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**AN EVALUATION OF EDUCATION
IN AN ORTHODONTIC TRAINING
CENTRE**

Richard John Cure

University number: 

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requirements for the degree of
Doctor of Philosophy in Clinical Education
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Dedication

To those, sadly long since departed this world, whose loss still leaves an unfillable hole....

Mom and Dad - you gave everything to give me a chance, taught me to stand up for what was right and to help those who could not help themselves. You are always with me, still my inspiration, continue to help me when the going gets tough, and never forgotten. I hope you are proud.

Colin – you were taken from us far too soon. I still miss your friendship. This is also for you mate.

To those in the present and future, who can make a difference....

Ian and Rachel, Alfie and Louis, and any future offspring - I hope this can be an inspiration.

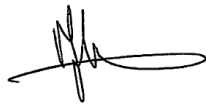
Just do it!

Declaration

'This thesis is my own work and has not been submitted for a degree at another University.'

Richard John Cure

Signature:

A handwritten signature in black ink, consisting of several vertical strokes followed by a horizontal line that loops back to the left.

Date: 14th December 2014.

Abstract

This thesis is an evaluation of interprofessional education (IPE) in Leamington Spa Orthodontics (LSO), a primary care outreach training centre. It is relevant, as there are no IPE studies in dentistry and timely, offering a model of integrated education and patient care. As a longitudinal study, where IPE is the organisational philosophy, it is significant in informing theorisation of IPE.

The methodology is realist evaluation, which aims to describe and understand the educational environment and identify how stakeholders perceive their experiences. The study group spans the full spectrum of stakeholders in LSO education, selected by purposive sampling. Data collection is by semi-structured interviews and focus groups. Thematic analysis allows in-depth data immersion, developing theory iteratively until saturation is achieved. Identified theories are tested and refined by stakeholders, thus providing respondent validation.

Findings show IPE in LSO to be successful for the orthodontic team. A core philosophy and attitude are the initiating contexts, which, with time, allow development of an appropriate skill-mix, organization and setting to facilitate learning. Empowerment leads to aspects of unlearning, reflection, formal and informal learning, combining with situated learning to deliver interprofessional learning. Outcomes include individual and team development, enhanced teamwork, communication and depth of learning. IPE evolves through situated learning in a conducive community of practice, where individuals develop their own identities, or learning trajectories, unrestricted by professional protectionism. To be sustainable, IPE must become organisationally contextual, which is dependent upon emergence of new leaders and, requires buy-in from and continuing motivation of the majority of stakeholders.

This thesis identifies contexts required for IPE, mechanisms which generate defined outcomes, and suggests that a customized primary care setting is ideally suited for its' development. IPE has struggled to transform healthcare professional education. An institutional teaching model, with IPE as the core philosophy, may achieve this goal. This thesis therefore suggests that IPE should be an overarching educational theory in its own right, within which other social science and education theories combine, to maximize integrated learning and patient care.

List of abbreviations

ADEE: Association of Dental Education in Europe.

BOS: British Orthodontic Society.

CAIPE: The Centre for the Advancement of Interprofessional Education.

CPD: Continuing professional development.

DGP: Dental care professional.

GDC: General Dental Council – the organisation that regulates dental professionals in the UK.

GDP: General dental practitioner.

MEE: Medical Education England.

MRC: Medical Research Council.

NEBDN: National Examining Board for Dental Nurses – the historical awarding body for dental nurse qualifications in the UK.

VLE: Virtual learning environment.

Glossary of terms

Interprofessional clinical education (IPCE): When individuals of two or more health care professions come together within a clinical or fieldwork environment to learn with, from and about each other in order to improve collaboration and the quality of practice (CAIPE).

Interprofessional collaboration (IPC): The process of developing and maintaining effective interprofessional working relationships with learners, practitioners, patients/clients/families and communities to enable optimal health outcomes (CIHC, 2010:8).

Interprofessional collaborative practice (IPCP): All members of the health service delivery team participate in the team's activities and rely on one another to accomplish common goals and to improve healthcare delivery, thus improving the patient's quality experience (Stone, 2009:4)

Interprofessional education (IPE): Those occasions when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (WHO, 2010:7).

Interprofessional learning (IPL): Learning arising from interaction between members (or students) of two or more professions. This may be a product of interprofessional education or happen spontaneously in the workplace or in education settings (Freeth *et al.*, 2005b:15).

Interprofessional practice (IPP): Occurs when all members of the health service delivery team participate in the team's activities and rely on one another to accomplish common goals and improve health care delivery, thus improving patient's quality experience (Nisbet *et al.*, 2011:5).

Interprofessionality: The development of a cohesive practice between professionals from different disciplines. It is the process by which professionals reflect on and develop ways of practicing that provides an integrated and cohesive answer to the needs of the client/family/population (D'Amour & Oandasan, 2005:9).

Multidisciplinary teamwork (MDT): Health professionals involved in the collective management of patient care (Lowe, 2014).

Multiprofessional education (MPE): When members (or students) of two or more professions learn alongside one another: in other words, parallel rather than interactive learning (Hammick *et al.*, 2007:7).

Orthodontics: The dental specialty concerned with facial growth, development of the dentition and occlusion, and the diagnosis, interception, and treatment of malocclusions (Mitchell, 2007).

Realist Evaluation: Primary research, which follows an approach grounded in realism, a school of philosophy which asserts that both the material and the social worlds are 'real' and can have real effects; and that it is possible to work towards a closer understanding of what causes change (Pawson & Tilley, 1997).

Uniprofessional education: Where professionals learn in isolation from one another (Reeves *et al.*, 2008b).

Chapter 1: Introduction

1.1 Overview

Orthodontics is the dental specialty concerned with facial growth, development of the dentition and occlusion and the diagnosis, interception and treatment of occlusal anomalies (Mitchell, 2007). In the UK, orthodontic treatment is now delivered by a highly skilled team. Historically, education and training for orthodontic team members has been delivered unprofessionally, in secondary care hospital settings, despite 96% of dental care, including orthodontics, being delivered in primary care (Wilson *et al.*, 2008). The General Dental Council (GDC) is the regulatory body for dentistry in the UK, and has stated that good dental care is delivered by a team of professionals, that Dental Care Professionals (DCPs) should be able to train as a part of the dental team and that this training should be more flexible with regard to the environment in which it is delivered. The contribution of appropriately qualified part-time teachers based in primary care is seen to be highly advantageous in this training process (GDC, 2004). The GDC therefore oversees the education of its registrants, including setting learning outcomes but, does not plan or deliver training programmes.

Health Education England (HEE) is a Special Health Authority of the Department of Health (DoH) and from April 2013 has primary responsibility for healthcare education and training in England; prior to this, accountability lay with the DoH and Strategic Health Authorities (SHAs) (DoH, 2013). The

Medical Education England (MEE) Dental Programme plans the education and training of dentists and DCPs (Robinson *et al.*, 2012). In a review of dental skill mix, MEE identifies the potential for delegation of more routine procedures to DCPs, and states that workforce planning must ensure a sufficient number of general dental practitioners (GDPs) and DCPs for future service delivery (MEE, 2012).

Leamington Spa Orthodontic Centre (LSO) is a primary care specialist orthodontic referral practice, where patient care is delivered by a specialist led team (Table 1). It is approved as the University of Warwick’s national orthodontic outreach training centre, delivering education to all members of the orthodontic team (Cure & Ireland, 2008). Development and delivery of orthodontic courses started in 2005 and orthodontic therapists, orthodontic nurses and Masters level orthodontic students now all work and train at LSO in an interprofessional education (IPE) environment. This study is a realist evaluation of education in LSO and is the story of its initial inception, development and continuing evolution.

Table 1: Members of the LSO orthodontic team

Members of the LSO orthodontic team
Orthodontic specialists
MSc in Orthodontics qualified dentists
Orthodontic therapists
Orthodontic nurses
Dental hygienists
Orthodontic technicians
Administrators

1.2 Outline of the thesis

1.2.1 The conceptual basis of the thesis

1.2.1.1 Purpose

To increase knowledge and understanding of education within LSO, to inform its progression and to add to the wider body of evidence of effectiveness in the field of IPE based in primary healthcare settings.

1.2.1.2 Aims

The aims of this thesis are to describe and understand the LSO educational environment and identify how contributors to and participants in, perceive the educational experiences and their effectiveness for different professional groups.

1.2.1.3 Objectives

The objectives are to determine the views that stakeholders hold about education at LSO, the range of contributors to the teaching, the range of methodologies employed, for which professionals these are perceived as most successful, the overall administration, what barriers there are to learning, identification of key factors which the contributors and participants feel affect learning and, how the educational experience may be improved.

1.2.1.4 Realist evaluation research questions

The current thesis aims to address the following research evaluation questions in relation to the education programmes taking place at LSO:

- What works?
- For whom?
- In what circumstances?
- Why?
- How?

1.2.1.5 Context

The thesis is a realist evaluation of IPE, as delivered in a primary care specialist orthodontic practice, which has been specifically developed to provide integrated education and clinical care.

1.2.1.6 The literature

The literature informed this thesis by deepening understanding of IPE, dental and orthodontic education, theories of learning, relevant methodology, evaluation methods, analytical tools and analytical concepts.

1.2.1.7 Methodology

The methodology is realist evaluation (Pawson & Tilley, 1997), which is an iterative explanation building process, chosen because it can answer the aims and objectives of the thesis. It is primary research that is firmly grounded in and applies the realist philosophy of science.

1.2.1.8 Data collection methods

Data collection was by semi-structured interviews and focus groups, which were undertaken by a dentally qualified educationalist research associate.

1.2.1.9 Data analysis

This thesis used manual methods of analysis, which allowed an in-depth immersion in the data. A thematic approach to analysing qualitative data was taken, helped by the use of NVivo software to support coding of data.

1.2.1.10 Ethics and governance

This study received approval from the University of Warwick Biomedical and Scientific Research Ethics Sub-Committee. All participants had the process explained by means of a short presentation and associated documentation, consented to be involved, and had their data coded for anonymity.

1.2.1.11 Role of the evaluator

In this thesis the researcher was an insider evaluator (Patton, 2002), who was completely integrated in the population of study.

1.2.1.12 Dissemination

The findings from this evaluation are to be presented at conferences and submitted to peer-reviewed journals.

1.2.1.13 Hypotheses

Education programmes do not simply work or not work, but contain certain ideas, which work for some people in some situations. There are key factors related to LSO education which have the potential to initiate change and are integral to some individuals maximising the opportunities LSO offers. Identification of these core factors may enhance theoretical understanding of what mechanisms are driving IPE at LSO, in what contexts they work, for whom, why and how this occurs and what outcomes are delivered, which may inform further development of education, add to the body of evidence relating to IPE, the delivery of integrated patient care and orthodontic education and IPE in primary healthcare environments.

1.3 Background

This chapter now discusses orthodontic education, outreach training, the orthodontic team, DCPs as educators, interprofessionality, the development of LSO education and initially an outline history of dental education.

1.3.1 History of dental education, training and qualifications

The first comprehensive dental textbook was written in 1728 by Fauchard (1678-1761) (Lynch *et al.*, 2006). Formal or institutional dental education began in the USA in 1840 (Field, 1995) and in the UK in 1858 (Gelbier, 2005), following a similar developmental pathway and to that of many other health professions. These pathways have mainly led to an independent set of health professions schools, with a culture of collaboration that, at best, is not fully developed and, at worst, is resistant (Alfano, 2012). Educational delivery is focused on dentists, and many dental tutors hold negative views about integrated learning with DCPs (Sweet *et al.*, 2008a). However, dental care in the 21st century is now increasingly delivered by an extended duty team (GDC, 2013a). For some time there was no formal career progression for dental nurses (NEBDN); subsequently some undertook further training to become dental hygienists.

The first dental hygiene school was established in the USA in 1910 but only one student cohort graduated before local dentists succeeded in closing it (Motley, 1986). Following this, in 1916, Columbia University founded the first

university-based hygiene programme (Orlando & Gies, 1992) whilst in the UK, in 1943, a hygiene school was established at RAF Sidmouth, with dentists claiming it diluted the profession. It was not until the 1957 Dentists Act that hygienists were allowed to work legally in the UK (Gelbier, 2005). By this time, postgraduate training for dentists was becoming more prevalent.

This dental hospital based education included individual specialty training, with the first qualifications, in orthodontics, awarded by the Royal College of Surgeons in England in 1948 (Gelbier, 2005). Membership qualifications in a variety of dental specialties have subsequently been developed (Rothwell, 1999), plus the development of new members of the dental care team (Gallacher *et al.*, 2012). Dental therapist, undergraduate dental students and dental technicians are now trained in dental schools simultaneously but undergoing separate courses (Gelbier, 2005).

By the late 20th century, there was an increasing recognition of the need for further postgraduate qualifications for dentists based in primary care. The historical focus of dental education has revolved around dentists; however the majority of GDC registrants are now DCPs, who are an integral part of the dental team.

1.3.2 Dental Care Professionals (DCPs)

This generic term covers the professional groupings listed in Table 2 (MEE, 2012); their professional roles and responsibilities are outlined in the GDC's

Scope of Practice document (GDC, 2013b). DCPs now undertake many of the clinical tasks traditionally the sole remit of the dentist. Historically their training has been delivered in dental teaching hospitals (Cure & Ireland, 2008).

From 2006 all DCPs have had to register with the GDC. The team approach to dental care, with a dentist lead, has been formally recognised by the GDC (GDC, 2004), leading to an increased demand for appropriate DCP training. Documented educational needs include: increased breadth across the dental team, vertical integration within and between specialties and growth longitudinally, with the concept of lifelong learning and continuing professional development (CPD) (Mossey, 2004; GDC, 2011).

Table 2: Dental Care Professionals (DCPs) recognised by the GDC

DCPs recognised by the GDC
Dental Nurses
Orthodontic Therapists
Dental Hygienists
Dental Therapists
Dental Technicians
Clinical Dental Technicians

1.3.3 Educating the dental team

Dental teams include a combination of GDC registrants. Team composition varies dependent on location and care delivery and may include non-clinical personnel. The GDC defines learning outcomes (GDC, 2012), aiming to develop a rounded professional with the range of skills required to work as

part of a dental team and within the context of the wider healthcare team (GDC, 2011). It issues guidelines on educational matters (GDC, 2012) stating that: the vital roles of DCPs have too often been under-recognised and their career development neglected. DCPs should be able to train as part of the dental team with more flexible training, both in time and delivery environment. Part-time clinical teachers, including those who work in primary care practice and hold appropriate qualifications, are highly advantageous in DCP training (GDC, 2004). The dental profession's main regulator recognises that contexts where all members of the dental team are educated together, as is the case at LSO, are of significant value.

Educational learning outcomes are derived from the GDC's Standards for Dental Professionals and requirements for lifelong learning (GDC, 2011). The dental education establishment have been empowered with the responsibility for ensuring the GDC objectives are implemented (Mossey, 2004) and that future dental education should focus on developing the skills needed in clinical practice, with an increased use of primary care outreach schemes to train both undergraduates and DCPs (DoH, 2002c).

