginning the process of teamwork: design, implementation and evaluation of an inter-professional education intervention for first year undergraduate students. *Journal of interprofessional Care,* 19(5), 492-357.

Coster, S. Norman, I. Murrells, T. Kitchen, S. Meerabeau, E. Sooboodoo, E. d'Avray, L. (2008) Interprofessional attitudes amongst undergraduate students in health professions: A longitudinal questionnaire survey, *Int J Nurs Stud*. http://www.sciencedirect.com/science/journal/00207489, Accessed 29 September, 2008.

Cotton, A.H. (2001) Private thoughts in public spheres: issues in reflection and reflective practice. *Journal of Advanced Nursing,* 36(4), 512-519.

Coulter, A. (2001) After Bristol: putting patients at the centre. *Br Med J*, 324(7338), 648-51.

Cowan, S, Tviet, L. (1994) Collegial model for clinical nurse specialist: theoretical perspective. *Clinical Nurse Specialist,* 8(5), 267-278.

Craddock, D. O'Halloran, C. Borthwick, A. McPherson, K. (2006) Interprofessional education in health and social care: fashion or informed practice? *Learn Health Soc Care*, 5(4), 220-42.

Cranton, P. (2001) Interpretative and critical evaluation. *New Directions for Teaching and Learning,* 2001(88), 11-18.

Crawford, K. (1978) Vygotskian approaches to human development in the information era. *Educational Studies in Mathematics,* (31)1, 43-62.

Cresswell, J.W. (1998) *Qualitative inquiry and research design. Choosing among the five traditions.* Thousand Oakes: Sage.

Cribb, A. (2000) The diffusion of the health agenda and the fundamental need for partnership in medical education. *Med Educ,* 34(11), 916-920.

Cripps, A. Johnson, N.W. Boocock, H. (2005) *A New Suite of Programmes in Dentistry and Oral Health: Challenges in Interprofessionalism, Internationalisation and Innovation.* Australian International Education Conference, Gold Coast, Australia.

Cruess, S.R. Johnston, S. Cruess, R.L. (2002) Professionalism for medicine: opportunities and obligations. *Med J Aust,* 177(4), 208-211.

Curzon-Hobson, A. (2002) 'A Pedagogy of Trust in Higher Learning', *Teaching in Higher Education*, 7(3), 265-276.

Czarniawska-Joerges, B. (1994) *Narratives of individual and organizational identities.* In S. Deetz, Communication yearbook 17. Newbury Park, London: Sage.

Czarniawska, B. (1997) *Narrating the organization. Dramas of institutional identity*. Chicago: Chicago University Press.

D'Amour, D. Ferrada-Videla, M. San Martin Rodriquez, L. & Beaulieu, M.D. (2005) The conceptual basis for interprofessional collaboration; Core concepts and theoretical frameworks. *Journal of Interprofessional Care*, 19(1), 116-131.

D'Amour, D. Oandasan, I. (2005) Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept. *Journal of Interprofessional Care*, 19(1), 224-34.

Davenport, J.C. Basker, R.M. Heath, J.R. Ralph, J.P. Glantz, P-O. & Hammond, P. (2000) Communication between dentist and the dental technician. *Br Dent J*, 189(9), 471-474.

Davies, A.R. (1999) Where do we go from here? Environmental focus groups and planning policy formation. *Local environment,* 4(3), 295-315.

Denzin, N.K. (2002) The interpretative process. In A. Huberman & M. B. Miles (Eds), *The Qualitative Researcher's Companion* (349-366), Thousand Oaks, Sage Publications.

Department of Health (1990) *National Health Service and Community Care Act 1990*. London, HMSO.

Department of Health (1995) *Child protection: messages from research*. London, HMSO.

Department of Health (1997) *The New NHS: Modern and Dependable*. London, HMSO.

Department of Health (1998a) *Partnership in action.* London, HMSO.

Department of Health (1998b) *Modernising health and social services: national priorities guidance.* London, HMSO.

Department of Health (2000) *NHS Plan*. London, HMSO.

Department of Health (2000) *NHS Direct 'A New Gateway to Healthcare'.* London, HMSO.

Department of Health (2001) *Investment and Reform for NHS Staff.* London, HMSO.

Department of Health (2001) *Working together and learning together: a framework for lifelong learning in the NHS.* London, HMSO.

Dispatches, (2011) *The Truth About Your Dentist.* Channel 4.

Dooreward, H. and Brouns, B. (2003) Hegemonic power processes in team based work. *Applied Psychology:* an international review, 51(1), 414-422.

Drew, N. (2001) Meaningfulness as an epistemological concept for explicating the researcher's constitutive part in phenomenological research. *Advances in Nursing Science*, 23(4), 16-31.

Drinka, T.J.K. & Clark, P.G. (2000) *Health Care teamwork: Interdisciplinary Practice and Teaching.* Westport CT: Auburn House.

Duff, R.S. Hollingworth, A.B. (1968) *Sickness and society.* New York: Harper & Row.

Duncan, M. Alperstein, M. Mayers, P. Olckers, L. Gibbs, T. (2005) Not just another multi-professional course Part 1: Rationale for a transformative curriculum. *Medical Teacher,* 28(1), 59-63.

Ellemers, N. Spears, R. Doose, J.E. (1999) *Social identity*. Oxford: Blackwell.

England, H. (ed) (1979) *Education for Co-operation in Health and social work: Papers from the Symposium in Interprofessional Learning.* University of Nottingham, London. RCGP.

Eruat, M. (1994) *Developing Professional Knowledge and Competence.* Falmer Press: London.

Evans, J. Henderson, A & Johnson, N. (2010) The future of education and training in dental technology: designing a dental curriculum that facilitates teamwork across the oral health professions. *British Dental Journal,* 208(5), 227–230.

Evans, L. (2009) Maximizing the effectiveness of classroom support. http://www.teachingexpertise.com/e-bulletins/maximising-the-effectiveness-of-classroom-support-2418, Accessed 17 July, 2010.

Fallsberg, M.B. Wijma, K. (1999) Student attitudes towards the goals of an inter-professional training ward. *Medical Teacher,* 21(6), 576-581.

Fassaert, T. Van Dulmen, S, Schellevis, F. Bensing, J. (2007) Active listening in medical consultations: development of the Active Listening Observation Scale. *Patient Educ Couns*, 68(3), 258-264.

Ferguson, L.M. (1996) Preceptors enhance students' self-confidence. *Nursing Connections,* 9(1), 49-61.

Fielding, M. (ed.) (2001) *Beyond the Rhetoric of Student Voice: New Departures or New Constraints in the Transformation of 21st Schooling*, Forum, 43.

Finch, J. (2000) Interprofessional education and teamworking: A view from the education providers. *BMJ,* 321(7269), 1138-1140.

Fishbein, M. & Ajzen, I. (1975) *Belief, attitude, intention, and behaviour: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Flanagan, J. Baldwin, S.A. Clarke, D.J. (2000) Work-based learning as a means of developing and assessing nursing competence. *Journal of Clinical Nursing*, 368(9), 360-368.

Fleck, J. (1997) New Technology Management. *Technology Analysis & Strategic Management,* 9(4), 383-398.

Folch-Lyon, E. Trost, J.F. (1981) Conducting focus group sessions*. Studies in Family Planning,* 12(12), 434-449.

Fontana, A. Frey, J.H. (1994) *"Interviewing: The Art of Science." In The Handbook of Qualitative Research,* edited by N. K. Denzin & Lincoln, Y. S. Thousand Oaks, CA: Sage Publications.

Foster, J. Greenwood, J. (1998) Reflection: a challenging innovation for nurses. *Contemporary Nurse,* 7(4), 165-172.

Fowler, P. Hannigan, B. Northway, R. (2000) Community nurses and social workers learning together: a report of an interprofessional education initiative in South Wales. *Health and Social Care in the Community,* 8(3), 186-191.

Fox, R. Moran, S. & MacCormick, A. (2003) Guidance for integrated care pathways: a reflective document for an acute NHS trust. *Journal of Integrated Care Pathways*, 7(3), 100-106.

Foy, R. Tidy, N. Hollis, S. (2002) Interprofessional learning in primary care: lessons from an action learning programme. *British Journal of Clinical Governance*, 7(1), 40-44.

Fraser, D. Symonds, M. Cullen, L. Symonds, I. (2000) A university department merger of midwifery and obstetrics: a step on the journey to enhancing interprofessional learning. *Medical Teacher,* 22(2), 179-183.

Fraser, S.W. Greenhalgh, T. (2001) Coping with complexity: educating for capability. *BMJ,* 323(7316), 799-803.

Freeth, D. (2001) Sustaining interprofessional collaboration. *Journal of Interprofessional Care,* 15(1), 37-46.

Freeth, D. Hammick, M. Koppel, I. Reeves, S. Barr, H. (2002) *A critical review of evaluations of interprofessional education.* London, UK Centre for the Advancement of Interprofessional Education.

Freeth, D. Hammick, M. Reeves, S. Koppel, I. & Barr, H. (2005) *Effective Interprofessional Education. Development, Delivery and Evaluation.* Blackwell Publishing Ltd, Oxford, UK.

Frey, J.H. Fontana, A. (1991) “The Group Interview in Social Research.” *The Social Research Journal*, 28(2), 175-187.

Funnell, P. (1995) *Exploring the Value of Interprofessional Shared Learning: Interprofessional Relations in Health Care.* London: Edward Arnold.

Gafa, M. Fenech, A. Scerri, C. Price, D. (2005) Teamwork in healthcare organisations. *Pharm Educ,* 5(4), 113-119.

Gallagher, J.E. Resmi, P. Donaldson, N. Nairn Wilson, H. F. (2007) The emerging dental workforce: why dentistry? A quantitative study of final year dental students' views on their professional career. *BMC Oral Health*, 7(1), 1-16.

Gallagher, J.E. Wilson, H.H.F (2009) The Future Dental Workforce? *Br Dent J*, 206(5), 195-199.

Gallagher, J.L. Wright, D.A. (2003) General Dental Practitioners' Knowledge of and Attitudes Towards the Employment of Dental Therapists in General Practice. *Br Dent J*, 194(1), 37-41.

Geissler, C. Freeth, D. Hammick, M. Koppel, I. Reeves, S. & Barr, H. (2002) *A critical review of evaluation of interprofessional education.* http://www.health.Itsn.ac.uk/publications/occasionalpaper/occasionalpaper02.pdf, Accessed 7th April, 2005.

Geertz, C. (1973) *Thick Description: Toward An Interpretive Theory Of Culture.* New York: Basic Books.

General Dental Council (1997) *The first five years. The undergraduate dental curriculum.* London, General Dental Council.

General Dental Council (1998) *Report of the Dental Auxiliaries Review Group.* London, General Dental Council.

General Dental Council (2001) *Regulating all members of the dental team.* Consultation Paper. London, General Dental Council.

General Dental Council (2002) *Frameworks for the initial education of Professionals Complementary to Dentistry (PCDs)*. London, General Dental Council.

General Dental Council (2004) Curricula *Frameworks for Registrable Qualifications for Professionals Complementary to Dentistry (PCDs)*. London, General Dental Council.

General Dental Council (2005) *Standards for Dental Professionals*. London, General Dental Council.

General Dental Council (2006) *The principles of dental team working.* London: General Dental Council, www.gdc-uk.org.

General Medical Council. (2002) *Tomorrow's doctors.* London. GMC.

General Medical Council (2005) *The new doctor: recommendations on general clinical training.* London: GMC.
www.gmc-uk.org/education/foundation/new_doctor.asp, Accessed 10th June, 2010.

Gibbs, G. (1988*) Learning by Doing: A Guide to Teaching and Learning methods*.
Oxford: Oxford Brookes University.

Gill, J. Ling, J. (1995) *Interprofessional shared learning: a curriculum for collaboration.* In: Soothill, K. Mackay, L. Webb, Ch. (Eds), Interprofessional Relations in Health Care. Edward Arnold, London.

Gilbert, J. (2005) Interprofessional Education for Collaborative, Patient-Centred Practice. *Nursing Leadership*, 18(2), 32-38.

Gilbert, J.H. Camp, R.D. Cole, C.D. Bruce, C. Fielding, D.W. Stanton, S.J. (2000) Preparing students for interprofessional teamwork in health care. *Journal of Interprofessional Care,* 14(3), 233-235.

Gillespie, R. Florin, D. Gilliam, S. (2002) *Changing relationships: findings from the patient involvement project.* King's Fund: 2002.

Ginsburg, L. & Tregunno, D. (2005) New approaches to interdisciplinary education and collaborative practice; Lessons from the organisational change literature *The Journal of Interprofessional Care,* 1(S1), 177-187.

Glaser, B.G. & Strauss, A.L. (1967) *The Discovery Of Grounded Theory: Strategies For Qualitative Research.* Chicago: Aldine.

Gleaves, A. Gleaves, C. Grey, J. (2007) Using digital and paper diaries for learning and assessment purposes in higher education: a comparative study of feasibility and reliability. *Assessment & Evaluation in Higher Education,* 32(6), 631-643.

Gleaves, A. Gleaves, C. Grey, J. (2008) Using digital and paper diaries for assessment and learning purposes in higher education: a case of critical reflection or constrained compliance? *Assessment & Evaluation in Higher Education,* 33(3), 219-231.

Gleaves, A. & Walker, C. (2010) Student teachers' situated emotions: a study of how electronic communication facilitates their expression and shapes their impact on novice teacher development during practice placements. *Teacher Development,* 14(2), 139-152.

Glen, S. & Leiba, T. (2002) *Multi-Professional Learning for Nurses. Breaking the Boundaries.* Basingstoke: Palgrave.

Glen, S. & Reeves, S (2004) Developing interprofessional education in the pre-registration curricula: mission impossible? *Nurse Education in Practice*, 4(1), 45-52.

Glover, P.A. (2000) “Feedback. I listened, reflected and utilized”: third year nursing students’ perceptions and use of feedback in the clinical setting. *International Journal of Nursing Practice*, 6(5), 247-252.

Goodman, C. & Evans, C. (2006) *Using focus groups*. In: K. Gerrish and A Lacey, Editors, *The Research Process in Nursing*, Blackwell Publishing: Oxford.

Gray, M. and Smith, L. (1999) The professional socialization of diploma of higher education in nursing students (Project 2000): a longitudinal qualitative study. *Journal of Advanced Nursing,* 29(3), 639-647.

Gray, M.A. Smith, L.N. (2000) The qualities of an effective mentor from the student nurse's perspective: Findings from a longitudinal qualitative study. *Journal of Advanced Nursing*, 32(2), 1542-1549.

Green, J.M. Draper, A.K. & Dowler, E.A. (2003) Short cuts to safety: risk and 'rules of thumb' in accounts of food choice. *Health, Risk and Society*, 5(1), 33–52.

Greiner, A. Knebel, E. editors (2003) *Health professions education: a bridge to quality*. Washington, National Academy Press.

Grey, N.J.A. MacDonald, R. (2004) An investigation of Aspects of Design of Partial Dentures. *Primary Dental Care,* 11(2), 55-56.

Griffin, T. (2004) Furthering the foundation degree. *The Dental Technician,* 57(6), 4.

Griffiths Report (1988) *Community Care: An Agenda for Action.* London, HMSO.

Gudmundsdottir, S. (2001) *Narrative research on school practice*. In V. Richardson (Ed.), *Fourth handbook for research on teaching*, (226-240). New York: Mcmillan.

Guest, C. Smith, L. Bradshaw, M.H. Hardcastle, W. (2002) Facilitating interprofessional learning for medical and nursing students in clinical practice. *Learning in Health & Social Care,* 1(3), 132-138.

Haber, R.J. and Lingard, L.A. (2001) Learning oral presentation skills: a rhetorical analysis with pedagogical and professional implications. *Journal of General Internal Medicine*, 16(5), 308–14.

Hager, P. Gonczi, A. Athanasou, J. (1993) *The development of competency-based assessment strategies for professions.* National Office of Overseas Recognition research paper No. 8. DEET Canberra: Australian Government Publishing Service.

Hagerty, B. Lynch-Sauer, J. Patusky, K. Bouwsema, M. & Collier, P. (1992) Sense of belonging: a vital mental health concept. *Archives of Psychiatric Nursing,* 6(3), 172-177.

Hall, D.T. (1987) Careers and socialization. *Journal of Management*, 13(2), 301-321.

Hall, P. (2005) Interprofessional teamwork: professional cultures as barriers. J *Interprof Care Supplement,* 19(1), 188-196.

Handy, C. (1993) *Understanding Organisations.* (4th Edition) London, Penguin.

Hannigan, B. (2001) A discussion of the strengths and weaknesses of 'reflection' in nursing practice and education. *Journal of Clinical Nursing,* 10(2), 278-283.

Hanson, E. (2006) *Successful qualitative health research: A practical introduction.* Crows Nest, New South Wales, Australia, Allen & Unwin.

Harbaugh, G. (1994) *Assumptions of interprofessional collaboration: interrelatedness and wholeness.* In R.M. Casto, & M.C. Julia, (Eds) Interprofessional Care and Collaborative Practice. Pacific Grove, CA: Brooks Cole, 11-118.

Harris, S. Dolan, G. and Fairbairn, G. (2001) Reflecting on the use of student portfolios. *Nurse Education Today,* 21(4), 278-286.

Harter, L. Krone, K.J. (2001) Exploring the emergent identities of future physicians: toward an understanding of ideological socialization of osteopathic medical students. *Southern Communication Journal,* 67(1), 66-83.

Haselgrave Report (1969) *Report of the Committee on Technician Course and Exams.* London, DES.

Hasler, J.C. and Klinger, M. (1976) Common ground in general practitioner and health visitor training: an experimental course. *Journal of the Royal College of General Practitioners,* 26(165), 266-276.

Hean, S. Macleod-Clark, J, Adams, K. Humphris, D. (2006) Will opposites attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. *Journal of Interprofessional Care,* 20(2), 162-181.

Heard, S.R. Schiller, G. Aitken, M. Fergie, C. McCready Hall, L. (2001) Continuous quality improvement; Educating towards a culture of clinical governance. *Qualitative Health Care,* 10(II), ii70-ii78.

Heath, H. (1998) Keeping a reflective practice diary: a practical guide. *Nurse Education Today,* 18(7), 592-598.

Heidegger, M. (1962) *Being and Time,* Trans by John Macquarrie and Edward Robinson. New York, Harper & Row. From the German original of 1927.

Henneman, E.A. Lee, J.L. & Cohen, J.I. (1995) Collaboration: A concept analysis. *Journal of Advanced Nursing,* 21(1), 103-109.

Hewstone, M. (1996) *Contact and categorization: Social psychological interventions to change intergroup relations.* In C.N. Macrae, Stangor, C. & Hewstone, M. (Eds.) *Stereotypes and stereotyping*. New York: Guilford Press.

Hewstone, M. Carpenter, C. Franklyn-Stokes, A. & Routh, D. (1994) Inter-group contact between Professional Groups: Two evaluation studies. *Journal of Community & Applied Social Psychology,* 4(5), 347-363.

Higgs, J. Edwards, H. (1999) *Educating beginning practitioners: challenges for health professional education.* Oxford: Butterworth-Heinemann.

Hilton, R. Morris, J. (2001) Student placements – is there evidence supporting team skill development in clinical practice settings? *Journal of Interprofessional Care,* 15(2), 171-183.

Hind, M. Norman, I. Cooper, S. Gilloran, A. Hilton, S. Judd, P. et al. (2003) Interprofessional perceptions of healthcare students*. Journal of Interprofessional Care,* 17(1), 21-34.

His Majesty's Government (1944) *Education Act, 1944*, 7 & 8 Geo. 6. Ch. 31, 3rd August, London, Her Majesty's Stationery Office.

Hojat, M. Fields, S. Rattner, S. Griffiths, M. Cohen, M. & Plumb, J. (1997) Student attitudes in evaluating courses, faculty and peers. *Academic Medicine,* 72 (10), S1-S3.