There is growing recognition that dental education needs to change, is dynamic and, that development of the dental care team, with DCPs skills increasing, will lead to them undertaking simpler clinical tasks and dentists developing more specialised skills (Hobson, 2009). As far back as 1993, the Nuffield Report on professionals auxiliary to dentistry (the original term for DCPs), set out the need to develop a differently constituted workforce,

running the service more effectively with auxiliaries providing more skills (Smith, 1993). However, in many areas, there is still a lack of understanding about what falls within DCP's scope of practice, yet, where used effectively and to their full competence, DCP individual job satisfaction is high, patients are treated efficiently and effectively and the dentist has more time to undertake more complex procedures (MEE, 2012).

Original incentives for DCPs registration included improved educational opportunities, a career pathway enabling new skills to be learnt and, a recognition of their contribution to the educational process (Mossey, 2004). With the majority of dental care delivery primary care based (Wilson *et al.*, 2008), it is increasingly recognised that dental schools alone will not provide the total learning environment for undergraduate or postgraduate dental training; that the optimum learning environment is the same environment as that in which the skill is practised and, as such, providing the most appropriate learning environment for CPD will include outreach schemes (Mossey, 2003; Mossey, 2004). This underpins the delivery of dental education in primary care, a process known as outreach training.

1.3.4 Outreach training in dentistry

Outreach training involves delivery at sites remote from the educational institution (Elkind, 2002) and is a recognised concept in dentistry (Elkind *et al.*, 2007). Maintaining high standards of clinical and educational excellence

is seen as a big challenge (Mossey, 2003); with training of educators and clinical supervisors a key factor (Mossey, 2004).

The use of dental outreach teaching is growing. In Finland, traditional dental education in secondary care hospitals no longer exists, however there have been few studies to evaluate this educational format (Eaton *et al.*, 2006). Outreach schemes described during an International Association for Dental Research (IADR) symposium highlighted many different approaches but did not consider the outreach education of other members of the dental team (Eaton *et al.*, 2006). The challenge in promoting dental outreach teaching may be changing attitudes and customs, facilitated by sound research evidence (Eaton *et al.*, 2006). One such attitudinal change could be related to dental team education, how it is delivered, by whom and in what setting.

Clinical teaching for many health professions is moving from traditional teaching hospitals into community settings under the direction of university academic departments. With patients referred into dental hospitals now deemed unsuitable for undergraduate training, the role of the dental school has changed (Elkind *et al.*, 2005). Future dental team education should focus on developing the skills needed in practice, with an increased use of primary care outreach schemes throughout undergraduate training (DoH, 2002c). Change is obviously required in the delivery of education for the dental team.

Dentistry and dental education have historically followed the traditions and structures of medicine, with dental hospitals based on the model of secondary care acute hospitals. Over 50% of medical graduates become hospital doctors, but over 95% of dental graduates become GPs (Wilson *et al.*, 2008). Advances in technology now allow dental education to be placed fully within the community, while retaining the same science and scientific principles (Kay, 2007). Dentistry also faces different challenges to medicine, in consequence of the different natures of practice (MEE, 2012); the placing of dental education wholly within primary care is based on sound philosophical, pedagogic and managerial principles, which benefits students, patients, the dental profession and the public (Kay, 2007). Students are very positive about outreach experiences and outreach provides an excellent opportunity to integrate all of the dental team (Wilson *et al.*, 2008).

The potential greater use of DCPs is an essential element of the future provision of dental services; in the current climate it is vital that professionals' skills are utilised to make the delivery of patient care accessible, safe and high quality, whilst ensuring that the NHS saves money to protect its future (MEE, 2012). Healthcare learning must therefore adapt to this situation, with efficient, effective care blending with education in a way that benefits all parties (Wilson *et al.*, 2008). To this end, ADEE found that: outreach provides access to resources not readily available on campus; there is no single preferred approach to outreach; and the evident benefits to students make the additional organisation involved worthwhile (Smith *et al.*, 2011).

Outreach primary care centres, quality assured by a University, may be well suited for the delivery of education for the dental team, including orthodontics. Alternative views will support a more traditional educational approach. This thesis aims to provide further evidence which may support or refute this hypothesis.

1.3.5 History of orthodontic education, training and qualifications

Orthodontic education varies significantly throughout the world, despite efforts to develop a unified approach to all dental education (Wilson *et al.*, 2008). In the United Kingdom, historically orthodontics has been introduced into the dental curriculum as part of the five year undergraduate degree course, training students to identify patients who may require orthodontic treatment (Rock *et al.*, 2002). Some dental graduates choose to specialise in orthodontics and complete a further three years of full-time postgraduate study, traditionally delivered by a university in a dental school secondary care hospital environment (Grimwade, 2003), with assessment by the Membership in Orthodontics examination from one of the four UK Royal Colleges, enabling entry onto the GDC specialist list in orthodontics (GDC, 2010). Qualified dental nurses can undertake a post-registration course of study leading to a Certificate in Orthodontic Nursing, which enables them to develop their orthodontic knowledge and skills as part of the orthodontic team delivering clinical care (Cure & Ireland, 2008). Traditionally, all tasks associated with orthodontic patient care have been carried out by orthodontic

specialists, assisted by orthodontic nurses, with the latter not being allowed to carry out tasks directly involving hands-on patient care. However, due to the numbers of patients requiring care, non-specialist dentists have for many years carried out some orthodontic treatment, with or without specialist supervision (Robinson *et al.*, 2005).

In 2004, the Department of Health outlined the concept of a 'dentist with a special interest' (DwSI) (DoH, 2004:6), to enable dentists, who, through experience and/or training had developed additional skills, to have them recognised by their peers (DoH, 2004) and, in 2006, defined a DwSI in Orthodontics as:

a primary care dentist with all round experience and training in general dental practice, who has developed a special interest in orthodontics but is not a specialist. He or she will have gained additional training and/or experience in orthodontics (DoH, 2006:5).

This description has subsequently been replaced by the term dentist with extended skills (DES) (MEE, 2012). The orthodontic team has now been further supplemented by the addition of extended duty nurses and orthodontic therapists (Cure & Ireland, 2008).

Orthodontic therapists have been widely used in orthodontic practice in North America for many years (Pollard, 2000) and extended duty orthodontic

nurses who carry out similar tasks to therapists have also been involved in delivery of clinical care in The Netherlands (Seeholzer *et al.*, 2000). Courses to train this group of DCPs have subsequently been developed, including at The University of Warwick (Cure & Ireland, 2008). The GDC has also widened the scope of practice for registered dental nurses, who, after appropriate training and under supervision, can now carry out prescribed extended duties, involving hands-on patient care (GDC, 2013b).

Historically, training for all orthodontic team members has been carried out unprofessionally in secondary care hospital environments (Wilson *et al.*, 2008). Until relatively recently, teamwork and communication skills were not even included in the core dental curriculum (Morison *et al.*, 2008), despite the importance of the dental team being clearly documented by the GDC (GDC, 2004). The need to develop new training courses in orthodontics was identified by a Nuffield enquiry and confirmed by the British Orthodontic Society (BOS) over 20 years ago (BOS, 1992) and more recently, modelling of the British orthodontic workforce identified a shortfall in orthodontists compared to estimates of treatment need and supply of orthodontists in other European countries (Robinson *et al.*, 2005). Specialist orthodontists benefit from the support of a team consisting of people specifically trained to assist in the provision of orthodontic care (GDC, 2004; Cure & Ireland, 2008). These fundamentals have underpinned the initial concept and development of education in LSO.

1.3.6 Dental and orthodontic clinical education

Historically, clinical dental education has focused on the individual learner and been delivered in secondary care dental teaching hospitals, where some students are found to be more adept practically at linking theory with practice but differences in learning styles are not considered (Sweet *et al.*, 2008a). The perceptions of chairside teaching centre around two major themes of learning and provision of 'student teaching and clinical organisation.' The origin of these perceptions could be subdivided into those taking a 'student centred' or 'teacher centred' approach (Sweet *et al.*, 2008a:500). Whatever the approach, availability of patients is a pre-requisite for clinical teaching.

Good patient selection for teaching in secondary care is seen as a massive organisational problem of critical importance (Sweet *et al.*, 2008a). A proposed solution is that resources could be maximised by reorganising dental curricula so that uniprofessional students such as undergraduate dental, hygienist and therapist students from a number of years could work together in collaborative practices, a process known as vertical podding, thus overcoming some of the drawbacks of traditional clinic organisation (Lawton, 1976). By providing a team of student clinicians with differing skills and learning needs, patient treatment requirements can be matched more easily. Vertical podding also provides a favourable collaborative learning situation for peer support where reliance on other members of a group underpins successful learning (Johnson & Johnson, 1999). The significance of social learning is increasingly recognised as making a vital contribution to an

understanding of dental education (Sweet *et al.*, 2009). Clinical dental education is not merely concerned with teaching a range of techniques; it is a complex example of situated learning, as described by Lave & Wenger (1991), drawing on a whole range of educational theories and practices in order to produce competent, skilled and self-directed dental practitioners (Sweet *et al.*, 2008a).

Despite recognition of the importance of aligning clinical education to theories of learning, very few of the innovations sweeping through higher education have reached dental chairside teaching. In part, it is the complexity of the clinical teaching situation that has kept teaching traditionally as a dental tutor/dental student one-to-one relationship (Sweet *et al.*, 2009). The possibilities for chairside teaching to change have been recognised for some time (Lawton, 1976). However, despite various curricula modifications, chairside teaching within a secondary care dental teaching hospital setting appears to have changed very little over the years, relying on dental tutor/dental student relationship, with dental nurses having an assumed supportive but, rarely formalised role (Sweet *et al.*, 2008a). Yet the importance of the team in the quality of patient care has been well recognised (GDC, 2004) and is growing in orthodontics.

1.3.7 The development of the orthodontic team

In many parts of the world, orthodontic treatment has been delivered for some time by a highly trained team, led by a specialist orthodontist (Pollard,

2000; Seeholzer *et al.*, 2000; Cure & Ireland, 2008). The recognition of orthodontic therapists, DiWSIs and extended duty dental nurses has allowed the development of a team approach to patient care as proposed by the GDC in 2004. Many clinical tasks, prescribed by the orthodontist, are now carried out by DCPs. At LSO, not only has this team approach to clinical care taken place (Cure & Ireland, 2008) but, has been extended to the provision of education both for and delivered by the orthodontic team.

1.3.8 DCPs as educators

Original incentives for DCP registration aimed to include improved educational opportunities and a career progression allowing the development of new skills and competencies, as well as indicating that DCPs ‘...need to be recognised for their contribution to the education process’ (Mossey, 2004:3). Experienced DCPs are beneficial to inexperienced dental team members, with a majority of dental trainers indicating there would be advantage to their practice in having a dental nurse educated in the principles and application of training and assessment (McKie *et al.*, 2010). Despite this, there is little evidence of such structured collaborative processes for dental nurses, or indeed of interprofessionalism in dentistry.

1.3.9 The concept of interprofessionalism

Interprofessionalism is defined as the development of a cohesive practice between professionals from different disciplines; it concerns the processes and determinants that influence IPE initiatives as well as those inherent to

IPC. It also involves analysis of the linkages between these two spheres of activity, aiming to bridge the gap between them (D'Amour & Oandasan, 2005). An interprofessional education for collaborative patient-centred practice framework (IECPCP) has been proposed, which establishes linkages between the determinants and processes of collaboration at several levels, including links among learners, teachers and professionals (micro level), links at the organisational level between teaching and health organizations (meso level) and links among systems such as political, socio-economic and cultural systems (macro level) (Curran, 2004). Research must play a key role in interprofessionality development, documenting these linkages and the results of any initiatives (D'Amour & Oandasan, 2005).

Education and practice across professions need to be evaluated, including their interdependency, in order to enhance patient centred care. Interprofessionality is therefore an education and practice orientation, where educators and practitioners collaborate synergistically and processes support a cohesive practice (D'Amour & Oandasan, 2005). Such interdependency may exist at LSO, in terms of the integrated approach to education and clinical practice and is evaluated in this thesis. Originally, LSO was purely a specialist orthodontic practice, delivering clinical care but no education.

1.3.10 History of LSO

LSO opened in 1992; at this time, clinical work was carried out by one orthodontist, assisted by a dental nurse. In 2004, the practice relocated to

larger premises; a move which coincided with significant developments within the dental profession, in relation to delivery of care and education (GDC, 2004) and a change in the NHS orthodontic treatment provision contract in the UK (DoH, 2005). The new location presented opportunities to provide education 'in-house' for members of the LSO team. Thus, the background context to the initial development of LSO formal education was a divergence of opportunity, a professional and economic need and a pool of individuals at LSO keen to develop their skills. The LSO leader wished to develop primary care based education with a new style of assessment. This would enable the development of an extended duty and increasingly skilled workforce by providing an appropriate content and style of education, allowing the orthodontic practice to train people as and when required.

The first orthodontic nursing course for dental nurses was delivered in 2005, preparing students for the Certificate in Orthodontic Nursing (ONC) awarded by NEBDN (Cure & Ireland, 2008) and was delivered by the LSO leader and a specialist colleague who shared a similar treatment and education philosophy. The University of Warwick MSc in Orthodontics started in 2006, delivered on a part-time basis, to allow flexible learning for students. Following a change in legislation in the UK allowing provision of clinical care by orthodontic therapists, in 2008, the Diploma in Orthodontic Therapy course accepted its first cohort of students (Cure & Ireland, 2008). These developments mean that all members of the orthodontic team now receive training at LSO.

Orthodontic treatment is now delivered by a trained clinical team within LSO. The integration of the education processes and delivery of clinical care enables the opportunity to put learnt knowledge and clinical skills into practice seamlessly, and for ongoing learning to take place, but prior to this thesis, assessment and analysis of what works well and why had not been carried out. Quality assurance of all aspects of LSO as an outreach training centre is carried out by the University of Warwick (Cure & Ireland, 2008).

1.3.11 The University of Warwick National Orthodontic Outreach Centre

Although a significant amount of postgraduate specialist orthodontic training is carried out in specialist practice in Germany (McDonald *et al.*, 2000), in 2006, LSO became the first primary care specialist orthodontic practice to be approved as a training centre by any UK University. Facilities have been specifically developed to fulfil combined clinical and educational roles and include a fully equipped lecture theatre, camera/video link to surgeries, a clinical skills suite and orthodontic laboratory. Video conferencing facilities allow off site connections (Cure & Ireland, 2008). LSO has developed its training courses for the dental profession as recommended by both the GDC and the Department of Health (DoH) (GDC, 2004; DoH, 2006) and subsequently by Medical Education England (MEE, 2012). The orthodontic programmes combine outreach teaching and education of the orthodontic team in one single educational unit. Education is being delivered to and by the whole orthodontic team in the environment where patients live and where students will eventually work (Cure & Ireland, 2008).