Holman, H. Lorig, K. (2000) Patients as partners in managing chronic disease. *Br Med J*, 320(7324), 526-7.

Holmes, L. (1999) *Competence and capability: from confidence trick to the construction of the graduate identity.* In: O'Reilly D, Cunningham L, Lester S. *Developing the Capable Practitioner.* London: Kogan Page.

Holstein, J.A. & Gubrium, J.F. (1994) Phenomenology, ethnomethodology and interpretative practice. In N. K. Denzin and Y.S. Lincoln, eds, *The Handbook of Qualitative Research.* Thousand Oaks, Calif: Sage.

Horsburgh M, Lamdin R, Williamson E. (2001) Multiprofessional learning: the attitudes of medical, nursing and pharmacy students to shared learning. *Medical Education,* 35(9), 876-883.

Houston, W. (Ed.) (1990) *Handbook of Research on Teacher Education.* New York, Teachers College Press.

Hughes, B.M. (2005) Study, examinations, and stress: Blood pressure assessments in college students. *Educational Review,* 57(1), 21-36.

Humphris, D. & Dean, S. (2004) Educating the future workforce: building the evidence about interprofessional learning. *Journal of Health services Research and Policy,* 9(1), 24-27.

Husserl, E. (1977) *Cartesian Meditations: An Introduction to Phenomenology* (Trans D. Cairns). The Hague: Martinus Nijhoff.

Husserl, E. (1975) *Paris Lectures,* The Hague, Martinus Nijhoff.

Ibarra, H. (1999) Provisional Selves: Experimenting with Image and Identity in Professional Adaptation. *Administrative Science Quarterly*, 44(4), 764-98.

Insalaco, D. Ozkurt, E. Santiago, D. (2006) Attitudes and knowledge of students in the allied health professions toward their future professional team members. *Journal of Allied Health*, 35(3), 142-146.

Jacques, D. (1986) *Training for teamwork: the report of the Thamesmead interdisciplinary project.* Educational Methods Unit, Oxford Polytechnic.

Jarvis, P. (1987) *Adult learning in the Social Context*. London, Croom Helm.

Jay, P. (1979) (Chair) *Report of the Committee of Enquiry into Mental Handicap Nursing and Care.* London, HMSO.

Jaye, C. Egan, T. Parker, S. (2005) Learning to be a doctor: medical educators talk about the hidden curriculum in medical education. *Focus on Health Professional Education,* 7(2*),* 1-17.

Jeffs, T. & Smith, M.K. (1999) 'The Problem of "Youth" for Youth Work', *Youth and Policy,* 1(62), 45-66.

Johns, C. (1995) The value of reflective practice for nursing. *Journal of Clinical Nursing,* 6(4), 23-30.

Johns, C. (2000) *Becoming a Reflective Practitioner.* Oxford: Blackwell Science.

Johnson, A. (1996) 'It's good to talk' the focus group and the sociological imagination. *Sociological Review,* 44(3), 517-538.

Johnson, D. & Johnson, F. (2000) *Joining together: group theory and group skills*. London: Allyn & Bacon. (7th edition).

Johnson, R.B. (1997) Examining the validity structure of qualitative research. *Education*, 118(2), 282-292.

Jones, P.R. (1995) Hindsight bias in reflective practice: an empirical investigation. *Journal of Advanced Nursing,* 21(4), 783-788.

Jones, R.V.H. (1986) *Working together – Learning together.* Occasional Paper 23. London, RCGP 33, 1-26.

Juszczyk, A.S. Clark, R.F.K. Radford, D.R. (2009) UK dental laboratory technician's views on the efficacy and teaching of clinical-laboratory communication. *Br Dent J*, 206(10), 532-533.

Kahn, R.L. Wolfe, D.M. Quinn, R.P. Snoek, J.D. & Rosenthal, R.A. (1964) *Organizational Stress: Studies in Role Conflict and Ambiguity.* London: Wiley & Sons Inc.

Kea, C.D. & Bacon, E.H. (1999) Journal reflection of preservice education students on multicultural experiences. *Action-in-Teacher-Education*, 21(2), 34-50.

Keleher, K.C. (1998) Collaborative practice characteristics, barriers, benefits and implications for midwifery, *Journal of Nurse-Midwifery,* 43(1), 8-11.

Kelly, B. (1992) The professional self-concepts of nursing undergraduates and their perceptions of influential forces. *Journal of Nursing Education*, 3(3), 121-125.

Ker, J. Mole, L. Bradley, P. (2003) Early introduction to interprofessional learning: a simulated ward environment. *Medical Education*, 37(3), 248-255.

Kessler, P.D. (2004) Reflective journaling – developing an online journal for distance education. *Nurse Educator*, 29(1), 20–24.

Kilminster, S. Hale, C. Lascelles, M. Morris, P. Roberts, T. Stark, P. Sowter, J Thistlethwaite, J. (2004) Learning for real life: patient-focus interprofessional workshops offer added value. *Medical Education,* 38(7), 717-726.

Kitzinger, J. & Barbour, R.S. (1999) *Introduction: the challenge and promise of focus groups:* In Barbour, R.S. & Kitzinger, J. (Eds) *Developing Focus Group Research: Politics, Theory and Practice.* London: Sage.

Kitzinger, J. (1994b) The methodology of Focus Groups: The importance of interaction between research participants. *Sociology of Health and Illness,* 16(1), 103-121.

Kleehammer, K. Hart, L. & Fogel Keck, J. (1990) Nursing students' perceptions of anxiety-producing situations in the clinical setting. *Journal of Nursing Education,* 29(4), 183-187.

Knapp, M.L. & Hall, J.A. (2007) *Nonverbal Communication in Human Interaction*. (5th ed) Wadsworth, Thomas Learning.

Koch, T. (1995) Interpretative approaches in nursing research: the influence of Husserl and Heidegger. *Journal of Advanced Nursing,* 21(5), 827-836.

Koch, T. (1998) Story telling: is it really research? *Journal of Advanced Nursing,* 28(6), 1182-1190.

Kolb, D. (1984) *Experiential Learning*. London: Prentice Hall.

Krueger, R.A. (1994) *Focus Groups: A Practical Guide for Applied Research.* Thousand Oaks, CA: Sage Publications.

Krueger, R.A. & Casey, M.A. (2000) *Focus Groups: A Practical Guide for Applied Research,* 3rd ed. Thousand Oaks, CA: Sage Publications.

Kuzel, A. (1999) *Sampling in qualitative inquiry*, in Crabtree, B. and Miller, W. (eds.), Doing qualitative research, Thousand Oaks, CA: Sage.

Kvale, S. (1996) *Interviews: an introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.

Lakhani, N. Anderson, E (2008) Interprofessional education: preparing future Pharmacists for 2020. *The pharmaceutical Journal*, 280(7501), 571-572.

Lambert, D.M.D. (1988) *Team workshops for health promotion in primary health care organised.* Health Education Authority.

Landeen, J. Byrne, C. Brown, B. (1992) Journal keeping as an educational strategy in teaching psychiatric nurses. *Journal of Advanced Nursing,* 17(3), 347–355.

Landeen, J. Byrne, C. Brown, B. (1995) Exploring the lived experiences of psychiatric nursing students through self reflective journals. *Journal of Advanced Nursing,* 21(5), 878–885.

Langridge, M. & Hauck, Y. (1998) Perceptions of clinical role modelling: an exploration of nursing students' experiential learning. *Collegian,* 5(4), 22-27.

Lankshear, D.L. (1993) 'The use of focus groups in a study of attitudes to student nurse assessment', *Journal of Advanced Nursing,* 18(12), 1986-89.

LaRossa, R. (2005) Grounded theory methods and qualitative family research. *Journal of Marriage and Family,* 67(4), 837-857.

Larson, E. (1999) The impact of physician-nurse interaction on patient care. *Holistic Nursing Practice,* 13 (2), 38-46.

Lave, J. & Wenger, E. (1990) *Situated learning: Legitimate Peripheral Participation*. Cambridge, UK. Cambridge University Press.

Lave, J. & Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*: Cambridge University Press.

Lawler, S. (2000) *Mothering the self: mothers, daughter's subjects*. London: Routledge.

Leaviss, J. (2000) Exploring the perceived effect of an undergraduate multiprofessional educational intervention*. Medical Education,* 34(6), 483-486.

Leith, R. Lowry, L. O'Sullivan, M. (2000) Communications between dentists and laboratory technicians. *J Ir Dent Assoc,* 46(4), 5-10.

Levett-Jones, T. Lathlean, J. Higgins, I. & McMillan, M. (2009) Staff – student relationships and their impact on nursing students' belongingness and learning. *Journal of Advanced Nursing,* 65(2), 316-324.

Lincoln, Y.S. & Guba, E.G. (1985) *Naturalistic Inquiry*. Newbury Park, CA: Sage.

Lindop, E. (1999) A comparative study of stress between pre-and post-Project 2000 students. *Journal of Advanced Nursing,* 29(4), 967-973.

Lindqvist, S. Duncan, A. Shepstone, L. Watts, F. & Pearce, S. (2005) Case based learning in interprofessional groups – the development of a pre-registration interprofessional learning programme. *Journal of Interprofessional Care,* 19(5), 509-520.

Ling, J. Funnell, P. Gill, J. (1990) Shared Learning, *Nursing Times,* 66(1), 65-66.

Lingard, L. Reznick, P. Devito, I. and Espin, P. (2002) Forming professional identities on the health care team: discursive construction of the 'other' in the operating room. *Medical Education,* 36(8), 728-734.

Lo, R. (2002) A longitudinal study of perceived level of stress, coping and self-esteem of undergraduate nursing students: an Australian case study. *Journal of Advanced Nursing,* 39(2), 119-126.

Loftland, J. Lofland, L.H. (1984) *Analysing Social Settings: A Guide to Qualitative Observation and Analysis.* Belmont, CA: Wadsworth Publishing Company.