The outreach based nature of courses means that students not based full-time within LSO carry out competency tasks within their own workplaces, supported by the University of Warwick Virtual Learning Environment (VLE), including an e-portfolio for student clinical cases (Cure & Ireland, 2008). The need for creative ideas for gaining continuity from pre-clinical training to the clinical environment has been recognised (Sweet *et al.* 2008), together with institutions ensuring that they provide additional means for inclusive student use of shared resources on the web (Sieber *et al.*, 2008). The LSO infrastructure, with educational technology integrated into a primary care clinical environment is innovative and appears ideally suited to deliver all aspects of orthodontic education (Cure & Ireland, 2008). New approaches to course delivery, including the use of e-learning, are facilitated by the customisation of facilities. All courses follow a modular structure and so far have been developed and delivered to the three classes of learners as separate entities but by all members of the team. The modular approach to course design offers the possibility of overlap in areas of both theoretical or academic classroom teaching and the clinical teaching environment (Cure & Ireland, 2008).

1.3.12 Summary

The importance of the dental team in the delivery of patient care is recognised, yet, throughout history, there has been resistance from the dental profession to any development of DCPs scope of practice, both in the UK and further afield. Little education appears to be team based and despite

the vast majority of the profession working in primary care environments, education is still fundamentally carried out unprofessionally in secondary care teaching hospitals, with relatively few DCPs involved in its delivery. There have been calls for the increased use of outreach training and part-time educators within University infrastructures for some considerable time, together with the involvement of DCPs in the education process, yet fundamentally the historical UK hospital based model still predominates, despite several problems being recognised, including patient availability.

The LSO environment is seemingly unique in orthodontic education and provides an opportunity for primary care practice-based IPE to be evaluated, allowing for change to be implemented and researched, together with their impact on clinical care delivery. A significant amount of orthodontic academic subject matter is generic and the course designs could potentially be modified without loss of required content to facilitate integrated teaching of different learner groups. It is a concept offering new possibilities of educational course development and integrated patient care. A regional development is influenced primarily by the national picture of educational requirements, which tends to impact upon local institutional course development. However, local change which, when evaluated, is shown to be successful, could potentially influence national delivery, which, in turn, may affect the international scene. Evaluation of the LSO IPE model may be beneficial not only for the local environment, but potentially for the wider field too.

This chapter describes the historical background to dental education and qualifications, outreach training in dentistry, the development of the orthodontic team and the history of LSO becoming a university approved outreach training centre. It sets the scene for this thesis, which is to evaluate education within LSO. The literature supports the need for such an evaluation in an IPE primary care specialist environment. Chapter 2 discusses the literature review which has informed much of this thesis.

Chapter 2: Literature Review

2.1 Literature review context

This thesis is an evaluation of an interprofessional education (IPE) intervention in a primary healthcare setting. IPE occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (WHO, 2010:7). The Centre for the Advancement of Interprofessional Education (CAIPE) uses the term to include learning in academic and work based settings, pre and post qualification, adopting an inclusive view of professional. IPE is an initiative to secure interprofessional learning (IPL) and promote gains through interprofessional collaboration (IPC) in professional practice (CAIPE). IPL may be a product of IPE or happen spontaneously in the workplace or in education settings (Freeth *et al.*, 2005b).

Patient care is a complex activity whatever the specialty and for the most part involves a team for its delivery (Zwarenstein *et al.*, 1999). IPE has been advocated as the means to cultivate the necessary attitudes, knowledge and skills required for effective teamwork across health care settings (WHO, 1988; DoH, 1990; DoH, 1995; DoH, 1997; DoH, 2000; DoH, 2002b; WHO, 2006; WHO, 2010). There is evidence to suggest that professionals often do not collaborate well (Zwarenstein *et al.*, 1999; Barr *et al.*, 2000; Cooper *et al.*, 2001; Reeves, 2001); IPE initiatives began in the UK in the 1960s, with the objective to improve working relations amongst health, social care and

sometimes other professions (Barr, 2001). The rationale for IPE is that learning together enhances future working together (Thistlethwaite, 2012). Evidence to support the proposition that learning together helps practitioners and agencies work better together has been limited (Hammick *et al.*, 2007). In addition, debate continues as to what collaborative practice entails in health care settings, its similarities to, and differences from, traditional approaches to multidisciplinary teamwork (MDT) (Thistlethwaite, 2012).

Within healthcare, progress has been made toward identifying core competencies for effective IPC (Verma *et al.*, 2009), including the IPEC framework (IPEC, 2011); however essential components of effective IPE and IPC remain elusive (Reeves *et al.*, 2008b). IPL in classroom and practice settings is found to positively impact on participants' knowledge, attitudes, perceptions, values, and skills regarding interprofessional teamwork; longer-term study into IPL in various settings could improve how future practitioners approach patient care (Anderson *et al.*, 2011).

The purpose of the literature review was to provide an introductory overview on IPE and explore the outcomes evaluated in all healthcare professions. Although it aimed to be transparent and rigorous in its methods of extraction, quality assessment and synthesis of the identified literature, the review did not intend to be exhaustive, hence the focus on studies within previous reviews and systematic reviews reporting IPE outcome evaluations. The

literature review falls short of a formal systematic review and the conclusions drawn therefore need to be treated with appropriate caution.

This chapter defines the aims and objectives of the review, describes the methods of searching the literature, including eligibility criteria, selection of abstracts and full papers and details the results of the searches. It outlines the process of data extraction and quality assessment, using a modified CASP checklist [Critical Appraisal Skills Programme] (CASP, 2013), narrative synthesis, and finally discussion of the strengths and limitations of the review, the emergent understandings and definitions of IPE, the challenges of IPE to be theory-based and, implications of the findings for the current thesis, research and practice.

2.2 Literature review question

What are the evaluations of outcomes of IPE for healthcare professionals, including in primary care, dentistry and orthodontics?

2.3 Literature review aims

To become familiar with the current research into outcomes of IPE of healthcare professionals and education in dentistry, including orthodontics; to identify appropriate research questions; to establish a theoretical framework for the research and to justify the need for the research.

2.4 Literature review objectives

2.4.1 Primary objectives

- To assess and critically appraise evaluations of outcomes of IPE interventions in the education of healthcare professionals
- To assess and critically appraise evaluations of IPE interventions in primary care

2.4.2 Secondary objectives

- To assess and critically appraise evaluations of IPE interventions within dentistry and more specifically, orthodontics.

2.5 Literature review methodology

2.5.1 Types of evaluations

The systematic review of several randomised controlled trials (RCTs) has become the gold standard in the hierarchy of evidence but some questions do not require randomised trials (Sackett *et al.*, 1996). The criteria required for such studies appear too constricting for IPE, thus limiting the number of studies able to be evaluated (Barr *et al.*, 1999). By broadening the methodologies accepted, a wider range of studies is included and valuable evidence found relating to IPE which may otherwise have been missed, as in the Cochrane reviews which required RCTs. This literature review therefore includes a combination of systematic and literature reviews of IPE, where the

authors had recognised these limitations when assessing primary studies, together with selected papers referenced by these reviews, in order to fulfil the literature review objectives.

2.5.2 Background and approach to review

Initially a combination of free-text and thesaurus terms were used for a definition of IPE; the papers by Haig and Dozier (Haig & Dozier, 2003a; Haig & Dozier, 2003b) informed suitable databases for literature searches in the field of health professional education (page 52). Key papers on IPE (Reeves, 2001; Freeth *et al.*, 2002; Hammick *et al.*, 2007), which were identified through information from the Centre for the Advancement of Interprofessional Education website (CAIPE) were used to develop keyword strategies. The search strategies used are included (Appendix 1); minor alterations in the form of alternative words were necessary for specific databases. Searches were undertaken in June 2011 and repeated in January 2012, September 2013 and January 2014. Auto feed alerts were set up following the initial search. The actual date range for each of the databases searched depended on the coverage of the individual database. A PRISMA flow diagram (Moher *et al.*, 2009) outlines the review selection process (Appendix 2), with the reviewed papers listed (Appendix 3). Data collection sheets were developed (Appendix 4) which were based upon those used by Hammick *et al.* (2007), using the CASP Qualitative Research Checklist (Oxman *et al.*, 1994).

The approach to reviewing evaluations of outcomes of IPE relates to realist evaluation (Pawson & Tilley, 1997), which stresses the embedded nature of all human action, foregrounding context and social processes as central to creating and understanding outcomes (Hammick *et al.*, 2007). As such, attention is paid to identification of contexts, mechanisms and outcomes (Pawson & Tilley, 1997), offering explanation of IPE rather than judgment (Hammick *et al.*, 2007) and seeking further understanding of the complexities of IPE (Pawson *et al.*, 2005).

2.5.2.1 Inclusion and exclusion criteria

Table 3: Inclusion and exclusion criteria

The reviews included were:

- Papers published in peer-reviewed journals
- Systematic literature reviews and literature reviews of evaluations of IPE interventions for healthcare professionals
- Participants either healthcare professionals or student healthcare professionals
- Reviews including papers describing organised IPE initiatives attended by at least two of the many professional groups from health and social care, with the objective of improving care; and learning with, from and about each other
 - Studies from within these reviews
 - referenced papers from within these reviews
- Studies evaluating collaboration between all categories of health and social care
- Interventions which have been introduced to a practice setting with an explicit objective of improving collaboration between two or more health and/or social care team members
- Teaching initiatives where there is an interactive (integrating together) element to the learning process
- Studies where the outcomes of IPE are objectively measured or self-reported.

The reviews excluded were:

- Studies where the education is entirely based in a university or college setting with no clinical or fieldwork component
- Educational initiatives or input which only involve one profession
- Studies reported in a language other than English
- Studies not involving healthcare professionals or healthcare professionals in training
- Studies not addressing interactive learning.

2.6 Search strategy

The following bibliographic databases covering healthcare, social sciences and medical education were searched:

Cochrane Library,

Medline 1966–2014,

Cumulative Index to Nursing and Allied Health Literature (CINAHL) 1982–2014,

British Education Index (BEI) 1964–2014,

Education Resources Information Centre (ERIC) 1964-2014,

Applied Social Science Information and Abstracts (ASSIA) 1990–2014,

Google Scholar 1964-2014.

Endnote software was used to store papers and identify duplicates. Following the database searches, it was recognised that a small number of journals were regularly featuring relevant papers on IPE. These, plus previously recognised quality dental journals, were subsequently hand searched from 2000 to the present date:

Journal of Interprofessional Care

International Journal of Medical Education and Research

Medical Education

Medical Teacher

European Journal of Dental Education

Journal of Dental Education

British Dental Journal

Journal of Orthodontics

Reference lists of included studies were hand searched, websites of IPE organisations were reviewed, together with the grey literature held by CAIPE, accessible *via* the internet (CAIPE).

Cross checking the bibliographic database and hand search methods confirmed that the studies found by the latter were identified by the former. It is impossible to guarantee that all high quality reviews published elsewhere have been found but, continuing monitoring of published works aimed to identify relevant papers.

2.6.1 Search results

2.6.1.1 Data collection

The bibliographic database search produced 10,007 potentially relevant abstracts, with a further 23 from the hand searches of journals and grey literature. Following these searches, 146 studies were eliminated as duplicates. The selected papers were reviewed at title and abstract stage. The inclusion and exclusion criteria (Table 3) were applied independently to the title and abstracts (or full text if a decision could not be made from the abstract). As a result, 70 potentially relevant publications were identified.

Following review at full paper stage, 57 were rejected and 13 were selected for critical appraisal.

2.6.1.2 Data analysis – an explanatory narrative

A meta-analysis of study outcomes was not possible, given the small number of included studies and the heterogeneity in methodological designs and outcome measures. Consequently, the results are presented in a narrative format. The 3P (presage, process, product) model (Biggs, 1993) has been frequently used as a tool for describing and analysing IPE. Biggs (1993) viewed presage factors as the socio-political context for education and the characteristics of the individuals (planners, teachers and learners) who participate in learning/teaching; process factors as the approaches to learning and teaching used in an educational experience and product factors as the outcomes of the learning (Hammick *et al.*, 2007). Several evaluators use a similar approach to the recording of IPE outcomes, based on that originally developed by Kirkpatrick (1967), where four levels of educational outcome (learners’ reactions, acquisition of knowledge/skills/attitudes, changes in behaviour, changes in organisational practice) are recognised (Table 4) and, within IPE, subsequently modified (Table 5) on page 82.

Table 4: Kirkpatrick’s Model for Classifying Educational Outcomes

Kirkpatrick’s model for Classifying Outcomes of IPE	
Level 1:	learners’ reactions.
Level 2:	acquisition of knowledge, skills, and attitudes.
Level 3:	changes in behaviour.
Level 4:	changes in organisational practice

Findings presented as a 3P based narrative aim to derive key messages relating to IPE, to encourage theory development and highlight links between mechanisms (Shadish *et al.*, 2002). In realism, which is discussed on page 158, certain contexts in the social world around us ‘trigger’ mechanisms to generate outcomes (abbreviated to CMO) (Wong *et al.*, 2012:91). This link suggests a parallel between realist evaluation context, mechanism and outcome (CMO), described further on page 161, and the 3P model, albeit with a different understanding of the term mechanism. Using 3P as a synthesising tool can make a narrative analysis somewhat disjointed. Here, presage factors are equated to context, process to mechanisms, and product to outcomes of IPE, with recognition that some overlapping is inevitable.

2.7 Synthesis of evaluations of interprofessional education in health and social care

This synthesis includes the 13 papers selected (Appendix 3) and also cites certain papers referenced within those papers.

2.8 Discussion of evaluations of interprofessional education in health and social care

This discussion relates to the 13 papers selected (Appendix 3) and also cites papers referenced within those papers. It is based upon the 3P model and the realist model of CMO, as discussed on page 55.

2.8.1 Presage / Context

2.8.1.1 Drivers for IPE

The World Health Organization (WHO) formally recognised the importance of IPL in its report *Learning Together to Work Together for Health* (WHO, 1988), calling for closer links between education and health systems. Government departments and official inquiries have repeatedly called for closer collaboration by means of shared learning (Barr *et al.*, 2000; Cooper *et al.*, 2001; Reeves, 2001; Remington *et al.*, 2006). Educational evaluation is often seen as a political act; in health and social care a number of agencies participate in monitoring the work of educational providers (Barr *et al.*, 2000). As such, there appears to be a continuing drive by officialdom to improve aspects of healthcare through IPE.

Drivers for IPE may be described as either 'top-down' or 'bottom-up' and are frequently supported by IPE 'champions' (Hammick *et al.*, 2007:27). Top-down drivers include a government policy to improve IPC (or team work) (Carpenter & Hewstone, 1996), a NHS call for eradication of rigid professional demarcation (Cooke *et al.*, 2003) and government inquiry responses (Barr *et al.*, 2000; Tunstall-Pedoe *et al.*, 2003). They have also arisen from the need to reduce medical error by improved teamwork (Morison *et al.*, 2003; Tucker *et al.*, 2003; Tunstall-Pedoe *et al.*, 2003; Francis, 2013).

Bottom-up examples are usually driven by active professionals recognising the need to improve collaboration (Horbar *et al.*, 2001; Mu *et al.*, 2004). Changing the way health professionals are educated is a critical step towards ensuring that health practitioners have the necessary knowledge and training to work effectively within a complex and evolving health care system (Nisbet *et al.*, 2011). IPE is widely seen as a way to develop collaborative practice among health and social care professions; suggesting that learning together may help people to work together more effectively (Freeth *et al.*, 2002). Increased collaboration and teamwork, which are neither independently top-down or bottom-up driven, could therefore enhance IPE and maximise use of resources.

2.8.1.2 Resources and planning

Irrespective of the drivers, IPE requires adequate resourcing (Davidson *et al.*, 2008). Emphasis on effective use of resources has spearheaded interprofessional developments in practice (Leathard, 1994) and requires all healthcare organisations to provide greater service quality and value to patients (DoH, 1997; DoH, 2002a). To this end, IPE is linked to total quality management programmes (Reeves, 2001) and recognised as an approach aiming to encourage work-based IPE as an ongoing, daily activity for staff (Gelman *et al.*, 2000). This synergy between the health workforce planning sector and health education systems is critical, particularly for supporting the transition of learners from the classroom to the workplace (WHO, 2010). Such interdependency requires in-depth planning and appropriate resourcing. Despite the commissioning of IPE research (Barr *et al.*, 2000;

Reeves, 2001; Freeth *et al.*, 2002; Remington *et al.*, 2006; Hammick *et al.*, 2007; Thistlethwaite & Moran, 2010), lack of funding for IPE research is widely recognised, especially for qualitative or mixed methods studies (Freeth *et al.*, 2002). Funding is also a barrier for IPCE due to the difficulties of coordinating student placements and communicating with all stakeholders (Davidson *et al.*, 2008). An environment such as LSO, where students and stakeholders are together, could potentially reduce these problems.

Lack of funding is therefore a barrier to IPE; ironically a lack of finance in developing countries may make IPE initiatives, out of necessity, easier to set up (Nisbet *et al.*, 2011). Analysis of case studies of IPC from developed and developing countries shows similarities between the two, despite the diversity of their locations. For example, common barriers to IPC include team functioning issues, local and national protocols and lack of structured information systems and policies (Mickan *et al.*, 2010).

Integrated preparation is essential for IPE, irrespective of location. Structured planning of all associated resources is a prerequisite for successful IPE (Barr *et al.*, 2000). Time, space, management, administrative and institutional support, plus a consistent team of experienced faculty members to plan and facilitate courses are key factors in establishing and maintaining IPE (Cooper *et al.*, 2001; Hammick *et al.*, 2007). Obstacles to IPE include: lack of time; scarce finances; assignments specific to each professional group; varying educational schedules; and discipline specific requirements for registration (Cooper *et al.*, 2001). Timetabling within pre-registration professional

courses is also problematic (Tucker *et al.*, 2003). Davidson *et al.* (2008) suggest that IPCE requires detailed planning, stakeholder enthusiasm and commitment, plus flexibility in the model.

The widespread support for integrated planning, including common curricula, is reinforced by workforce policies that call for skill mix and more flexible deployment of personnel (Schofield, 1995). However, this rationale is weakened by the case for specialist studies that distinguish each profession and its specialist branches (Barr *et al.*, 2000). Inappropriate planning leads to programmes being too short and not including enough information (Hall & Weaver, 2001; Crutcher *et al.*, 2004). Selection of suitable delivery sites is vital in IPCE (Davidson *et al.*, 2008). Positive and well-supervised experiences of collaborative practice are needed for recently qualified workers to test and reinforce their IPL (Barr *et al.*, 2006).

Such workplace based IPE often involves participants from the same team or unit, which is difficult to arrange, when services to patients must also be maintained (Barr *et al.*, 2000). IPE curricula should affect learner behaviour in clinical settings and enhance care processes, thus improving patient outcomes (Remington *et al.*, 2006). However, policy barriers include: the lack of IPCE embedded in curricula, University departments that often lack the required level of commitment to IPCE, and the joint accreditation of certain courses (Davidson *et al.*, 2008). This supports the suggestion that specialisation of studies is a problem for IPE, as raised by Barr *et al.* (2000), and that educators should define the IPE learning outcomes expected and

align these with curricula and assessment (Biggs & Tang, 2007). However, there appears to be little synthesis of information available to inform educators about what specific IPL outcomes look like or how they can be achieved (Thistlethwaite & Moran, 2010), albeit the Canadian Interprofessional Health Collaborative (CIHC) (CIHC, 2009) and Interprofessional Education Collaborative (IPEC) (IPEC, 2011) competency frameworks are a move to overcome this. Overall, the review found a consensus relating to good organisation and planning being a prerequisite for successful IPE and of traditional specialisation within professions being a potential barrier to IPE. It is hypothesised that the latter issue could potentially be related to the attitudes of various professionals, as a range of participant characteristics are found to affect IPE.

2.8.1.3 Participant characteristics

Even when these institutional obstacles are overcome, participants left to apply IPL in their respective workplaces, often encounter resistance (Barr *et al.*, 2000). Barriers to IPE include differences between disciplines in history and culture, academic schedules, professional identity, accountability and clinical responsibility and, expectations of professional education (Headrick *et al.*, 1998). Further to this, interprofessional rivalry, negative stereotyping and ignorance of the role and contribution of other professions are recognised as barriers to teamwork and hence effective healthcare (Barr, 2001). There is increasing interest in developing and evaluating the effects of pre-qualification IPE conducted in clinical settings (Davidson *et al.*, 2008). However, the use of service-learning models or interprofessional problem-

based learning strategies requires selection of motivated and skilled faculty members or additional training in non-traditional teaching methods (Hall & Weaver, 2001). The quality of tutoring and student support are important factors when developing interprofessional training in a clinical setting (Ponzer *et al.*, 2004), where effective teamwork is an essential component of safe healthcare (Davidson *et al.*, 2008). The review clearly highlights the effect attitude of individuals may have on IPE implementation within organisations, plus further reinforces the importance of appropriate planning of and for IPE.

Such planning includes building relationships between key stakeholders, including the recruiting and training of facilitators, plus preparing students and facilitators for the experience (Davidson *et al.*, 2008). Adults learn best when there is collaboration and mutual respect between learners and facilitators, which also informs curriculum development (Knowles, 1975). However, such collaboration does not always exist; for example, tutors are sometimes found not to pay equal attention to diverse work settings (Barr *et al.*, 2000). Specialisation of training and roles appears to entrench a stereotyping of attitude, which leads to support for early embedding of IPE and its assessment as part of all pre-registration education (Barr *et al.*, 2000).

IPE is proposed as a way to reduce this silo mentality, as it is seen to change attitudes and perceptions by enabling participants to learn with, from and about one another in ways that counter prejudice and negative stereotypes, thus helping to overcome barriers to collaboration (McMichael & Gilloran,

1984). It cultivates interpersonal, group and organisational relations by creating opportunities for participants to become more aware of their relationships with others (Barr *et al.*, 2000). However, this raises the question of how IPE is successfully initiated and integrated into environments where stereotyping already abounds within those who make policy decisions.

To this end, an understanding of both professional roles and group skills is thought to aid IPE (Hall & Weaver, 2001). Practitioners, who also work in education, combine a professional practice and a university teaching role; research into such roles could inform linking of theory and practice but may also clarify ways in which such roles straddle two very different organisational and value-driven cultures (Murphy, 2000). Lecturer practitioners are aware of serving the needs of very differently perceived cultures and could inform practice based IPE through exploring the concept of combining cultures in a practical context (Fairbrother & Mathers, 2004). Clinician/educators could potentially have ideal skills to initiate and enhance practice-based IPE in an environment such as LSO.

Both teacher and learner characteristics are key factors in IPE (Reeves & Freeth, 2002). For example, senior practitioners have experience to exchange and can influence changes in practice. Such diverse participant backgrounds may enrich comparative learning about collaboration (Barr *et al.*, 2000). Facilitator styles are important to students (Reeves, 2000; Reeves & Freeth, 2002); allied to this, supervision quality is the most important contribution to student satisfaction (Ponzer *et al.*, 2004). Staff training

implications exist where educators are required to act as role models, with students indicating that the success of placement shared learning is linked to the encouragement given by teachers (Morison *et al.*, 2003). Successful IPCE requires enthusiasm and commitment of all stakeholders, commitment of institutions, transparent communication, use of a variety of training methods and adequate resources (Davidson *et al.*, 2008). Stakeholder capability affects IPE and may be related to their own training and development. The success of IPE also depends on interactive learning (Barr *et al.*, 2000), thus recognising the role of the learner.

Student characteristics of flexibility, co-operation, open mindedness, and a willingness to make suggestions, are recognised as important contributors to successful IPCE (LaSala *et al.*, 1997; Russell & Hymans, 1999). Learner expectations, beliefs and motivations about IPE, collaborative care and other professions influence IPE outcomes (Hammick *et al.*, 2007), with more mature and experienced learners found to be more favourably disposed towards IPE than younger and less experienced learners (Tunstall-Pedoe *et al.*, 2003). Although there appears to be little overall evidence relating to the influence of previous IPE on participant attitudes to subsequent IPE (Hammick *et al.*, 2007), there are differences between the willingness of students from different professional groups to participate in optional IPE. Repetition of previous uniprofessional study reduces participation (Cooke *et al.*, 2003) and students are reluctant to spend time on non-assessed study (Morison *et al.*, 2003). Timetabling issues cause a reluctance to participate, especially where students perceive IPE interventions to be less important

than other study sessions (Reeves, 2000; Morison *et al.*, 2003; Cooke *et al.*, 2003). This reinforces previous findings relating to planning but also raises the importance of appropriate assessments of and student attitude to IPE.

Several factors influence student perceptions of IPE: stereotyping and negative views of respective professional roles are widely identified (Reeves, 2000; Cooke *et al.*, 2003; Hammick *et al.*, 2007). Tunstall-Pedoe *et al.* (2003:169) conclude that: ‘...any notion that students arrive without preconceived ideas about other professions is misplaced.’ Professional orientation influences IPL; age, previous work experience and profession interact to influence students’ views about other professionals and collaborative care (Pollard *et al.*, 2005). Fear of failure in front of others concerns all students, irrespective of professional background (Dienst & Byl, 1981). Therefore, for IPE to be successful, the learner environment appears to be critical and must overcome these barriers.

To achieve this, different healthcare settings could be significant to successful IPE as they may provide more conducive environments for participants. For example, the hierarchical relations existing between professions in hospitals are inappropriate in the outside community, where teamwork is required to meet the needs of service users (Cooper *et al.*, 2001). Diverse student groups have different perceptions of learning interventions, which in turn are reflected in their views of professional and faculty support for IPE initiatives. Many individuals involved in patient care are competent and dedicated but have ineffective working relationships

(Hindle *et al.*, 2006). The historical professional hierarchy within secondary care may influence teaching in this environment and, as such, reinforce stereotyping, whereas primary care environments, such as LSO, where teamwork is seen as an essential pre-requisite may be more conducive to promoting IPE and reducing such stereotypical attitudes. Certain professions are also more involved with IPE than others.

2.8.1.4 Demographics and professions involved

Social work, nursing and midwifery and the allied health professions are engaged in the wider IPE movement with, historically, medicine, dentistry and pharmacy lying outside these associations, each having already established their professional credentials, knowledge base and place in higher education (Barr, 2001). Nursing and medical professions are the most frequently represented, followed by social workers, pharmacists, physiotherapists and occupational therapists, with other disciplines hardly represented (Freeth *et al.*, 2002; Barr *et al.*, 2006; Davidson *et al.*, 2008; Reeves *et al.*, 2008b). Demographically, studies are from the UK (Barr *et al.*, 2000); the majority UK based (Cooper *et al.*, 2001); from the USA, UK and Australia (Reeves, 2001), and from the USA, Australia and the UK (Davidson *et al.*, 2008). There is a need to develop IPE that can be delivered to large student cohorts, particularly at pre-qualification level (Hammick *et al.*, 2007) and to engage with the wider health professional groups, including dentistry.

Irrespective of location and professions involved, there are wide variations in numbers of students involved in IPE interventions: from two to over 5000,

with the majority including 10-50 students (Barr *et al.*, 2000; Cooper *et al.*, 2001). A wide range of sample sizes is often a feature of IPE per se, with postgraduate CPD courses tending to have smaller samples than award bearing undergraduate programmes; however, large group size is found to impact negatively on student satisfaction (Barr *et al.*, 2000), with student and practitioner numbers across professions influencing the success of interventions (Hammick *et al* 2007). Therefore, the facilitator-student ratio may be significant to the success of IPE from the student perspective but, gender may also be relevant.

2.8.1.5 Gender

The majority of participants in IPE are women, because most healthcare professionals are women (Hammick *et al.*, 2007). Pollard *et al* (2005) reported that female students hold more positive attitudes towards IPE than male students; however male pre-registration house officers are more likely to be involved in role play and dominate discussion (Kilminster *et al.*, 2004). As house officers are based in secondary care institutions, this latter finding may link with a previous suggestion relating to the potentially less conducive nature of secondary care institutions for IPE, which may be in part due to the prevalence of increased stereotyping.

2.8.1.6 Presage / Context résumé

In summary, there are a multiplicity of interacting presage factors which set the overall context for IPE and affect its delivery. Appropriate resources and

planning, enthusiasm and commitment of staff and institutions, with clear and open communication and engagement between stakeholders, plus use of a variety of flexible training methods are required. Barriers include a lack of any of the above, plus differences between disciplines in history and culture, academic schedules, professional identity, rivalry and negative stereotyping, accountability and clinical responsibility and, expectations of professional education. Presage factors are relevant to practice-based IPE in environments such as LSO and this thesis will evaluate the implications. The interrelationship between presage/context and process/mechanisms in IPE is vital to its synthesis and the latter are now discussed.

2.8.2 Process / Mechanisms

In the 3P model, process relates to the approaches taken to learning and teaching; in realist terms these are considered mechanisms and, are discussed relating IPE to: multiprofessional and uniprofessional education; whether pre- or post-registration; if formal and/or informal learning takes place; the site of the intervention; if participants have a choice as to participation; if there are any underpinning theories of learning to the education and; the style and duration of the experience.

2.8.2.1 Interprofessional, multiprofessional and uniprofessional; pre- and post- registration education

IPE aims to encourage different professionals to meet and interact in learning to improve collaborative practice and the healthcare of patients. It

therefore has more potential for enhancing collaborative practice than a programme of multiprofessional education (MPE), or uniprofessional education (Reeves *et al.*, 2008b). IPE has been categorised as a subset of MPE (Hammick *et al.*, 2007), with the key difference being interactive as opposed to parallel learning and may be delivered either pre- or post-registration, with most pre-qualifying and much post-qualifying education being uniprofessional (Barr *et al.*, 2000). Where found, pre-qualifying IPE may, for example, consist of foundation studies in health and social sciences (Tope, 1996) and deliver modification of reciprocal attitudes between students of different professions and acquisition of knowledge relevant to collaborative practice (Barr *et al.*, 2006). When delivered as part of full-time undergraduate programmes, IPE can involve pre-registration health and social practitioners from a number of different professions learning together, vary in length (Barr *et al.*, 2000) and, typically comprise themes, modules or placements appended to, or cutting across, two or more uniprofessional programmes (Barr *et al.*, 2006).