Lord Laming (2003) The *Victoria Climbié Inquiry, report of an inquiry.* www.victoria-climbie-inquiry.org.uk, Accessed 29th September, 2008.

Lovas, D. A. & Lovas, P. M. (2008) Mindfulness and professionalism in dentistry. *Journal of Dental Education*, 72(9*),* 998-1009.

Lowenberg, J. S. (1993) Interpretative research methodology: broadening the dialogue. *Advances in Nursing Science,* 16(2), 153-162.

Lucas, A.F. (1990) *"Using Psychological Models to Understand Student Motivation"* In M.D. Svinicki (ed.), *The Changing Face of College Teaching.* New Directions for Teaching and Learning, no 42, San Fransisco: Jossey-Bass.

Lynch, C.D. Allen, P.F. (2003) A survey of chrome-cobalt RPD design in Ireland. *Int J Prosthodont,* 16(4), 362-364.

Lynch, C.D. Allen, P.F. (2003) Quality of materials supplied to dental laboratories for the fabrication of cobalt chromium removable partial dentures in Ireland. *Eur J Prosthodont Restor Dent,* 11(3), 176-180.

Lynch, C.D. Allen, P.F. (2005) Quality of communication between dental practitioners and dental technicians for fixed prosthodontics in Ireland. *J. Oral Rehabil,* 32(12), 901-905.

Lynch, C.D. Allen, P.F. (2005) Quality of written prescriptions and master impressions for fixed and removable prosthodontics: a comparative study. *Br Dent J*, 198(1), 17-20.

Lynch, C.D. Allen, P.F. (2006) Why do dentists struggle with removable partial denture design? An assessment of financial and educational issues. *Br Dent J,* 200(5), 277-281.

Lynch, C.D. Allen, P.F. (2007) The teaching of removable partial dentures in Ireland and the United Kingdom. *Br Dent J,* 20 (8), E17.

Lynch, C.D. McConnell, R.J. Allen, P.F. (2005) Communicating design features for fixed and removable prostheses. *Dent Update,* 32(9), 502-510.

Maben, J. Latter, S. and Macleod, J. (2006) The theory-practice gap: impact of professional-bureaucratic work conflict on newly-qualified nurses. *Journal of Advanced Nursing*, 55(4), 465-477.

Mail Online (2007) *Dentists fitting 'cheap and dangerous' crowns from abroad.* http://www.dialymail.co.uk/news/article-445491, Accessed 6th September, 2010.

Makely, S. (2005) *Professionalism in Health Care: A Primer for Career Success* 2nd Edn. New Jersey: Person Prentice Hall.

Mandy, A. Milton, C. Mandy, P. (2004) Professional stereotyping and interprofessional education. *Learning in Health and Social Care,* 3(3), 154-170.

Mannion, G. (2001) Journal writing and learning: Reading between the structural, holistic and post-structural lines. *Studies in Continuing Education*, 23(1), 95-115.

Mariano, C. (1989) The case for interdisciplinary collaboration. *Nursing Outlook*, 37(6), 285–288.

Marshall, C. & Rossman, G.B. (1999) *Designing qualitative research* (3rd ed.). Thousand Oaks: Sage Publications.

Marsiglio, W. (2003) *Studying fathering trajectories: In-depth interviewing and sensitizing concepts.* In R. Day & M. Lamb (Eds.), *Conceptualizing and measuring father involvement* (61-82). Mahwah, NJ: Lawrence Elbaum.

Maryan, C. (2011) Teamwork. *The Technologist* 16, 19-21.

Masella, R. S. (2005) The hidden curriculum: value added in dental education. *Journal of Dental Education,* 70(3), 279-283.

Masella, R. S. (2007) Renewing professionalism in dental education: overcoming the market environment. *Journal of Dental Education,* 71(2)*,* 205-216.

Mathias, P. Prime, R. & Thompson, T. (1997) *Preparation for interprofessional work: holism, integration and the purpose of training and education.* In J. Øvretveit, P. Mathias, & T. Thompson Eds) Interprofessional working for health and social care. London, Macmillan, 116-130.

Mattick, K. Bligh, J. (2003) Interprofessional learning involving medical students or doctors. *Medical Education,* 37(11), 1008-1011.

Mayer, M. (1998) Behaviours leading to more effective decisions in small groups embedded in organizations. *Communication Reports,* 11(2), 123-132.

Maykut, P. & Morehouse, R. (1994) *Beginning qualitative research: a philosophic and practical guide.* Washington DC: Falmer.

McAllister, L. Lincoln, M. McLeod, S. & Maloney, D. (1997) *Facilitating learning in clinical settings*. Cheltenham: Stanley Thornes.

McCarthy, R.L. (1996) Ethics and the use of Drug Formularies*. Journal of Managed Care Pharmacy*, 12(2), 76-82.

McCarthy, R.L. (1996c) *The nature of caring in pharmacy*. In A.M. Haddad and R.A. Buerki (Eds.), *Ethical dimensions of pharmaceutical care* (103–124). Binghamton, NY: Pharmaceutical Products Press.

McClure, P. (2005) *Reflection on Practice.* http://www.practicebasedlearning.org/resources/materials/doc, Accessed 17th June, 2009.

McGarry, T.J. Jacobson, T.E. (2004) The professions of dentistry and dental laboratory technology: improving the interface. *J Am Dent Assoc,* 135(2), 220-226.

McGowen, K.R. & Hart, L.E. (1990) Still different after all these years: Gender differences in professional identity formation. *Professional Psychology: Research and practice,* 21(2), 118-123.

McLaren, P. (1993) *Border Disputes: multicultural narrative, identity formation, and critical pedagogy in post modern America,* in: D. McClaughlin & W. Tierney (Eds) *Naming Silenced Lives – Personal Narratives and the Process of Educational Change.* New York: Routledge.

McLeod, J. M. (2001) *Qualitative research in counselling and psychology.* London: Sage.

McMichael, P. Irvine, R. & Gilloran, A. (1984) *Pathways to the professions: Research report. Edinburgh*: Moray House College of Education.

McMichael, P. & Gilloran, A. (1984) *Exchanging Views: Courses in Collaboration.* Edinburgh: Moray House College of Education.

McMichael, P. Irvine, R. & Gilloran, A. (1984a) *Pathways to the Professions: Research Report.* Edinburgh: Moray House College of Education.

McMichael, P. Molleson, J. & Gilloran, A. (1984b) *Teaming up to Problem Solve.* Edinburgh: Moray House College of Education.

McNair, R. P. (2005) The case for educating health care students in professionalism as the core content of interprofessional education. *Medical Education,* 39(5), 456-464.

McNair, R. Stone, N. Sims, J. Curtis, C. (2005) Australian evidence for interprofessional education contributing to effective teamwork preparation and interest in rural practice. *Journal of Interprofessional Care,* 19(6), 579-594.

McPherson, K. Headrick, L. Moss, F. (2001) Working and learning together: good quality care depends on it, but how can we achieve it? *Quality in Health Care,* 10(2), 46-53.

McPherson, G. and Thorne, S. (2006) Exploiting Exceptions to Enhance Interpretative Qualitative Health Research: Insights from a Study of Cancer Communication, *International Journal of Qualitative Methods*, 5(2), 1-11.

McWhinney, W. (1997) *You, the agent of change. Creating paths of change: managing issues and resolving problems in organisations.* London: Sage.

Mercer, J. (2007) The Challenges Of Insider-Research In Educational Institutions: Wielding A Double-Edged Sword And Resolving Delicate Dilemmas. *Oxford Review of Education*, 33(1), 1-17.

Merleau-Ponty, M. (1962) *Phenomenology of perception*. London, Routledge & Kegan Paul.

Merleau-Ponty, M. (1996) *Phenomenology of Perception,* Trans. Colin Smith. London and New York, Routledge. From the French original of 1945.

Merton, R.K. (1972) Insiders And Outsiders: A Chapter In The Sociology Of Knowledge. *The American Journal of Sociology*, 78(1), 9–47.

Mickel, A. (2008) Should social care workers be trained in compassion?

http://www.communitycare.co.uk/Articles/2008/07/30/109003/, Accessed 4th March, 2011.

Miles, H.B. & Huberman, A.M. (1994) *Qualitative data analysis: an expanded sourcebook.* Thousand Oaks, CA: Sage.

Miller, C. Freeman, M. Ross, N. (2001) *Interprofessional practice in health care and social care: challenging the shared learning agenda*. London: Arnold.

Miller, C. Ross, N. Freeman, M. (1999) *Shared learning and Clinical Teamwork: new direction in education for multiprofessional practice.* The English National Board of Nursing Midwifery and Health Visiting, London.

Mitra, D. (2003) Student Voice in School Reform: Refraining Student-Teacher Relationships. *McGill Journal of Education*, 38(2), 289-304.

Mitra, D. (2004) The Significance of Students: Can Increasing 'Student Voice' in Schools Lead to Gains in Youth Development, *Teachers College Record*, 106(4), 651-688.

Moen, T. (2006) Reflections on the narrative research approach. *International Journal of Qualitative Methodology*, 5(4), 1-11.

Molyneux, J. (2001) Interprofessional teamworking: what makes teams work well? *Journal of Interprofessional Care,* 15(1), 30-35.

Morgan, D.L. (1997) *Focus Groups as qualitative research.* London: Sage

Morison, S. Boohan, M. Jenkins, J. Moutray, M. (2003) Facilitating undergraduate interprofessional learning in healthcare: comparing classroom and clinical learning for nursing and medical students. *Learning in Health and Social Care,* 2(2), 92-104.

Morison, S. Marley, J. Stevenson, M. Milner, S. (2008) Preparing for the dental team: Investigating the views of dental and dental care professional students. *Eur J Dent Educ,* 12(1), 23-28.

Morrow, G. Malin, N. Jennings, T. (2005) Interprofessional team working for child and family referral in the Sure Start local programme. *Journal of Interprofessional Care,* 19(2), 93-101.

Morrow, S. L. & Smith, M. L. (1995) Constructions of survival and coping by women who have survived childhood sexual abuse. *Journal of Counseling Psychology*, 42(1), 24-33.

Morse, J. (1994) *Designing qualitative research,* in Denzin, N. and Lincoln, Y. (eds.), *Handbook of qualitative inquiry,* Thousand Oaks, CA: Sage.

Mortimer, E. (1979) *Interdisciplinary Learning at the Qualifying and Post-Qualifying Stages.* In, England, H. (ed) op. cit.

Mozingo, J. Thomas, S. Brooks, E. (1995) Factors associated with perceived competency levels of graduating seniors in a baccalaureate nursing program. *Journal of Nursing Education,* 34(3), 115-122.

Myall, M. Levett-Jones, T. & Lathlean, J. (2008) Mentorship in contemporary practice: the experiences of nursing students and practice mentors. *Journal of Clinical Nursing,* 17(14), 1834-1842.

Napier, R. & Gershenfeld, M. (1999) *Groups: Theory and experience.* Boston: Houghton Mifflin.

Nash, A. & Hoy, A. (1993) Terminal care in the community – an evaluation of residential workshops for general practitioner/ district nurse teams. *Palliative Medicine*, 7(1), 5-17.

Newman, D. Griffin, P. and Cole, M. (1989) *The construction zone: Working for cognitive change.* New York, NY: Cambridge University Press.

Newsome, P. (2011) Summary of: An Audit of dental prescriptions between clinics and dental laboratories. *Br Dent J,* 211(3), 126-127.

NHS Executive (1996) *Promoting Clinical Effectiveness: a framework for action in and through the NHS.*

Nicol, M. & Chaput de Saintonge, M. (2002) Learning clinical skills: an interprofessional approach. In: *Multi-Professional Learning for Nurses* (eds S. Glen & T. Leiba), 84-96. Palgrave, Basingstoke.

Niemi, P. (1997) Medical students' professional identity: self-reflection during the preclinical years, *Medical Education*, 31(6), 408-145.

Nieswiadomy, R.M. (1993) *Foundations of Nursing Research*, 2nd eddn. Norwalk, Conn: Appleton & Large.

Nisbet, G. Hendry, G.D. Rolls, G. Field, M.J. (2008) Interprofessional learning for pre-qualification health care students: an outcomes-based evaluation. *Journal of Interprofessional Care,* 22(1), 57-68.

Noddings, N. (1986) *Caring – a Feminine Approach to Ethics and Moral Education.* USA: University of California Press.

Nolan, C. (1998) Learning on clinical placement: the experiences of six Australian student nurses. *Nurse Education Today*, 17(18), 1834-1842.

Norman, I.J. (2005) Editorial: interprofessional education for pre-registration students in the health professions: recent developments in the UK and emerging lessons. *International Journal of Nursing Studies*, 42(2), 119–123.

Nuckles, M. & Bromme, R. (1998) Knowing what others know: A study on interprofessional communication between nurses and medical doctors. *Klinische Paediatrie,* 210, 291-296.

Nuffield Foundation (1980) *An Inquiry into Dental Education.* Nuffield Lodge, Regents Park, London.

Nuffield Foundation (1993) *Education and training of personnel auxiliary to dentistry.* Oxford, The Nuffield Foundation.

Nursing and Midwifery Council (2004) *The NMC Code of Professional Conduct: Standards for conduct, performance and ethics.* London Nursing and Midwifery Council.

Nystrom, M. Dahlberg, K. & Segesten, K. (2002) The enigma of severe mental illness: a Swedish perspective. *Issues in Mental Health Nursing,* 23(2), 121-134.

Oandason, I. & Reeves, S. (2005) Key elements for interprofessional education. Part 1; The learner, the educator and the learning context. *Journal of Interprofessional Care,* 19(1), 21-38.

Oermann, M.H. & Lukomski, A.P. (2001) Experiences of students in paediatric nursing clinical course. *Journal of the Society of Paediatric Nurses*, 6(2), 65-74.

O'Hara, P. and Neutel, I. (2002) Maintaining confidentiality in research data. *Pharmacoepidemiology and Drug Safety,* 11(1), 75-78.

Olckers. L. Gibbs, T. Mayers. P. Alperstein, M. Duncan. M. (2006) Early involvement in a multiprofessional course: an intergarted approach to the development of personal and interpersonal skills. *Education for Primary Care,* 17(3), 1-9.

Olesen, V.L. & Whittaker, E.W. (1968). *The Silent Dialogue.* San Francisco: Jossey-Bass Inc.

O'Neill, B. Wyness, A. McKinnon, S. & Granger, P. (2000) "*Partnership, Collaboration and Course Design: An emerging model of interprofessional education".* www.cstudies.ubc.ca/facdev/services/registry/pcacdaemoie.html, Accessed 29th September, 2008.

O'Rourke, R. (1998) The learning journal: from chaos to coherence. Assessment *and Evaluation in Higher Education,* 23(4), 403-413.

Page, S. Meerabeau, L. (2004) Hierarchies of evidence and hierarchies of education: Reflections on a multiprofessional education initiative. *Learning in Health and Social Care*, 3(3), 118-128.

Parsell G, Bligh J. (1998) Educational principles underpinning successful shared learning. *Medical Teacher,* 20(6), 522-528.

Parsell G, Bligh J. (1998) Interprofessional learning. *Postgraduate Medical Journal,* 74(868), 89-95.

Parsell, G. Spalding, R. & Bligh, J. (1998) Shared goals, shared learning: evaluation of multiprofessional course for undergraduate students. *Medical Education,* 32(3), 304-311.

Paterson, B. (1995) Developing and maintaining reflection in clinical journals. *Nurse Education Today,* 15(3), 211-220.

Patton, J.G., Wood, S.J. & Agarenzo, T. (1997) Enhancing the clinical practicum experience through journal writing*. Journal of Nursing Education,* 36(5), 238-240.

Patton, M. Q. (2002). *Qualitative research & evaluation methods (3rd ed.)*. Thousand Oaks, CA: Sage Publications.

Payne, P.A. King, V.J. (1998) A model of nurse-midwife and family physician collaborative care in a combined academic and community setting. *Nurse Midwifery,* 43(1), 19-26.

Pethybridge, J. (2004) How team working influences discharge planning from hospital: a study of four multi-disciplinary teams in an acute hospital in England. *Journal of Interprofessional Care,* 18(1), 29-41.

Pietrobon, N. Malament, K.A. (2007) Team approach between prosthodontics and dental technology. *Eur J Esthet Dent*, 2(1), 58-79.

Pietroni, P. (1994) *Interprofessional teamwork. Its History and development in hospitals, general practice and community care (UK). Going Interprofessional: Working together for health and welfare.* In Leathard, A. London, Routledge.

Pirrie, A. Wilson, V. Harden, R. M. Elsegood, J. (1998) AMEE Guide No 12: Multiprofessional education: Part 1 – effective multiprofessional education: a three-dimensional perspective. *Medical Teacher,* 20(5)**,** 402-408.

Pirrie, A. Wilson, V. Harden, R.M. Elsegood, J. (1999) AMEE Guide No 12: Multiprofessional education: Part 3 – promoting cohesive practice in health care. *Medical Teacher,* 20(5), 409-16.

Polanyi, M. (1966) *The Tacit Dimension Garden City*, NY, Doubleday & Co.

Pollard, K.C. Miers, M.E. Gilchrist, M. (2004) Collaborative learning for collaborative working? Initial findings from a longitudinal study of health and social care students. *Health Soc Care Community,* 12(4), 346-358.

Pollard, K. Miers, M.E. Gilchrist, M. (2005) Second year scepticism: pre-qualifying health and social care students' midpoint self-assessment, attitudes and perceptions concerning interprofessional learning and working. *Journal of Interprofessional Care,* 19(3), 251–268.

Pollard, K.C. Miers, M.E. Gilchrist, M. Sayers, A. (2006) Comparison of interprofessional perceptions and working relationships among health and social care students: the results of a 3-year intervention. *Health Soc Care Community,* 14(6), 541-552.

Pugsley, L. (1996) *"Focus Groups, Young People, and Sex Education." In Gender and Qualitative Resaerch,* edited by Pilcher, J. and Coffey, A. Aldershot: Avebury.

Rahdi, A. Lynch, C.D. Hannigan, A. (2007) Quality of written communication and master impressions for the fabrication of removable partial prostheses in the kingdom of Bahrain. *J Oral Rehabil,* 34(2), 153-157.

Reese, D.J. & Sontag, M.A. (2001) Successful interprofessional collaboration on the hospice team. *Health & Social Work,* 26(3), 167.

Reeson, M.G. Jepson, N.J.A. (2005) 'Bridging the gap' Should the training of dental technicians be linked with that of the dental undergraduate? *Br Dent J,* 198(10), 642-645.

Reeson, M.G. Walker-Gleaves, C. Jepson, N.J.A. (2009) *Emerging Themes: A Commentary on Interprofessional Training between Undergraduate Dental Students and Trainee Dental Technicians.* In: *Dental Implantation and Technology*, Chapter 3, 57-69, Editor: Williams, P.A. Nova Science Publishers, Inc.

Reeves, S. (2000) Community-based interprofessional education for medical, nursing and dental students. *Health and Social Care in the Community,* 8(4), 269-276.

Reeves, S. Pryce, A. (1998) Emerging themes: an exploratory research project of an interprofessional education module for medical, dental and nursing students. *Nurse Education Today,* 18(7), 534-541.

Reeves, S. Freeth, D. McCrorie, P. & Perry, D. (2002) “It teaches you what to expect in future…” interprofessional learning on a training ward for medical, nursing, occupational therapy and physiotherapy students. *Medical Education,* 36(4), 337-344.

Reeves, S. Lewin, S. (2004) Hospital-based interprofessional collaboration: strategies and meanings. *Journal of Health Services Research and Policy,* 9(4), 218-25.

Report of the GDC Dental Auxiliaries Review Group. May (1998) *Professionals complementary to dentistry a consultation paper.* London, General Dental Council.

Reynolds, F. (2005) *Communication and clinical effectiveness in rehabilitation*. Edinburgh, Elsevier Butterworth-Heinemann.