In comparison, post-qualifying programmes may be less constrained; for instance, all rather than part of the programme may be shared, with study being typically part-time, thus enabling participants to relate theory and practice, to draw upon work experience and to apply their IPL concurrently (Barr *et al.*, 2000). The majority involve primary health care practitioners, where participants vary from whole teams to smaller groups of staff and, most interventions are types of CPD (Barr *et al.*, 2000; Freeth *et al.*, 2002). Post-registration IPE can be further subdivided into traditional staff

development based on workshops and short-courses, or IPE that occurs as a by-product of a quality improvement initiative (Hammick *et al.*, 2002). The longer the time between IPL and qualification presents greater challenges associated with evaluating the outcomes of IPE, based upon Kirkpatrick's modified model (Table 5, page 82), at levels 3, 4a and 4b (Hammick *et al.*, 2007). In relation to presage factors, ideally IPE should be initiated during pre-registration education but, at present, some current healthcare professionals may not have had any exposure to IPE in their undergraduate training. IPE may also occur outside structured forms of learning.

2.8.2.2 Formal and informal learning

Both pre- and post- registration IPE may also be categorised as being formal, informal or mixed, with informal including interprofessional meetings within a quality improvement initiative (Freeth *et al.*, 2002). Informal IPL is of significant value (Freeth *et al.*, 2005a). Social times such as refreshment breaks (Morison *et al.*, 2003), where learners from different professions can interact, enhances positive attitudes to others and reinforces formal input (Hammick *et al.*, 2007). For example, one successful study was designed specifically to 'foster a collegial atmosphere' (Horbar *et al.*, 2001:15). Time spent together socially plays an important role within the IPE experiences of learners (Nash & Hoy, 1993; Reeves, 2000). Informal learning is an important additional source of work-based education (Bond, 1997; Freeth *et al.*, 1999) and seemingly enhances collaboration and teamwork, which is essential in health professional workplaces.

2.8.2.3 Location of learning experience and related method of delivery

Whether pre- or post- registration, formal or informal, IPE is often associated with workplace based learning, which is a complex process during which prior learning is used and expanded (Eraut, 2001; Eraut, 2003; Eraut, 2004; Payler *et al.*, 2008). Workplace based IPE enables participants to share objectives and to work together to effect immediate change or improvement and potentially cultivate collaboration in different ways (Barr *et al.*, 2000). IPE interventions usually occur within the workplace or an employer's training facilities, however fewer than 30% of studies include pre-registration students and the location of their IPE is often a service delivery setting rather than the university (Freeth *et al.*, 2002). Learning includes: learning from peers in small-group discussion; receiving information or practical tuition from an expert often *via* a lecture or seminar; problem-solving; students being allocated to clinical placements; role-play and, observation of professionals at work in a variety of practice settings (Freeth *et al.*, 2002). Different methods may be suited to different participants, which would support the suggestion of flexibility in the IPCE model (Davidson *et al.*, 2008).

Post-qualifying IPE typically comprises workshops or action-based projects in the workplace; in both pre- and post- qualifying studies interactive learning methods include case studies, problem solving and simulation exercises (Barr *et al.*, 2006). Many interventions are set in clinical practices, combining didactic instruction with clinical training (Remington *et al.*, 2006). Non-clinical skills, including communication, group, and conflict-resolution, are seen as a

requirement for future IPE interventions (Hall & Weaver, 2001). In these settings, IPE is of value, especially for post registration initiatives delivered to address a practice development need (Mu *et al.*, 2004). Thus, there appears to be significant support for IPE in clinical practice and, for modes of learning to be underpinned by sound educational theories and peer practice. It is hypothesised that an increasing development of IPE, based in primary care clinical practice, would benefit pre- and post- registration learners and, increase the flexibility of the teaching model.

Such flexibility is achievable because workplaces may be customised, which in this context means adaptation of each clinic; its relevance extends beyond professional practice to the individuals unique learning context and is seen as a strength of IPE (Shafer *et al.*, 2002). In such situations, participants are subsequently found to select the perceived better practice environments for development (Horbar *et al.*, 2001). Models of IPCE are extremely diverse in terms of setting, team size and composition, duration, aims, and teaching and learning strategies (Davidson *et al* 2008). Interventions include didactic components, role playing, interactive dialogue, practical exercises, discussion of video segments and case discussions (Reeves *et al.*, 2008b), interprofessional ward rounds, meetings and audit (Zwarenstein *et al.*, 2009). Smaller, primary care settings are potentially easier to customise for IPE than larger, secondary care settings. Indeed, the difficulties in adapting traditional dental hospitals for interactive small group teaching has been recognised (Fincham & Shuler, 2001). Wherever the intervention, attitudes to IPE can be influenced by the setting (Hammick *et al.*, 2007).

Whatever the setting, IPE gains value when interactive methods are introduced that involve participants in shared tasks and enable them to learn not merely with but also from and about one another (Barr *et al.*, 2000). There is no evidence of traditional distance learning relating to IPE, although Reeves *et al.* (2008) describe facilitators being available in remote locations during the initiation phase and after IPE interventions. The importance of face to face interaction in IPE is supported by students, linking the success of placement shared learning to the quality of and encouragement given by teachers (Davidson *et al.*, 2008). Irrespective of the venue, IPL has to be interactive, whether it takes place in a classroom, clinical setting, or online (Thistlethwaite, 2012). The healthcare setting where the professional is to work, is potentially an ideal environment for IPE interventions, especially where the underpinning philosophy is based upon teamwork, as peer performance may empower the learner, who then is encouraged and stimulated to be increasingly involved in the process.

2.8.2.4 Learner choice

There is wide variation in terms of compulsion to attend interventions. Learner choice related to IPE operates at different levels including: participation, engagement, subject matter and how to break up into small groups (Hammick *et al.*, 2007). In some interventions, learners are given full choice relating to attendance; in others it is compulsory. There is a mixed picture of the link between the learners' degree of choice of participation and their contribution to the design of their learning (Hammick *et al.*, 2007). As the active participation of learners should be encouraged in designing and

implementing educational programmes (Knowles, 1990), an understanding of the importance of IPE may be enhanced by it being included in curricula.

IPE is often initiated either as workplace learning (Horbar *et al.*, 2001; Morey *et al.*, 2002; Shafer *et al.*, 2002), or through curricula designed for undergraduates (Carpenter & Hewstone, 1996; Tunstall-Pedoe *et al.*, 2003; Ponzer *et al.*, 2004; Pollard *et al.*, 2005). The intention in IPE is to encourage discussion using participatory learning experiences. Where IPE is an integral part of introducing change into clinical practice and where team members actively identify relevant issues, learner motivation is important in the process of change (Horbar *et al.*, 2001). The more involvement given to the learner in the process, the better, which is supported by Knowles (1975; 1990; 2005) and which could reduce the need to make attendance compulsory. Acceptance of a need to learn is usually established through a problem-focus or work-related task (Freeth *et al.*, 2002). For all stakeholders involved, knowledge of theories of learning would appear to be a pre-requisite when designing IPE interventions.

2.8.2.5 Underpinning theories of learning

IPE is underpinned by different educational philosophies which comprise different concepts and different approaches (Harden, 1998). Indeed, there are a plethora of theories that could be used to describe and explain IPE (Craddock *et al.*, 2013) but curriculum developers to date have not used educational theory to underpin the design of IPE initiatives (Craddock *et al.*, 2006). The first documented evaluation of college-based IPE in the UK

utilised a combination of practice placements, a common course and a series of workshops (McMichael & Gilloran, 1984), with all three projects grounded in contact theory, which holds that people like others who are rewarding to them (Tajfel, 1981).

Social contact theory is a social psychology theory that may partly explain why working collaboratively across professions facilitates attitudinal changes. It suggests that just being together makes no difference to attitudes or behaviours and that more attention needs to be paid to the actual interactions between and among people (McMichael & Gilloran, 1984). This theory illuminates the need for active engagement as part of the IPE process (Bainbridge & Wood, 2012).

Social identity theory (Tajfel, 1981; Tajfel & Turner, 1986) suggests that people tend to reinforce positive perceptions of their own group and less positive perceptions of out-groups, making it necessary to seek ways of reducing negative perceptions of other groups (Bainbridge & Wood, 2012). Transformative learning (Mezirow, 2003) represents a strong theoretical base for IPE, the concept providing an understanding of the shift that learners are required to make as concepts such as (a) shared competencies, (b) non-hierarchical organization of the work force and (c) interprofessional collaboration are introduced (Bainbridge & Wood, 2012). Approaches such as self-directed learning, case-based learning, guided discovery learning and problem based learning aim to facilitate transformative learning (Craddock *et al.*, 2006). Guided discovery learning is based upon the discovery learning

model, which also forms the basis of problem-based learning and case-based learning, terms which are similar in origin but not identical to guided discovery learning. It combines didactic instruction by a teacher with the discovery of facts, relationships, and solutions by students themselves, as they explore, discuss, or perform tasks, drawing upon their own experience and existing knowledge (Lavine, 2012). Lave and Wenger (1991) describe the concept of situated learning, where a shared repertoire of communal resources occur in a community of practice (Barr, 2013). These theories, together with reflective learning (Schön, 1983; Schön, 1987) are all potentially relevant to IPE and are discussed further in Chapter 3.

In undergraduate IPE, educational and psychological theories are rarely used to guide the development of educational interventions (Cooper *et al.*, 2001; Freeth *et al.*, 2002); where found, contact hypothesis is used (Cooper *et al.*, 2001). Where used, staff development activities such as workshops, short-courses, or problem-solving groups are underpinned by theories of adult learning and problem-based learning; nearly all IPL opportunities reflect good practice in adult learning, with learners actively engaged and reflection on practice and values encouraged through discussion, role-play and carefully structured observation (Freeth *et al.*, 2002).

Adult learning theory supports the above approach, suggesting that learning is more likely to become embedded if the learner has a degree of control over the pace and content of learning and the area under study is personally and professionally relevant (Knowles, 1975; Hammick *et al.*, 2007). Also, in

relation to both curriculum design and learning theories, the concepts of deep and surface learning approaches in higher education that influence implicit or explicit approaches to teaching have been suggested (Lee, 2005). In association, three theories of teaching are proposed: 'teaching as telling or transmission'; 'teaching as organising student activity' and; 'teaching as making learning possible' (Ramsden, 2003:8). Relating these theories to IPE and adult learning, the second and third would appear to support the concept of facilitation. The deeper the level of learning achieved may translate into better facilitation subsequently delivered by the tutor.

Certainly, adult learning theories recognise the role of the teacher as a facilitator (Knowles, 1975), thus further reinforcing the importance of tutor characteristics. Attributes required to facilitate IPE include an ability to work creatively with small groups and knowledge of the historical relationship shared by health and social care professions (Holland, 2002; Oandasan & Reeves, 2005). Regular reflection upon personal and professional IPE experience helps staff in their facilitation role (Nash & Hoy, 1993; Reeves & Freeth, 2002; Mu *et al.*, 2004). Continuing coaching and mentoring by interprofessional facilitators is required to help learners develop and maintain their teamwork expertise (Morey *et al.*, 2002); clinical staff also benefit from facilitation experience to help their professional development (Reeves & Freeth, 2002).

However, few studies include the principles of reinforcement and facilitation (Cooper *et al.*, 2001). How IPE is influenced by facilitation is related to

teacher characteristics as a presage factor (Hammick *et al.*, 2007). Also, the process of facilitation is not just limited to the teacher; careful planning is required for a successful IPCE model (Davidson *et al.*, 2008). Clearer thinking, greater reflection and deeper analysis offer potential contributions to the cycle of continuous quality improvement (Freeth *et al.*, 2002), which relates to the points made on page 36 concerning resource planning implications in dental education and, on page 57, to IPE.

Distinction has also been made between so-called declarative knowledge and functioning knowledge, with the latter said to provide a means of conceptualising education for professional practice, leading to the development of educational pedagogies and practices such as problem-based learning, case-based learning, lifelong learning and work-based learning, which foster collaborative and team learning (Biggs, 1999; Biggs & Tang, 2007). These learning styles are regularly used in IPE interventions; the concept of functioning knowledge may be a deeper level of understanding which could either be a product of IPE, or required for IPE. Also, functioning knowledge could be analogous to deeper knowledge, as described by Lee (2005).

The variety and style of educational activities have already been discussed in this review, relating to location of activity and learning theories and are now further explored, in relation to other relevant processes or mechanisms.

2.8.2.6 Style, duration of intervention and group dynamics

There is wide variation in both the place and style of IPE interventions, including for example, in pre-qualifying IPE, use of simulation-based learning, with interprofessional practice-based assignments during placements (Tope, 1996) and a course for GP trainees and student health visitors (Hasler & Klinger, 1976). The majority of pre-registration interventions are found in academic classrooms, although clinical skills laboratories and community clinical environments have been used, with teaching techniques dominated by small group teaching, case studies and experiential learning, although didactic teaching is used in over one third of interventions (Cooper *et al.*, 2001). Small group learning activities, including seminar-based discussions and group problem-solving are reported (Reeves, 2001), however, evidence of practice-based learning for pre-registration students is not sufficiently detailed to permit any judgements about the relative value of these different methods (Barr *et al.*, 2000). There is however, a significant amount of evidence supporting small group interventions.

Whatever the learning theories underpinning IPE, the value of team reflection time is well documented (Barber *et al.*, 1997; Reeves & Freeth, 2002; Cooke *et al.*, 2003; Kilminster *et al.*, 2004; Mu *et al.*, 2004; Ponzer *et al.*, 2004). This could be informal, such as during a journey to the location (Mu *et al.*, 2004), or integrated throughout the intervention (Barber *et al.*, 1997). The intention in IPE is inevitably to encourage group discussion, using participatory learning experiences, and the goals include an improvement in team working

(Barr *et al.*, 2000). Separate training encourages different health professional groups to maintain their independence and autonomy, thus detracting from effective teamwork (Pietroni, 1994). This potentially gives support to the training of professional groups together in a primary care environment such as LSO, where teamwork is integral to all processes including patient care.

More time than is often allocated is required to develop group processes, with 6-8 weeks suggested as the most effective time (Cooper *et al.*, 2001). Learner numbers have been discussed as a presage factor on page 65; associated with group dynamics, numbers need to be kept between 4 and 8 for members to learn from one another (Cooper *et al.*, 2001; Fincham & Shuler, 2001). Some studies include didactic educational experiences about participating in teams (Remington *et al.*, 2006), others documented that team sizes ranged from 2 – 10 participants (Davidson *et al.*, 2008). In other interventions, team building and related activities are used as the total IPE process (Barber *et al.*, 1997; Morey *et al.*, 2002). The highly variable features of programme design imply that effective training programmes for participating in interprofessional teams could be developed for a variety of trainees across a range of clinical settings (Remington *et al.*, 2006). Careful planning of group size relating to the specifics of IPE interventions is further reinforced as a key factor.