Richardson, G. & Maltby, H. (1995) Reflection-on-practice; enhancing student learning. *Journal of Advanced Nursing,* 28(22), 235-242.

Robson, C. (2002) *Real World Research.* Blackwell Publishing.

Rodehorst, T.K. Wilhelm, S.L. Jensen, L. (2005) Use of interdisciplinary simulation to understand perceptions of team member’s roles. *Journal of Professional Nursing*, 21(3), 159-166.

Roethlisberger, F.J. Dickson, W.J. (1939) *Management and the Worker* (MA, Harvard University Press.

Rogers, A. (1996) *Teaching Adults* (2nd ed). Buckingham: Open University Press.

Rogoff, B. (1990) *Apprenticeship in thinking: cognitive development in social context.* New York, NY: Oxford University Press.

Rolfe, G. Freshwater, D. Jasper, M. (2001) *Critical Reflection for Nursing and the Helping Professions: a User's Guide.* Basingstoke: Palgrave.

Ross, M. K. Turner, S. Ibbetson, R. J. (2009) The impact of teamworking on the knowledge and attitudes of final year dental students. *British Dental Journal,* 206(3), 163-167.

Rossman, G. & Rallis, S. (2003) *Learning in the field: An introduction to qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.

Rudduck, J. & Flutter, J. (2000) Pupil participation and Perspective: 'Carving a New Order of Experience'. *Cambridge Journal of Education*, 30(1), 75-89.

Rudland, J.R. & Mires, G.J. (2005) Characteristics of doctors and nurses as perceived by students entering medical school implications for shared teaching. *Medical Education,* 39(5), 448-455.

Rutherford, J. McArthur, M. (2004) A qualitative account of the factors affecting team-learning in primary care. *Education for Primary Care,* 15(3), 352-360.

Ryynänen, K. (2001) *Constructing physician's professional identity – explorations of students' critical experiences in medical education*
URL: http://herkules.oulu.fi/issn03553221/, Accessed 18th January, 2011.

Sainsbury Centre for Mental Health (1997) *Acute Problems – A survey of the Quality of Care in Acute Psychiatric Wards.* London: Sainsbury Centre for Mental Health.

Sainsbury Centre for Mental Health. (2001) *The capable Practitioner: a Framework and List of the Practitioner Capabilities Required to Implement the National Service Framework for Mental Health.* London: Training and Practice Development Section of the Sainsbury Centre for Mental Health.

Salvatori, P. Mahoney, P. & Delottinville, C. (2006) An Interprofessional Communication Skills Lab: A Pilot Project. *Education for Health*, 19(3), 380-384.

Sartre, J.P. (1956) *Being and Nothingness*. Trans. Hazel Barnes. New York, Washington Square Press. From the French original of 1943.

Saxell, L. Harris, S. Elarar, L. (2009) The Collaboration for Maternal and Newborn Health: Interprofessional Maternity Care Education for Medical, Midwifery, and Nursing Students. *Journal of Midwifery & Women's Health,* 54(4), 314-320.

Scanlon, J.M. Care, W.D. Udod, S. (2002) Unravelling the unknown of reflection in classroom teaching. *Journal of Advanced Nursing*, 38(2), 136-143.

Schein, E. (1978) *Career dynamics: matching individual and organizational needs.* Addison-Welsey Publishing Company, Reading, MA.

Schneider, B. (2000) Establishing and maintaining a successful laboratory/dentist relationship. *J Dent Technol*, 17(3), 36.

Schon, D. *(1983) The Reflective Practitioner; How Professionals Think in Action.* New York: Basic Books.

School of Dentistry & Oral Health (2004) Accreditation of a New Program: Bachelor of Oral Health in Dental Technology, Gold Coast, Griffith University.

Scott, D.C. Jaffe, D.T. (1990) *Managing change in organisations. Managing organisational change: a guide for managers.* London: Kogan Page Ltd.

Seebohm, F. (1969) (Chairman) *Report of the Committee on Local Authority and Allied Personal Social Services.* London, HMSO.

Seward M (1997) *General Dental Council Initiatives.* GDPA Report.

Seward, M. (1997) *Teamwork: sharing a learning experience.* GDPA Report

Shapiro, J. & Stefkovich, J.A. (2005) *Ethical Leadership and Decision Making in Education,* 2nd. ed, Mahwah, N.J.: Lawrence Erlbaum Associates.

Sibson, L. Machen, I. (2003) Practice nurses as mentors for student nurses: an untapped educational resources? *Nurse Education in Practice,* 3(3), 144-145.

Silverman, D. (1993) *Interpreting Qualitative Data - Methods for analysing talk, text and interaction.* London, Sage.

Sinclair, L. (2004) *Interprofessional education (IPE): New knowledge in need of translation?* Canadian Physiotherapy Association: Research News and Views Newsletter, Spring, 11-13.

Skills for Health (2002) *Oral Healthcare project Awards in Dental technology – The Way Forward.* Oral Health Project Consultancy Team.

Skjorshammer, M. (2001) Co-operation and conflicts in a hospital: interprofessional differences in perception and management of conflicts. *Journal of Interprofessional Care*, 15(3), 7-18.

Slife, B.D. & Williams, R.N. (1995) *What's behind the research? Discovering hidden assumptions in the behavioural sciences*. Thousand Oaks, CA: Sage Publications.

Slotnick, H. B. (2001) How doctors learn: education and learning across the medical-school-to-practice trajectory. *Academic Medicine,* 76(10), 1013-1026.

Spalding, E. & Wilson, A. (2002) Demystifying reflection: A study of pedagogical strategies that encourage reflective journal writing. *Teachers College Record*, 104(7), 1393-1421.

Spears, R. Oakes, P. Emmerson, H. Haslam, A. (1997) *The social psychology of stereotyping and group life*. Oxford, Blackwell.

Spratley, J. (1990a) *Disease Prevention and Health Promotion in Primary Health.* London, Health Education Authority.

Spratley, J. (1990b) Joint *Planning for the Development and Management of Disease Prevention and Health Promotion Strategies in Primary Health Care.* London, Health Education Authority.

Stapleton, S.R. (1998) Team-Building. Making Collaborative Practice Work. *Journal of Nurse-Midwifery*, 43(1), 12-18.

Stephen, D.E. O'Connell, P. & Hall, M. (2008) ''Going The Extra Mile', 'Fire-Fighting', Or Laissez-Faire? Re- Evaluating Personal Tutoring Relationships Within Mass Higher Education', *Teaching in Higher Education*, 13(4), 449-460.

Stewart, D.W. & Shamdasani, P.N. (1990) *Focus Groups Theory and Practice.* Newbury Park, CA, Sage.

Stockton, R. Rohde, R.C. Haughey, J. (1992) The Effects of Structured Group Exercises on Cohesion, Engagement, Avoidance, and Conflict. *Small Group Research,* 23(2), 155-168.

Strauss, A. & Corbin, J. (1990) *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage

Suikkala, A. Leino-Kilpi, H. (2001) Nursing student-patient relationship: A review of the literature from 1984 to 1998. *Journal of Advanced Nursing*, 33(1), 42-50.

Sullivan, T.J. (1998) *Collaboration: a health care imperative*. New York, McGraw-hill.

Tajifel, H. & Turner, J. (2001) *An Integrative Theory of Intergroup Conflict.* In: *Intergroup Relations: Essential Readings* (eds M A Hogg and D Abrams). Psychology Press, Philadelphia, USA. 94-109.

Tamamoto, M. (2005) Current status of team communication considered from a questionnaire survey on the laboratory prescription card. *Nihon Hotetsu Shika Gakkai Zasshi*, 49(3), 414-424.

Tang, C. (2002) Reflective diaries as a means of facilitating and assessing reflection. HERSDA, 2002.

Taylor, C. (2003) Narrating Practice: reflective accounts and the textual construction of reality. *Journal of Advanced Nursing,* 43(3), 244-251.

Taylor, J.W. (2002) *Collaborative Practice: shared responsibilities and outcomes.* Excerpt from a Margaret J. Stafford Educational Research Lecture January 2002 at the Edward Hines Veterans Administration Hospital.

Tennant, M. (1997) *Psychology and Adult learning 2e*. London, Routledge.

Teviot Report (1946) *Inter-Departmental Committee on Dentistry.* Final Report, London, HMSO.

The Independent (2010) Dental patients put at risk by banned fake-gold. http://www.independent.co.uk/life-style/health-and-families/health-news/dental

patient/Accessed 28/06/20010

Thomas, L. MacMillan, J. McColl, E Hale, C. & Bond, S. (1995) Comparison of focus group and individual interview methodology in examining patient satisfaction with nursing care. *Social Sciences in Health,* 66(1), 206–219.

Thompson, E. (2008) *Mind in Life: Biology, Phenomenology, And The Sciences Of Mind.* Cambridge, MA.: Harvard University Press.

Thornton, R. and Nardi, P. M. (1975) “The Dynamics of Role Acquisition.” *American Journal of Sociology, 80*(40), 870–885.

Timmins, F. & Kalizer, M. (2002) Aspects of nurse education programmes that frequently cause stress to nursing students – fact-finding sample survey. *Nurse Education Today,* 22(3), 203-211.

Tucker, K. Wakefield, A. Boggis, C. Lawson, M. Roberts, T. Gooch, J. (2003) Learning together: clinical skills teaching for medical and nursing students. *Med Educ,* 37(7), 630-637.

Tunstall-Pedoe, S. Rink, E. Hilton, S. (2003) Student attitudes to undergraduate interprofessional education. *Journal of Interprofessional Care*, 9(2), 161-172.

Turner, J.C. (1991) *Social Influence. Buckingham*, Open University Press.

Turner, J.C. (1999) *Some current issues in research on social identity and self-categorisation theories.* In Ellemers N, Spears R and Doosje B. *Social identity context, commitment, content.* Oxford, Blackwell.

Valle, R. King, M. & Halling, S. (1989) *An introduction to existential-phenomenological thought in psychology*. In R. Valle & S. Halling (Eds.), *Existential-phenomenological perspective in psychology* (3-16). New York: Plenum Press.

Van den Hoonaard, W.C. (1997) *Working with sensitizing concepts: Analytical field research*. Thousand Oaks, CA: Sage.

Vygotsky, L.S. (1978) *Mind and Society: The development of higher mental processes.* Cambridge, MA: Harvard University Press.

Wagner, P. Hendrich, J. Moseley, G. & Hudson, V. (2007) Defining medical professionalism: a qualitative study. *Medical Education,* 41(3)*,* 288– 294.

Walker, J.A. (1996) Learning to be interpretative: Hermeneutics and personal text. *Marriage & Family Review*, 24 (3-4), 233-239.

Warden, D. (2002) The dentist-laboratory relationship: a system for success. *J Am Coll Dent*, 69(1), 12-14.

Watts, R. (1987) Development of Professional Identity in Black Clinical Psychology Students, Professional Psychology: *Research and Practice*, 18(1), 28-35.

Watson, B. & Ashton, E. (1995) *Education, Assumptions and Values*. London: David Fulton.

Watson, N. (1999) Mentoring today – the students' views. An investigative case study of pre-registration nursing students' experiences and perceptions of mentoring in one Theory/practice module of the Common Foundation Programme on a Project 2000 course. *Journal of Advanced Nursing*, 29(1), 254-262.

Webb, C. & Shakespear, P. (2008) Judgements about mentoring relationships in nurse education. *Nurse Education Today*, 28(5), 563-571.

Wech, B. Mossholder, K. Steel, R. Bennett, N. (1998) Does work group cohesiveness affect individuals' performance and organizational commitment? A cross-level examination. *Small Group Research,* 29(4), 472-494.

Weick, K. E. 1979 *The Social Psychology of Organizing*, 2nd ed. McGraw-Hill, New York.

Weinstein, J. (1997) *The development of shared learning: conspiracy or constructive development?* In: J. Ovrteveit, P. Mathias and T. Thompson (eds.), *Interprofessional working for health and social care.* Basingstoke, Macmillan.

Weiss, M. (2007) The informed patient: friend or foe? *The Pharmaceutical Journal*, 278(3), 143-146.

Wertsch, J.V. Sohmer, R. (1995) *Vygotsky on learning and development*. Human Development 38(6), 332-37.

Whateley, B. (1998) *A Very Special Team*. London, British Dental Association.

Wilcock, P. Lewis, A. (2002) Putting improvement at the heart of health care. *BMJ,* 325(7366), 670-671.

Williams, R. and Wessel, J. (2004) Reflective journal writing to obtain student feedback about their learning during the study of chronic musculoskeletal conditions, *Journal of Allied Health*, 33(1), 17-23.

Williams, R.M. Sundelin, G. Foster-Seargeant, E. Norman, G.R. (2000) Assessing the Reliability of Grading Reflective Journal Writing. *Journal of Physical Therapy Education*, 14(2), 23–26.

Williams, R. Wessel, J. Gemus, M. and Foster-Seargent, E. (2002) Journal writing to promote reflection by physical therapy students during clinical placements. *Physiotherapy Theory and Practice*, 18(1), 5-15.

Willis, J. (1996) *A framework for task-based learning.* Harlow: Longman.

Windsor, A. (1987) Nursing students' perceptions of clinical experience. *Journal of Nursing Education*, 26(4), 150-154.

Winne, L. and Palmer, C. (2004) Investigating effectiveness of reflective journaling for radiation therapy students: a student perspective, *Canadian Journal of Medical Radiation Technology*, 35(1), 3-9.

Woodward, H. (1998) Reflective journals and portfolios: learning through assessment. *Assessment and Evaluation in Higher Education*, 23(4), 415-423.

Working together. Education and Training. (1986) White Paper. London, HMSO.

Workman, B. (1998) Exploring student nurse experiences in the community. *Journal of Community Nursing*, 12(5), 14-18.

World Health Organisation (1988) *Learning together to work together for health.* Technical Reprt Series 769. Geneva: WHO.

World Health Organisation (1988) *Learning together to work together for health: The Team Approach.* Report of a WHO Study Group on Multiprofessional Education of Health Personnel. WHO, Geneva.

Young, S. Theriault, J. Collins, D. (1989) The nurse preceptor: preparation and needs. *J Nurs Staff Dev*, 5(3), 127-31.

Zellermayer, M. (1997) When we talk about collaborative curriculum-making, what are we talking about? *Curriculum Inquiry*, 27(2), 187-214.

Zungolo, E. (1994) Interdisciplinary education in primary care: the challenge. *Nursing and Health Care*, 15(6), 288-292.

Zwarenstein, M. Atkins, J. Barr, H. Hammick, M. Koppel, I. Reeves, S. (1999) A systematic review of interprofessional education. *Journal of Interprofessional Care,* 13(4), 417-424.

Zwarenstein, M. Reeves, S. Perrier, L. (2004) Effectiveness of pre-licensure interdisciplinary education and post-licensure collaborative interventions. *Journal of Interprofessional Care*, 19(1), 149-165.

Zwarenstein, M. Reeves, S. (2006) Knowledge translation and interprofessional collaboration: where the rubber of evidence-based care hits the road of teamwork. *J Cont Educ Health profess*, 26(1), 46-54.

APPENDIX A

NHS
National Research Ethics Service

24 January 2008

Dr Nicholas J Jepson
Senior Lecturer/Honorary Consultant

Dear Dr Jepson

Full title of study: **The benefits to patient care gained by training dental technicians alongside undergraduate dental students.**
REC reference number: **07/H0906/154**

Thank you for your letter of 21 January 2008, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Vice-Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

It is suggested that the consent forms could also have relevant headers indicating whether they are for students or patients.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA. There is no requirement for other Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date

Application	A+B	13 November 2007
Investigator CV	N Jepson	26 October 2007
Investigator CV	C Walker-Gleaves	29 June 2007
Investigator CV	M G Reeson	18 June 2007
Protocol	2	09 January 2008
Covering Letter	N Jepson	13 November 2007
Participant Information Sheet: Patient	2	09 January 2008
Participant Information Sheet: Student	2	09 January 2008
Participant Consent Form: Focus group	2	09 January 2008
Participant Consent Form: Semi-structured interview	2	09 January 2008
Participant Consent Form: Reflective diary/learning log	2	09 January 2008
Response to Request for Further Information		21 January 2008

R&D approval

All researchers and research collaborators who will be participating in the research at NHS sites should apply for R&D approval from the relevant care organisation, if they have not yet done so. R&D approval is required, whether or not the study is exempt from SSA. You should advise researchers and local collaborators accordingly.

Guidance on applying for R&D approval is available from http://www.rdforum.nhs.uk/rdform.htm.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

Here you will find links to the following

a) Providing feedback. You are invited to give your view of the service that you have received from the National Research Ethics Service on the application procedure. If you wish to make your views known please use the feedback form available on the website.
b) Progress Reports. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
c) Safety Reports. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
d) Amendments. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
e) End of Study/Project. Please refer to the attached Standard conditions of approval by Research Ethics Committees.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nationalres.org.uk .

07/H0906/154	Please quote this number on all correspondence

With the Committee's best wishes for the success of this project

Yours sincerely

pp

Chris Turnock
Vice Chair

Email: leonard.key@nhs.net

Enclosures: *Standard approval conditions*

Copy to: Mrs Amanda Tortice

APPENDIX: B

Teamwork and barriers to learning: a study on a shared learning exercise between undergraduate dental students and trainee dental technicians

PARTICIPANT INFORMATION SHEET (STUDENT)

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being carried out and what it will involve. Please take time to read the following information carefully. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

1. What is the purpose of the study?
Traditionally the working relationship between dentist and dental technician has depended on communication by written prescription with little face to face discussion. Both make assumptions based on their own experience about the other's approach to the needs of the patient. Unsurprisingly, this sometimes unreliable means of communication has resulted in a variable quality of service. This study intends to investigate whether there are any benefits to shared learning between these two groups within the dental team.

2. Why have I been chosen?
As a student within the Dental Hospital/School you will be fabricating both complete and partial dentures for patients as part of your formal course. Therefore, you have been randomly selected from your year group.

3. What do I have to do if I do take part?
During the course of your patient's treatment you will be asked to complete a reflective diary/learning log. You will also be invited to take part in a focus group meeting at the end of the exercise with other students who have taken part. The focus group will take about 15-20 minutes to complete and will be recorded by tape for the purposes of data collection and analysis. Your participation will be treated in the strictest confidence and comply with the data protection act 1998.

4. Do I have to take part?
It is up to you whether or not to take part. If you are happy to complete the reflective diary/learning log and attend a focus group meeting, you should keep this information sheet and sign the consent form that is enclosed. If you do decide to take part you are still free to withdraw at any time and without giving a reason. Whether or not you decide to take part, your present or future training will not be affected.

5. What are the possible benefits of taking part?
Taking part in this study may or may not benefit you but may benefit others in the future. The study will provide information on whether training dental technicians alongside undergraduate dental student's offers any professional and occupational specific disciplinary developmental benefits.

6. Will my taking part in this study be kept confidential?
Yes. All information that is collected regarding your experiences will be kept strictly confidential. Your name will not be used in the transcript of the reflective diary/learning log. Any focus group and reflective diary/learning log data will be kept in secure cabinets and will be destroyed on completion of the study. Although responses will be anonymised some direct quotes from students may be used in journals. However, there will be no direct reference made to any particular participant.

7. What will happen to the results of the research study?
The study will provide information on whether this type of training provides any benefits between these two members of the dental team. The information will be distributed to other dental teaching hospitals nationally.

8. Who has reviewed the study?
The protocol for this study has been reviewed by the Local Research Ethics Committee.

9. Contact information
For further information please contact:

Mr M G Reeson
Chief Instructor
School of Dental Technology

Dr N J Jepson
Senior Lecturer/Honorary Consultant
Department of Restorative Dentistry

For independent advice about participating in the study please contact:

Mrs Jill Forsyth
Research Support Officer

Thank you for taking the time to read this information.