Not only is there wide variation in group size but also in the reported duration of IPE experiences. Most interventions are between 1 day and 1 week (Barr *et al.*, 2000); can vary from single sessions, to curriculum strands running

through courses, with the majority lasting up to 4 weeks (Cooper *et al.*, 2001); or last from 1 or 2 days to longer training sessions held over a number of months (Reeves, 2001). However, these papers do not report on any informal learning (such as discussions between staff) which also takes place in these settings. Other interventions are generally of longer duration (Reeves & Freeth, 2002), with over 50% lasting more than seven days, often spread over several months (Barr *et al.*, 2006; Remington *et al.*, 2006). The duration, intensity of the educational programmes and types of learners involved varies widely, with some said to be 'discrete' experiences, yet others lasting for weeks or months (Remington *et al.*, 2006:3). The length of interventions varies between studies, including two four-hour workshops delivered a month apart; eight hours of instruction in one day; four hour IPE seminars; and two half day sessions (Reeves *et al.*, 2008b).

IPCE interventions range from 2.5 hours to 9 weeks, with placements taking place in blocks of clinical time. The most common is of 2 weeks duration but are quite varied; for example, 1 hour per week for 4 weeks. The diversity in the duration and intensity of IPCE experiences offers no consistent pattern as to an 'optimum dose' of IPCE (Davidson *et al.*, 2008:115), however one review identified that longer IPE courses are associated with more positive student perceptions (Mu *et al.*, 2004). The review therefore identified that there was wide variation in how the duration of IPE is quantified, and also the actual length of interventions. However, these descriptions of the length of interventions imply that IPE is often seen as a separate process set aside from the main educational routine, with a finite beginning and end. As such,

the literature review findings lead to the suggestion that: if IPE were integrated as an underpinning philosophy, thus continuing seamlessly within healthcare educational, institutional and workplace practice, then the benefits which are felt to come from IPE may be more achievable and sustainable.

2.8.2.7 Process / Mechanisms résumé

In summary of process, most IPE evaluations have a formative purpose, using, for example, action research, case study approaches and, most often, pre and post course surveys (Barr *et al.*, 2000). Data collection tools are mainly questionnaires, student essays, individual semi-structured and focus group interviews, observations and informal feedback (Barr *et al.*, 2000; Cooper *et al.*, 2001; Reeves, 2001; Freeth *et al.*, 2002) but only 35% of questionnaires use validated tools (Cooper *et al.*, 2001). Few interventions summatively assess students, which potentially detracts from the significance of IPE. Interactive methods of adult learning enhance IPE and the form, duration, location, composition and content may be significant (Barr *et al.*, 2000). Assessment of IPE is required to establish the resulting outcomes of interventions. For learners, teachers, institutions and those funding education, the intervention end product will be used as a measure of its success and is the final part of the presage–process-product (3P) and context-mechanism-outcomes (CMO) models for discussion.

2.8.3 Product / Outcomes

Product or outcome relates to development of collaborative competencies resulting from an intervention. Reference has been made to Kirkpatrick's (1967) model of educational outcomes (page 54). Kirkpatrick did not see these outcomes as hierarchical; he wanted to encourage more holistic and comprehensive evaluations to inform future policy and development (Hammick *et al.*, 2007). Following an iterative process of reflection upon the literature and discussion, Kirkpatrick's model has been subsequently expanded and modified for IPE (Table 5), distinguishing between outcomes relating to people and those impacting on service delivery (Barr *et al.*, 2000).

Table 5: Barr *et al* (2000) Modification to Kirkpatrick's Model for Classifying IPE Outcomes

Barr <i>et al</i> (2000) modification for Classifying Outcomes of IPE	
Level 1: learners' reaction	These outcomes are related to participants' views of their learning experience and satisfaction with the programme
Level 2a: modification of attitudes / perceptions	Outcomes here are related to changes in reciprocal attitudes or perceptions between participant groups, towards patients/clients and their condition, circumstances, care and treatment
Level 2b: acquisition of knowledge/skills	For knowledge, this is related to the acquisition of concepts, procedures and principles of interprofessional collaboration. For skills, this related to the acquisition of thinking/problem-solving, psychomotor and social skills linked to collaboration
Level 3: Change in behaviour	This level covers behavioural change transferred from the learning environment to the workplace prompted by modifications in attitudes or perceptions, or the application of newly acquired knowledge/skills in practice
Level 4a: Change in organisational practice	This is related to wider changes in the organisation /delivery of care, attributable to an education programme
Level 4b: Benefits to patients/clients	This final level covers any improvements in the health and well-being of patients/clients as a direct result of an education programme

Studies evaluating university-based IPE focus mainly upon measuring either learner reaction to the education, participants' attitudes towards other professions or interprofessional teamwork, or knowledge and attitudes to others in relation to certain patient/client groups (Freeth *et al.*, 2002; Hammick *et al.*, 2007). Studies evaluating IPE instigated to augment a quality improvement initiative tend to examine behavioural change, organisational change and patient benefits, thus reflecting their focus on specific problem solving in practice (Freeth *et al.*, 2002).

Thistlethwaite and Moran (2010) suggest a slightly different approach, aiming to differentiate the key learning outcomes of IPE which promote IPP. They propose a classification framework for defined learning outcomes for students, what is hoped students will learn for any particular intervention and what can be assessed. This splits the learning outcomes into 3 groups, namely: profession specific outcomes, generic outcomes that should be achieved by two or more professions and generic outcomes that should be met by all professions. Their review concentrates on the latter group and found a variety of terms used to describe the desired end-point of the learning activity or experience, including: learning objectives, competencies, capabilities, outcome-based education and competency-based education. This approach is similar to the CIHC (CIHC, 2009) and US (IPEC, 2011) competency frameworks and serves different purposes to Kirkpatrick's outcomes-based evaluation model, which relates to what the programme itself has achieved. Whilst this may include learner outcomes such as

knowledge, it is broader in terms of level 4 outcomes relating to organisations and/or patients.

Other different strategies for classifying IPL outcomes also exist. One distinguishes between three types of competencies required for successful IPP: 'Common' which are required of all health professionals; 'Complementary' which relate to specific disciplines; and 'Collaborative' which are required for different professions to work effectively together (Barr, 2001:16). An alternative to the competencies strategy is a developmental framework that links learning outcomes with stages of professional development (Charles *et al.*, 2004). Outcomes flow from exposure to immersion to mastery. Exposure outcomes parallel the early years of professional education, immersion outcomes are more likely to be achieved in the later pre-registration and early years of post-registration learning. Mastery outcomes are situated towards the end of the continuum and may not be fully achieved until learners have been immersed in a practice environment. This strategy may parallel the different levels of learning, discussed in IPE process, implies a progressive development of expertise and could link with individual paradigmatic learning trajectories, which are discussed on page 340.

Whatever approach is taken, learning outcomes are often not defined but are assumed within the evaluation tool and evaluation outcomes are usually given in terms of changes in student attitude or behaviour rather than knowledge (Thistlethwaite & Moran, 2010). Thistlethwaite and Moran (2010)

support the use of the Barr *et al* (2000) modification of Kirkpatrick's (1994) typology of educational outcomes for programme evaluation and to examine the evidence base for published IPE initiatives in terms of change and improvement. Also, they support Freeth *et al* (2005) in suggesting definition of learning outcomes in terms of attitudes, skills and knowledge for collaboration at pre- and post-qualification levels, to help with planning curriculum content and process at these different stages of learning. Their review found that the main themes of the stated outcomes are: teamwork; roles and responsibilities; communication; learning and reflection; the patient/client; and ethics and attitudes.

Overall, learners find IPE an enjoyable and valuable experience and are positive relating to changes in attitudes and knowledge (Barr *et al.*, 2000). Studies with pre-registration students indicate that the experience of IPE positively changes their perceptions of peer professionals. In some studies, changes in knowledge are reported but most commonly it is the ability to work as part of a team that is enhanced, especially in interventions involving post-qualifying practitioners (Barr *et al.*, 2000), plus an appreciation of facilitator input and interprofessional interaction (Freeth *et al.*, 2002).

Early pre-registration IPE learning is found to benefit later interprofessional activities; by the pre-registration final year, attitudes towards other health professionals are entrenched, which then act as barriers to teamwork (Barrington *et al.*, 1998). Pre-registration IPE also leads to modification of

reciprocal attitudes between students of different professions and helps acquisition of knowledge relevant to collaborative practice (Barr *et al.*, 2006). Remington *et al* (2006) report similar positive findings relating to attitudes of trainees toward other disciplines, their own discipline, health care teams, interprofessional team training and roles on health care teams. These studies clearly provide further support to the concept of initiating IPE as early as possible within pre-registration education.

IPE interventions also enable students and facilitators to understand others' professional roles, skills and responsibilities and to better understand their own. They also give facilitators further insight into different education styles, thus acting as a learning experience for them, reduce stereotyping in terms of attitude to other professional groups and enhance team-working skills (Cooper *et al.*, 2001). This is endorsed by Remington *et al* (2006) who found that knowledge of other disciplines' skills and roles increases, together with communication skills, group interactions, team skills and problem-solving. Furthermore, Davidson *et al* (2008) found that significant changes are reported in attitudes and knowledge before and after IPCE experience. Attitude is affected by whether or not the IPE is assessed (Hammick *et al.*, 2007). It would appear therefore that IPE leads to an improved awareness of professional roles and responsibilities by those proactively involved and that this could be further enhanced by some form of assessment, which could be within healthcare professional qualifications.

These attitudinal changes should lead to improvements in collaboration, however, if and when achieved, these changes may be varied, diffuse and hard to measure. Positive changes in personal behaviour are reported in post-registration IPE interventions but a downside to this is an inability to change the practice of colleagues (Barr *et al.*, 2000). Most of the evaluations reporting changed behaviour also report changes in the organisation or delivery of care (Reeves, 2001; Hammick *et al.*, 2002). It would appear that, if not all individuals within healthcare teams are involved in IPE, non-participants maintain their previously discussed silo-mentality preconceptions and do not change attitude or practice.

Despite the challenges in measuring and interpreting outcomes of IPE, it is possible to identify commonly reported outcomes and make inferences from them, with the key products of an IPE intervention said to be: positive learning outcomes for the participants, extending across the range of relevant knowledge, skills and attitudes required for confidence and capability in the practice of collaborative care (Hammick *et al.*, 2007). Mixed reactions from participants are found relating to perceptions and attitudes, which vary from other studies. However, different outcomes should be expected, as interprofessional learners are a diverse group, and multiple factors are at work in IPE interventions (Hammick *et al.*, 2007). Davidson *et al* (2008) found that a number of studies evaluate benefits to patients or clients but that outcomes at the level of organisational practice are rarely considered.

Where benefits to patients/clients are perceived, changes in the organisation or delivery of care are also reported. This may be because changed practitioner behaviour, changed service delivery and changed outcomes for patients/clients are strongly interrelated (Freeth *et al.*, 2002; Hammick *et al.*, 2002). By contrast, poor IPC can negatively affect the delivery of health services and patient care. Interventions that address IPC problems have the potential to improve professional practice and healthcare outcomes (Zwarenstein *et al.*, 2009). Changes in service delivery and patient care resulting from IPE initiatives are recognised with examples including: patients on an interprofessional training ward feeling they are given more attention (Reeves & Freeth, 2002), post-qualifying initiatives reporting beneficial changes in cultivating collaboration and improving services (Barr *et al.*, 2006), IPE quality improvement initiatives for qualified practitioners improving care and, in two undergraduate IPE interventions, one increased the volume of patients seen and the other the comprehensiveness of patient care (Hammick *et al.*, 2007). The recognised need for collaborative planning of all IPE resources for educational benefit also appears to impact on patient care.

2.8.3.1 Product / Outcomes résumé

In summary of product, or outcomes of IPE, the majority of outcome measurements use a Kirkpatrick based (1967) model and show positive effects relating to the interventions. Alternative outcome evaluations which relate more specifically to the student and measurement of what they have learnt from IPE interventions may be of increasing value, especially in a

world where health professionals still achieve professional registration based upon individual assessment, as is the case in dentistry.

2.9 Interprofessional education in dentistry

Dentists, along with pharmacists, are least likely to be involved when health professionals take part in continuing professional education or training where two or more health professions are present together, (Shakespeare et al, 1989; Barr and Waterton, 1996) but are keen to participate if organisational constraints can be overcome (Owens et al, 1999). A feasibility study into integrated interdisciplinary learning for health professionals found no IPE involving any dental professional (Tope, 1996). Subsequently, dentists figure in only 6% of IPE studies and there is no mention of DCPs (Freeth *et al.*, 2002). Barr *et al* (2006) found no mention of any dental professionals as IPE participants. Where dentistry is mentioned it is as a secondary aspect of what are essentially studies into medical care of the elderly and not as primary studies involving dentistry (Remington *et al.*, 2006).

Compared with other healthcare professions therefore, dentistry appears to have little involvement in IPE. However, if curricula are sufficiently flexible, there are opportunities for students from the different dental care professions to learn and practise together, creating IPE communities of practice that mimic real life working environments (Barr, 2001). The importance of education of the whole dental team, reflecting change in the role of the dentist from the performer of all dental tasks, to the leader of the dental team

needs to be more widely recognised and curricula developed to reflect this change, including more emphasis on team and leadership skills (Wilson *et al.*, 2008). Furthermore, teamwork is essential for the provision of contemporary, high quality oral health care (GDC, 2013a). Teamwork skills should be a core competency in all dental education programmes, yet, at present, there appear to be few opportunities for collaborative learning and practice within educational establishments and in the practising dental professions, which hampers the development of effective teamwork (Evans *et al.*, 2010). The potential relationship of individuals within certain institutions to attitude to IPE is again hypothesised as a barrier.

Indeed, students and dental nurses in a secondary care dental teaching hospital recognise the value of peer and interprofessional education; this view however is not shared by the majority of tutors, with only two tutors with formal training in education favouring peer learning and collaborative teaching (Sweet *et al.*, 2008a). This substantiates the previously discussed (page 60) lack of tutor collaboration (Barr *et al.*, 2000). Encouraging opportunities for learning communities (Shapiro & Levine, 1999) of students who may not normally work or learn together, may produce valuable learning outcomes in dental education (Sweet *et al.*, 2009). For students across oral health care, learning together requires positive action for teamwork skills to be developed. Interprofessional curricula need to be formally developed, based on evidence from the wider education literature. The study of IPE within dentistry is in its infancy but, formalised IPE is perceived as an

effective strategy to improve interactions among oral health professionals leading to improved patient care (Evans *et al.*, 2010).

There is growing evidence that IPE will improve professionals' abilities to work more effectively in a team and to communicate more effectively with colleagues and patients (Barr *et al.*, 2005). However, there are very few reports of initiatives concerning dental students (Rafter *et al.*, 2006), particularly where learning occurs with DCPs. IPL opportunities for dental and DCP students need to be developed, thoroughly evaluated and reported, so that IPE dental development can be better clarified (Morison *et al.*, 2008).

In further support of this theme, after the publication of the U.S. surgeon general's report in 2000, the dialogue surrounding IPE in dentistry escalated but subsequent studies have shown that little has changed in the way dental students are taught and prepared to participate in IPE. Academic dentistry must take the lead in initiating and demanding IPE if dental students are to be prepared to work in the health care environment of the twenty-first century (Wilder *et al.*, 2008). There is little research on the effectiveness of interprofessional programmes within dentistry as, unlike other health professions, there are very few of them to study (Rafter *et al.*, 2006). The need for team based education in dentistry is recognised and, given the opportunity, dental professionals are keen to be involved in IPE, yet so far the profession has little structured IPE, despite the documented benefits it offers in improving teamwork. It is the responsibility of the dental academic

and educational community to act upon what has been recognised for some considerable time in terms of developing IPE in dentistry.

2.10 Interprofessional education in orthodontics

None of the reviews reported evidence of any studies of IPE in orthodontics.

2.11 Review strengths and limitations

This literature review has methodological weaknesses. It does not have the transparency and rigour of a systematic review. As such this is seen as a shortcoming. Other more recent IPE reviews may have been missed. However, having read the selected reviews, it became apparent that, the majority of the papers included work from many considered by their peers to be experts in the field of IPE. The inclusion and exclusion criteria allowed access to a broader range of literature than systematic reviews following Cochrane collaboration criteria, which was appropriate for this study. It is inevitable given the amount of IPE presently being delivered and papers written that newly published work may be available at the date of writing this chapter. However, despite the recognised limitations, and despite the studies found within the papers reviewed being of variable quality, this literature review has achieved its stated objectives and informed the further progression of the thesis. It has also demonstrated the need for high quality

studies in the field of IPE and for the development of appropriate tools to aid this research.

The use of the 3P model for description, analysis and synthesis of IPE provides a structure for data analysis and organising the narrative. During this process, the parallel with the realist context-mechanism-outcome (CMO) model became more obvious and the interrelationships relating to IPE as a whole strengthened understanding. The 3P model improved understanding of CMO and as such benefitted the choice of study methodology. However, it makes linking of the narrative description on the one hand more complex, especially as very few of the papers reviewed followed a similar structure. The narrative was not originally conceived as a realist synthesis (Pawson *et al.*, 2004) but has paid attention to contexts, mechanisms and outcomes in an attempt to explain and seek further understanding of the complexities of IPE (Pawson *et al.*, 2005).

2.12 Emerging understandings of IPE

IPE was defined in 1997 as: 'occasions when two or more professions learn from and about each other to improve collaboration and the quality of care' (CAIPE, 1997 revised) (Barr, 2001:6), revised in 2002 to: 'Interprofessional Education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care' (CAIPE, 2002) and most recently: 'Interprofessional education occurs when students from

two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes' (WHO, 2010:7).

The first definition change added the word 'with', potentially reflecting the increasing recognition of the importance of collaborative learning in IPE. In the WHO 2010 definition, 'students' are added, plus a change in the order of 'about', 'from' and 'which.' The words 'about' 'from' and 'which' are fundamental to an understanding of IPE. As yet, learning with, from and about each other, has not been conceptualized and described fully enough to effectively inform curriculum development and evaluation of interprofessional learning (Bainbridge & Wood, 2012). Addition of 'students' reinforces the recognition that for true IPE, everyone is learning from each other continuously; as such all stakeholders are students.

Exploration of the meaning of 'with', 'from' and 'about' consolidates key characteristics of IPE. Words describing learning 'with' each other include active engagement, co-location and equally valued. Within the context of IPE, 'with' means more than being present with others physically; there must be active engagement in a respectful manner. Thinking together, communicating actively and discovering together are described as characteristics of learning with each other. For IPE to be effective the environment must foster a sense of equality (Bainbridge & Wood, 2012).

Learning 'from' others is characterized by trust, respect and confidence in others' knowledge and means a transfer of knowledge. Willingness to learn

and the need for the interaction to be free of judgment are important. Participants need a level of prior knowledge to feel comfortable asking questions in order to learn from someone else, or be confident that it is a safe place and time to ask questions. To learn from others requires trust in the other person's knowledge base and skill set and also needs to be facilitated in a context of equal value. If the learner perceives that the person who is teaching sees it as a hierarchical activity, the learner feels disempowered and devalued (Bainbridge & Wood, 2012).

Learning 'about' others is linked to watching and observing what others do. Experiences such as shadowing reflect the importance of witnessing people in action as a way of understanding roles and behaviours. Overcoming preconceived notions and stereotypes is necessary to be able to learn about someone else. Concepts linked to learning about include knowing about people outside their professional role and interaction (Bainbridge & Wood, 2012).

Learning about other professions seems to form the foundation for learning with and from other professions. From a students' perspective, learning about others must come before learning with and from others. This places learning about others in the early stages of IPE and, therefore, informs the timing of IPE, the active engagement or interaction necessary for effective IPE and the social aspects of learning about others. The words about, from and with represent an iterative process, which is a key factor relating to IPE (Bainbridge & Wood, 2012).

2.13 Challenges for IPE to become theory-based

Many of the early exponents of IPE approached it pragmatically: as practitioners, they avoided theory in case it might intellectualize or complicate self-evident truth; learning together to work together seemingly needed no further explanation. Others grounded their IPE 'initiatives' in a single theory from a particular academic discipline: they were practitioner/teachers attuned to 'think theory' albeit from narrow perspectives (Barr, 2013:4).

Theories generate complex and comprehensive understandings of phenomenon that are not easily explained. Historically, there has been some resistance to using theory relating to IPE; more recently there has been an increased adoption and explicit use of social science based theories, to the extent that theories now abound in the interprofessional field (Reeves & Hean, 2013).

In IPE, theory supports the articulation, reflection and potential reinterpretation of existing practices, providing a tool with which allows engagement in second-order reflection (Hean *et al.*, 2012). However, at present no single IPE theory is considered to be superior (Hean *et al.*, 2009). Indeed, a network of theories may serve IPE development more effectively (Colyer *et al.*, 2005).

Theories informing IPE appear to fall into two groups. There are those (mainly from education and psychology) which inform the improvement of the interprofessional learning process. Others are more detached and more critical (mainly from sociology), which challenge professional and interprofessional orthodoxy, raising questions beyond the bounds of process (Barr, 2013).

The interprofessional community has an underlying goal of challenging the status quo of traditional healthcare education and delivery (Thistlethwaite *et al.*, 2013). To achieve this, greater focus must now be placed on the rigorous testing of theories within the IPE context (Hean *et al.*, 2013). A number of educational, psychological and sociological theories have been suggested as possessing utility for IPE. However, there is limited theory proposed that has been derived directly from data (Green, 2013) and a lack of effective application of these theories in curricula, educational practice and evaluation (Craddock *et al.*, 2013).

The application of theoretical perspectives to the design, implementation and evaluation of IPE remains an area for development (Reeves *et al.*, 2011), with more work needed from sociology, a traditionally poorly represented discipline in the interprofessional field (Reeves & Hean, 2013). In order to challenge the status quo of traditional education, IPE must be underpinned by theories which have been tested against empirical evidence collected from the context of appropriate studies (Hean *et al.*, 2013).

Securing the theoretical base for IPE depends on the readiness of academic disciplines to compare and combine their perspectives in a spirit of openness, honesty and humility in much the same way as collaborative practice depends upon those same qualities between professions (Barr, 2013). The silo mentality within professions has been recognised as a barrier to IPE and, as such, is one of the challenges to be overcome in IPE becoming more theory-based. However, in overcoming this challenge, not only will this strengthen the case for IPE, but may lead to further examination of the commonly accepted definition of IPE.

2.14 Summary

Many opinions abound as to the benefits of and requirements for IPE. It has been advocated as the means to cultivate the necessary attitudes, knowledge and skills required for effective teamwork across health care settings (WHO 1988; NHSE 1996). Collaborative learning has been emphasised in criteria regarded as important for effective IPE (Barr *et al.*, 1999). Formal education is said to be required to enable the learning of interprofessional team skills (Hall & Weaver, 2001). Practice-based IPL is thought to offer enculturation, skill and knowledge development and peripheral participation (Payler *et al.*, 2008).

IPE gains value, when interactive methods are introduced that involve participants in shared tasks and enable them to learn not merely with but also from and about one another (Barr *et al.*, 2000). While there is now an

array of IPL-related publications and a rapidly increasing number of IPE initiatives underway within pre-qualification education programmes, what is less common is a 'whole of curriculum' approach where IPL is part of the vision for the future, and is practically integrated and embedded within mainstream curricula as a mandatory, assessed component (Nisbet *et al.*, 2011:24). There would appear to be little evidence from the appraised literature of a longitudinal study in a primary care IPE environment which explores stakeholder views in depth.

The literature review studies reported some positive outcomes but did not draw generalisable inferences about the key elements of IPE and its effectiveness and showed little evidence of IPE in dentistry and none in orthodontics. IPE has not yet succeeded in the transformative overhaul of health professional education it advocated from its early days, however, currently there appear to be stronger imperatives for such reform and change than ever before (Nisbet *et al.*, 2011). There is, therefore, a continuing need for further, rigorous IPE studies including:

- Longer term evaluation of the effect of IPE to be able to determine whether any initial changes attributed to IPE are sustainable over time, or whether they were incorporated into practice (Reeves, 2001)
- Research designs which include a multi-method and longitudinal dimension, in order to understand both the processes and the impact of IPE over the longer term (Reeves, 2001)

- Qualitative, more interpretive studies, which would evaluate innovation and pedagogy (Freeth *et al.*, 2002)
- Further and advanced IPL opportunities (in the workplace and in universities) (Barr *et al.*, 2005)
- More evaluations of IPE in real and simulated practice settings to strengthen our knowledge of mechanisms that lead to positive behaviour changes and patient/client care and service delivery improvements (Hammick *et al.*, 2007)
- More studies to allow sound conclusions to be reached about effectiveness of IPE, as well as to inform IPE policy development. In particular, these should include: studies assessing the effectiveness of IPE interventions compared to separate, profession-specific interventions; and, studies with qualitative strands examining processes relating to IPE and practice changes (Reeves *et al.*, 2013).

This thesis is relevant, as there are no other IPE studies in dentistry, is timely, due to the current need for new models of integrated education and patient care which political and economic forces dictate, plus is addressing the need for theoretical underpinning of IPE. It is significant, being primary care based research, carried out in the environment where the vast majority of dental care is delivered and, a longitudinal study where IPE is more than a module inserted within a programme and, may have become embedded in the organisational culture. It aims to provide a significant contribution to the body of IPE evidence: theoretically the concept of outreach training is widely

accepted, but has not been researched relating to the dental team; practically this research seeks the opinions of all stakeholder groups involved in LSO IPE; morally there is an obligation for all health professionals to improve patient care, which it may facilitate and, heuristically, aiming to stimulate further interest by investigation. To achieve this requires understanding of what factors make LSO work, or not work and underpins the realist inspired research questions, documented on page 23, namely: what works, for whom, in what circumstances, why and how?

It is now thought that fully developed learners move through a series of developmental stages before they achieve the ability to engage in transformative learning. This learning enables students to reach their highest potential for understanding, enabling adults to acquire insight, ability and disposition to realize their full potential and cognitive development (Mezirow, 2004). A range of pedagogical approaches are used to facilitate learners' abilities to engage in transformative learning, including self-directed learning, case-based learning, guided discovery learning and problem based learning (Craddock *et al.*, 2006). These approaches may be relevant to theoretically underpinning IPE and are further considered in Chapter 3, followed by discussion in Chapter 4 of the rationale behind the chosen methodology for this thesis.

Chapter 3: Education at LSO and theories of learning

3.1 Introduction

Education, like every other social institution, has undergone many changes in recent years, including: the concept of lifelong learning, which is now often discussed as opposed to lifelong or continuing education, moving from teacher-centred to student-centred learning, from rote learning to reflective learning and the recognition that more learning takes place outside the formal educational institution. These changes do not take place in a social vacuum, with education reflecting the forces that shape society (Jarvis *et al.*, 2002).

Education may be defined as the process of teaching, training and learning to improve knowledge and develop skills (Oxford English Dictionary Online, 2011); or philosophically as a social need and function, which historically has been too concerned with delivering knowledge and not enough with understanding students' actual experiences (Dewey, 1916), which may still be true a century later. It is described as a complex intervention in that it is built up from a number of components, which may act both independently and inter-dependently (MRC, 2000). Learning is said to be the acquisition of knowledge or skills through study, experience, or being taught (Oxford English Dictionary Online, 2011); by contrast, Burns (1995:99):

...conceives of learning as a relatively permanent change in behaviour, with behaviour including both observable activity and internal processes such as thinking, attitudes and emotions.

Formal education started at LSO in 2005, with a course delivered to dental nurses solely by the two specialist orthodontist leads. Subsequently, education has evolved, to the point where LSO has become an IPE environment. This chapter discusses these developments, the theories of learning which are potentially relevant to the evolution of LSO IPE and their relationship to healthcare professional education.

3.2 Background

Traditionally, educationalists have argued that education is essentially cognitive, whilst training is skills based (Peters, 1967). However, these arguments fail to recognise the integration of knowledge and action and, as it has become necessary to describe the combination of these two, the term learning has been increasingly used (Jarvis *et al.*, 2002). Lifelong learning is especially relevant to andragogy, which includes a more student-centred approach to adult education (Knowles, 1990). It applies to all dental registrants (GDC, 2013a) and supports the development of the individuals at LSO, who, it is hypothesised, are continually evolving within the IPE environment. As more learning occurs outside the formal educational institution, the learner is seen as central to the process and the nature of teaching is changing (Jarvis, 2001).

The aim and purpose of educational theory can be to challenge the status quo and explore and explain new concepts (Sweet *et al.*, 2009). Theories should evolve in response to evaluation and new evidence, should be dynamic and open to proactive reflection and change (Freeth *et al.*, 2005b). Historically education has held a monopoly in teaching [academic pre-clinical] theory, which had to be taught before new members of a profession could go into practice, where they subsequently applied this learnt theory (Jarvis *et al.*, 2002). This has traditionally applied to the training of dental students (Sweet *et al.*, 2008b). However the relationship is changing, with more arguments that theory comes from practice (Jarvis, 1999), with the latter becoming more central in teaching and learning (Jarvis *et al.*, 2002). This concept, where team members are encouraged to use their experiences in practice to underpin their delivery of education to others, which, in turn, may shape and influence the progression of their own lifelong learning, is being investigated by this thesis.

3.3 Lifelong learning for healthcare professionals

This ethos of lifelong learning for healthcare professionals is recognised as being a key factor for good patient care (GDC, 2004; GDC, 2011; GDC, 2013a). Health professionals need to be continually prepared for a lifetime in practice, as opposed to the historical 3 to 5 year training programmes (Houle, 1980) and lifelong learning requires individuals to take responsibility for their own CPD (Jarvis, 1995). It is inappropriate for any profession to claim expertise based on education completed 5 to 10 years previously

(Frost, 2001), so the need for continuing education and development are seen as requirements, together with the role of education in developing skills of critical analysis and reflection that can be applied in professional practice (Barnett, 1990).