Date: 09/01/2008 Version: 2

APPENDIX: C

Teamwork and barriers to learning: a study on a shared learning exercise between undergraduate dental students and trainee dental technicians

We would like to invite you to take part in a study to find out whether there are any benefits to be gained by training dental technicians alongside undergraduate dental students? If you agree to take part you would simply be asked to complete a reflective diary/learning log during the course of your patient's treatment and attend a focus group once your patient's treatment was completed.

Your participation in this study will be treated in the strictest confidence. Although responses will be anonymised some direct quotes from students may be used in scientific journals. However, there will be no direct reference made to any particular participant. Taking part in the study is voluntary. If you do not want to take part or at any time wish to withdraw, your training at the Dental Hospital/School will not be affected in any way. You may ask at any time for further information about the study.

Thank you for your help and co-operation

……

Student Consent Form (Reflective diary/learning log)

I understand that my participation is entirely voluntary and I have read and understand the above in the presence of

Mr/Dr……..

I hereby agree to participate in this study. I have received satisfactory answers to my questions.

Participant……

Witness……..

Date……

Participant ID Number

Date: 09/01/2008 Version: 2

APPENDIX: D

Teamwork and barriers to learning: a study on a shared learning exercise between undergraduate dental students and trainee dental technicians

We would like to invite you to take part in a study to find out whether there are any benefits gained by training dental technicians alongside undergraduate dental students? If you agree to take part you would simply be asked to complete a reflective diary/learning log during the course of your patents treatment and attend a focus group meeting once your patient's treatment was completed. These focus groups will be recorded by tape for the purposes of data collection and analysis.

Your participation in this study will be treated in the strictest confidence. Although responses will be anonymised some direct quotes from students may be used in scientific journals. However, there will be no direct reference made to any particular participant. Taking part in the study is voluntary. If you do not want to take part or at any time wish to withdraw, your training at the Dental Hospital/School will not be affected in any way. You may ask at any time for further information about the study.

Thank you for your help and co-operation

……

Student Consent Form (Focus Group interviews)

I understand that my participation is entirely voluntary and I have read and understand the above in the presence of

Mr/Dr……..

I hereby agree to participate in this study. I have received satisfactory answers to my questions.

Participant……

Witness……..

Date……

Participant ID Number

Date: 09/01/2008 Version: 2

APPENDIX: E

Shared Learning Experience

Reflective Diary/Learning Log

Weekly Progress Report

.

Shared learning experience
Information Sheet

Hello,

Thank you for agreeing to participate in this shared learning exercise. What we are trying to find out is whether the linking of undergraduate dental students and trainee dental technicians has any benefits in the quality of dental care we provide our patients'.

We are hoping to identify learners' experiences together with any perceived barriers to learning with patients and other professional groups. The data collected will hopefully help to make improvements by enabling more effective learning and development to take place between these two professional groups.

The shared learning exercise will involve a trainee dental technician working alongside an undergraduate dental student in the fabrication of dentures for a patient as part of the formal 3rd and 4th year BDS course in both complete and partial dentures. The trainee technician will attend the chairside at every stage and undertake all of the technical work for the patient. The trainee dental technician will also attend the same lectures and seminars as the undergraduate dental students. There will also be an opportunity for the undergraduate dental students to undertake some of the technical work for their patients in the School of Dental Technology.

The purpose of this reflective diary/learning log is for you to record your actions, thoughts and reflections over the coming weeks as your patient's treatment progresses. The diary has been designed with headings for example, what you did, the outcome, the problems you may have encountered. (An example of how the diary might be completed for both groups of students is attached). Please feel free to incorporate your experiences in treating your patient and your experiences of working alongside each other. An extra page has been provided for any additional comments after each weekly progress report. You may also want to ask your patient's questions if you so wish. At the end of your patient's treatment we would like to invite you all to a focus group meeting to discuss how the exercise influenced your learning experience.

We hope you will enjoy taking part in this exercise which we hope will be of some benefit to you. If you have any queries please do not hesitate to ask either Dr Nicholas Jepson or Mr Michael Reeson.

Reflective Diary/Learning Log
Weekly Progress Report

Name: *Peter Canine 3rd year trainee dental technician*

Date: *03/03/2008*

What you did:

Spoke with both the undergraduate/s and the patient as to what treatment was to be carried out today. Upper and lower wax trial dentures to be tried in the patient's mouth. Occlusion and appearance checked.

Outcome:

Dentures looked good in the patient's mouth; however, the patient felt that the two upper incisors were a little lighter compared to her natural teeth. Helped to check shade against her natural teeth with undergraduate dental student. Decided to go for a darker shade .of tooth.

Problems encountered / handled:

Patient felt that the denture tooth shade was slightly lighter than her natural teeth. Helped undergraduate dental student check tooth shade. Decided to replace teeth with a slightly darker shade. Explained to dental student I had to grind the teeth to get them to fit therefore some of the body colour may have been lost.

What I would do again / what I would not do again / what was a mistake:

As the teeth had to be ground a lot we should have possibly chosen a slightly darker shade of tooth as a lot of the colour out of the body of the teeth was lost once they were ground. Brought new shade of stock tooth from lab to show student and patient

Follow up / Action Plan:

Slightly darker shade of teeth chosen to be retried next appointment

Reflective Diary/Learning Log
Weekly Progress Report

Name: *Andrew Molar 3rd or 4th Year BDS*

Date: *15/10/2007*

What you did:

Discussed with both patient and technician the proposed treatment to be carried out today. Upper and lower wax trial dentures to be tried in.

Outcome:

Upper and lower trial dentures tried in, occlusion checked, appearance very good. Patient felt that the shades of two anterior teeth were a little lighter than her natural teeth.

Problems encountered / handled:

Dentures looked good in the patient's mouth, however, the patient felt that the central and lateral incisor were a little to light in colour compared to her natural teeth. Checked shade with the help of the technician. Need to replace these two teeth with a slightly darker shade.

What I would do again / what I would not do again / what was a mistake:

The shade of the teeth originally chosen slightly different to the teeth on the wax trial denture. Technician student explained that he had to grind the teeth to get them to fit and this sometimes causes the tooth to become lighter than the original shade chosen. Need to take this into consideration in the future.

Follow up / Action Plan:

New shade of incisor teeth chosen to be retried in next week

Additional comments; possible comments about

- **How I felt in the clinic / laboratory**

Today was the patient's first appointment. Things went Ok, got on reasonably well with the trainee technician; intend to visit the lab before patient's next appointment to mark tray design on casts for technician

- **How the patient felt**

This was the patient's first appointment, she told us all about the problems she had with her previous dentures and what she would like from her new dentures. I have made some notes that I will be able to refer to when it comes to setting-up the teeth.

APPENDIX: F Focus Group Questions

1) Firstly, you have just taken part in a shared learning exercise what benefits if any did you gain from the shared learning exercise.

   PROBE

   - Before the exercise were you clear about one another's role

2) The next question is was there anything that wasn't of benefit from the exercise.

   PROBES

   - What difficulties arose
   - Relationships

3) Tell me were you conscious of any barriers to learning during the exercise.

   PROBES

   - What did work / What didn't work
   - Is there anything you felt you couldn't say or do
   - Were you restricted in anyway

4) Did you feel the patient gained benefit from the exercise?

   PROBES

   - In what ways do you feel the patient benefited
   - In what ways did they not

5) Finally, how could the exercise be improved.

   PROBES

   - What did you like about it
   - What didn't you like about it

APPENDIX: G Table for tabulating data from reflective diaries.

Question	Quote	Context	Date
What you did	*"… The trainee technician assisted in trimming the excess off the special tray and explained the reasons why the tray had been made larger than necessary".*	*3rd year undergraduate dental student working with trainee dental technician in the clinic*	*7/11/2007*
Outcome	*"…Tray was well made, therefore not much trimming needed. The trainee technician checked the impression after I had taken it".*	*4th year undergraduate dental student working with trainee dental technician on the clinic*	*21/09/2008*
Problems encountered/handled	*"… From a technicians perspective I would in the future trim my trays slightly shorter as I usually leave them slightly overextended yet by seeing what the dentist needs to work with it has made me more conscious of my tray measurements".*	*Trainee dental technician working with 3rd year undergraduate dental student in clinic*	*7/11/2007*
What I would do again/ What I would not do again/ What was a mistake	*"… Next time I will try to get more involved by looking in the patient's mouth to see what there is to work with".*	*Trainee dental technician working with3rd year undergraduate dental students in clinic*	*24/10/2007*
Follow up/Action plan	*"… Both the undergraduate and I consulted the x-rays and discussed the bone loss, resorption and design of the patents new denture".*	*Trainee dental technician working with 4th year undergraduate dental student in laboratory*	*17/12/2008*
Additional comments; Possible comments about How I felt on the clinic/laboratory How the patient felt	*"… My confidence with both patient and undergraduates has increased, which makes me more comfortable on clinic. This week I feel more of a team. The undergraduates asked for my help in marking the mid-line, and I was able to adding wax to the rim".*	*Trainee dental technician working with 3rd year undergraduate dental students in the clinic*	*26/11/2008*

APPENDIX: H Table for tabulating data from focus group interviews.

Question	Quote	Context	Date
What benefits did you gain from the exercise	*"… We felt it really useful to have the technician present going through the various stages with you because we were learning. They seemed to know a bit more about things than we did at times so that helped us. I don't know if it helped them. I feel that we probably benefited more than they did."*	*3rd year undergraduate dental student*	*4/03/2009*
Was there anything that wasn't of benefit from the exercise	*"… The only other thing I felt was how much did they know about the clinical stages and how familiar they were with them so I didn't know whether I should be explaining to them".*	*4th year undergraduate dental student*	*1/04/2009*
Were you conscious of any barriers to learning during the exercise	*"… Sometimes felt that my opinion was disregarded especially by the clinical supervisor".*	*3rd year Trainee dental technician*	*23/06/2008*
Do you feel the patient benefited more	*"… Yes they felt that they were getting a lot more choice and better treatment, the patient could tell the technician directly what he or she wanted without it having to be explained in writing".*	*3rd year undergraduate dental student*	*23/06/2008*