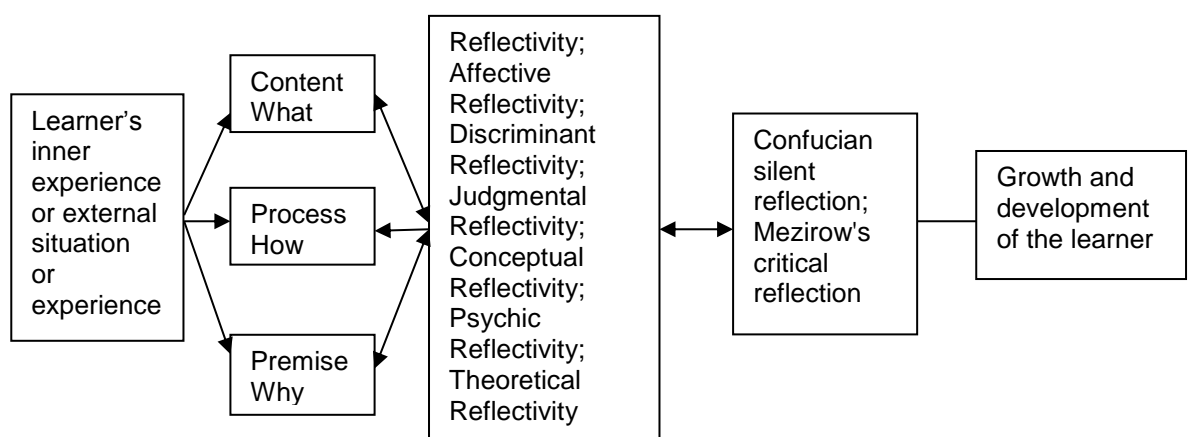
Emphasis on lifelong learning also features in educational theory and research, in relation to the translation of policies into practice (Gorard & Rees, 2002; Edwards *et al.*, 2002). Alongside this, society has become increasingly reflective (Beck, 1992), retrospectively analysing causation of events. Reflective learning has become more prevalent, with expert opinion increasingly regarded as discourse and critically appraised before acceptance or rejection, with learners helped to reflect upon information given (Jarvis *et al.*, 2002) and teachers acting only as interpreters of knowledge (Bauman, 1987). As such, there is a recognition that teaching, learning and good practice itself are all social processes, that the focus is increasingly on learning and that providers of learning may not be conventional educators. The move from traditional education towards lifelong learning exemplifies the need to explore the context surrounding this transition, including how learning takes place (Jarvis *et al.*, 2002). The LSO IPE model appears to be supported by these views; certainly critical analysis, reflective practice and a commitment to lifelong learning are potential prerequisites for progression at LSO, which in turn both encourages and supports these actions for all individuals and are essential for learning. There are many different theories as to how people learn (Dunn, 2002); those considered potentially most relevant to LSO education are now discussed.

3.4 Theories of learning

The mainstream concepts include behaviourist, cognitivist, constructivist, social and experiential learning theories, but multiple learning theories can be confusing, conflicting and, not fully validated by research (Minter, 2011). Most learning theories aim for change in three domains: cognitive, affective and psychomotor. Some theorists list more domains and others put learning theories into different classifications but, not all theories are categorised (Wang, 2012) and, any learning theory presupposes a more general model according to which theoretical concepts are formulated (Reese & Overton, 1970). Wang (2012) suggests that, unless a general model can be derived from a learning theory, it may be hard to apply in practice. He and King (2006, 2007) proposed a model to illustrate how a general model can be derived from any of the learning theories (Figure 1) (Wang & King, 2006; Wang & King, 2007), summarizing an in-depth comparison between transformative learning and Confucianism, which is based upon mutual respect and, where it is felt that humans are teachable (Wang, 2012).

Figure 1: Model of Learning through Critical Reflection

Figure derived from Wang and King (2006, 2007).



This model would seem to recognise that the experience and/or situation of the learners, together with the process of reflection, all interact continuously and are critical in the overall development of the learner.

3.5 Reflection in learning

Reflection has been described as:

...the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self and which results in a changed conceptual perspective (Boyd & Fales, 1983:100).

Reflection in action is the continuing process of translating experience into knowledge; reflection is thought to occur in practice at the time of the activity and practice should allow the development of a student's capability for reflection in action (Schön, 1983). However, time for self-awareness and reflection is limited in clinical situations (Eraut, 1994). This development of theories through reflection in action has been called informal theory (Carr & Kemmis, 1986). The reflective practitioner uses informal theory and reflection in action and learns from every task (Rolfe, 1997). Non-reflective learning is a process of accepting what is presented and memorising it, whereas reflective learning is the process of being critical (Jarvis, 1992). As practice becomes more central in teaching and learning and, with the development of experiential learning theories, it is no surprise that problem-based learning and work-based learning have become more significant (Jarvis *et al.*, 2002).

Reflection is proposed to be embedded in LSO education and is thought to occur increasingly as learners develop, become more experienced and take on more of a teaching role. This evolution from learner towards educator not only involves a process of self-reflection but also the ability to re-evaluate previous learning. Learning has also been defined as a change in behaviour in the learner due to reflection (Wang & King, 2006). Reflection by tutors may be critical in their role progression towards facilitation, involvement in course development, plus in the evolution of educational delivery and assessment.

Sweet *et al.* (2009) suggest that formative assessment could be a more reflective process that recognises the range and extent of work that has been undertaken as well as looking at outcomes, and ensuring that students receive clear and constructive feedback on their progress. In LSO, e-portfolios are used as a learning tool, for monitoring of clinical cases and tutor feedback to students, as a record of clinical cases for summative assessment, and must contain a reflective commentary. Assessment is further discussed on page 123.

Despite its importance being recognised, reflection is poorly developed in UK undergraduate clinical dentistry (Sweet *et al.*, 2008a; Sweet *et al.*, 2009). In LSO emphasis is placed upon an understanding of clinical case assessment, diagnosis and treatment planning prior to starting patient treatments, rather than the student simply carrying out clinical procedures. Repetitive clinical tasks impact on opportunities for critical thinking (Sweet *et al.*, 2009); as

much of traditional dental clinical education is based upon practising clinical tasks, this could in part explain the lack of reflection in dental education.

The processes of briefing, debriefing and reflection are seen to have direct application to learning in dentistry (Sweet *et al.*, 2009). Debriefing after teaching is educationally valuable (Ments, 1990). Observation suggests that to many, particularly more junior students, the concept of reflective thinking is new. As such, Mezirow's (1981) transformative learning theory may be less viable when hypothesising how less mature students learn. Having accepted the concept of reflective thinking, more mature students at LSO appear to utilise reflection throughout subsequent learning. The reflective practitioner is recognised as being a prerequisite for good patient care (GDC, 2011).

Reflection could be fundamental to further progression towards an IPE environment and may lead to a more in depth knowledge, compared with a memorisation of facts. An obvious progression for a reflective practitioner who is also a teacher, is to research their own practice (Stenhouse, 1985) thus underpinning an insider evaluation of the LSO environment, aiming to determine those aspects critical to learning.

3.6 The learning environment

Education produces different outcomes in different circumstances and environments (Wong *et al.*, 2012). It is affected by students themselves –

their prior experiences, motivations and their interactions with peers and by the skills and enthusiasm of teachers (Hutchinson, 1999). Indeed, multiple influences combine: medical and dental education does not happen in a vacuum and is a process that cannot readily be stopped (Shea *et al.*, 2004). This could imply that a desire for lifelong learning can be created by the learning environment; data from this thesis may confirm or refute whether this occurs at LSO. Students are seen as adults who actively contribute to the learning process; learners experience multiple interventions simultaneously and it is difficult to separate the effects of individual components (Baxter Magolda & King, 2004), especially as learning might not manifest itself in observable behaviour until some-time after the educational programme has taken place (Dunn, 2002). LSO learners are adults who need an element of control over their learning, together with the ability to apply self-direction to the learning process (Knowles, 1975). The LSO environment potentially requires and encourages self-direction by the nature of both education processes and assessment of learners.

3.7 Self-directed learning

It is extremely difficult to determine which learning theories are sounder than others because people are engaged in informal or formal learning to change the way they see themselves, change the way they see other people and change the way they see situations (Cramer & Wasiak, 2006). Informal and formal learning has been previously discussed related to IPE (page 69) but in adults, self-directed learning, where learners control both the objectives and

means of learning, is also important (Mocker & Spear, 1982). To succeed as a lifelong learner, individuals must become self-directed learners and to know not only how to learn but how to put it into practice (Griffin & Brownhill, 2001). Experiential learning involves a degree of self-directed learning (Jarvis *et al.*, 2002). The attitude and interactivity of learners may often influence the means of learning; also, objectives are usually pre-determined, at least in part, by course requirements, which in turn relate to style and content of assessments (Fincham & Shuler, 2001). In such an IPE environment as LSO, many types of learning potentially take place, with learners controlling some objectives and means of learning; as such this adult learning requires self-direction, which is explored by this thesis.

There have been many innovations in teaching and understanding of student learning in higher education in recent years that may have contributed to a better learning experience for students (Sweet *et al.*, 2008a). Many learning theories overlap, have their proponents and critics and, many do not differentiate between pedagogy and andragogy (Minter, 2011). Andragogy has always embraced the principle of individualised learning and implies that the role of adult educators is to facilitate self-directed, reflective and critical learning (Jarvis *et al.*, 2002) and, as such, is relevant to LSO.

3.8 Adult learning (andragogy)

Knowles' (1990) andragogical theory is based on four assumptions which differ from those of teacher centred or directive learning (pedagogy): (1)

changes in self-concept, (2) the role of experience, (3) readiness to learn and, (4) orientation to learning. Knowles proposed that adulthood has arrived when people behave in adult ways and believe themselves to be adults; then they should be treated as adults. He proposed that adult learning was special in a number of ways, including:

- adult learners bring a great deal of experience to the learning environment. Educators can use this as a resource
- adults expect to have a high degree of influence on what they are to be educated for and how they are to be educated
- the active participation of learners should be encouraged in designing and implementing educational programmes
- adults need to be able to see applications for new learning
- adult learners expect to have a high degree of influence on how learning will be evaluated
- adults expect their responses to be acted upon when asked for feedback on the progress of the programme (Knowles, 1990).

Burns (1995:233) says that:

By adulthood people are self-directing. This is the concept that lies at the heart of andragogy...andragogy is therefore student-centred, experience-based, problem-oriented and collaborative, very much in the spirit of the humanist approach to learning and education...the whole educational activity turns on the student.

All aspects of this comment may be recognised in LSO education processes. It is hypothesised that an IPE environment has been created, not by a grand design but has evolved because of the core philosophy instilled in individuals of helping others to develop, plus the environment they themselves have been instrumental in creating. A teamwork ethos may be critical in allowing individual progression, with leaders encouraging personal development for all within the team environment. Individuals may be empowered both with responsibility and opportunity, given confidence and support, whilst simultaneously having to reflect continually on their own development and being assessed on performance. Knowles (1990) states the importance of learners' participation in course design; at LSO this is taken a stage further. Educators who were previous learners at the levels they teach now influence aspects of courses, bringing significant experience both as learners and teachers, which may enhance the educational experience. These hypotheses are to be evaluated by this thesis.

The theme of learning being student-centred, albeit not proven, appears to be fundamental for adult education. However, there is no single pure model that practicing educators agree upon for effective teaching with the adult learner. Many subscribe to a mixed model of learning theory and practice, based on their own intuitive model, without knowing whether learning theory or research support their instructional initiatives (Minter, 2011). Development of early education in LSO has followed this path, taking an innovative approach, different from traditional dental school teaching, both in terms of being situated in primary care, its integration of all members of the

orthodontic team, DCPs having an active role in the education of their colleagues (Cure & Ireland, 2008) and potentially the philosophy behind the delivery of education. Training of DCPs involves developing certain clinical skills; as such there is the need to demonstrate practical procedures and processes (GDC, 2013b). As discussed on page 112, adult learning is suggested to be 'self-directed, student-centred, experience-based, problem-oriented and collaborative' (Burns, 1995:233). These pre-requisites, coupled with the requirements of developing diagnostic, treatment planning and clinical skills suggest that experiential and/or problem based learning could underpin LSO educational processes for developing these skills.

3.9 Problem based learning (PBL)

Problem based learning is an instructional model and curriculum design methodology often used in higher education and primary and secondary education settings (Savery & Duffy, 1995) and was developed in medical education because the 'traditional' teaching approach was producing students who could not think for themselves and who had not developed self-directed learning skills (Bearn *et al.*, 2002:162). It is a curriculum development and instructional system that simultaneously cultivates both problem solving strategies and disciplinary knowledge bases and skills, by placing students in the active role of problem-solver (Finkle & Torp, 1995). Students take an active role in their own learning whilst tutors facilitate (Gallagher & Stepien, 1996).

The learning goals of PBL relate to self-directed learning, content knowledge, and problem solving (Savery & Duffy, 1995). In PBL, students are encouraged and expected to think both critically and creatively in their interactions with the problem, the peers, the resources and the tutor. PBL has been summarised based on three essential principles:

1. Activation of prior-learning via the problem: problems function as stimuli for learning to activate prior knowledge and to determine the organization and nature of what is learned.
2. Encoding specificity: students can recall what they have learned better in the context in which it will be used. In other words, the resemblance of the problem to intended application domains facilitates later transfer. Understanding is in interacting with the environment.
3. Elaboration of knowledge via discussion and reflection to consolidate learning experience: knowledge evolves through social negotiation. Moreover, elaboration of knowledge at the time of learning enhances subsequent retrieval (Norman & Schmidt, 1992).

Rather than a teacher provide facts and testing students' recall *via* memorization, PBL attempts to get students to apply knowledge to new situations. Students are faced with contextualized problems and asked to investigate and discover meaningful solutions (Barrows, 1986). This learning through prior thinking and conceptualising leads to organisation and structure of knowledge which is critical for understanding (Huberman & Miles, 1998). Generally, dental education has been based on memorizing lessons, paying less attention to problem-solving ability (Gaengler *et al.*, 2002). The vast

volumes of information and knowledge now available mean traditional methods of dental education are less effective (Plasschaert *et al.*, 2006). PBL originally was used in dentistry to a limited extent (Fincham & Shuler, 2001), but, in 1990, the Malmö Dental School reopened with a completely revised curriculum employing a student-centred PBL pedagogy (Rohlin *et al.*, 1998). Other examples of PBL in dentistry have since been documented (Mullins *et al.*, 2001), in orthodontics (Bearn *et al.*, 2002; Bearn & Chadwick, 2010) and, where comprehensive educational teacher training is included in the curriculum, reported to be beneficial (Sweet *et al.*, 2009). PBL enhances dental students motivation and long-term learning (Gharechahi *et al.*, 2014).

PBL allows context to be varied according to the learner group, potentially explaining how LSO education has evolved with different student groups. LSO has increasingly integrated PBL into pre-clinical teaching, using clinical case material during study days and also as summative assessments, in the form of clinical case based assignments. This process seamlessly integrates with case-based learning (CBL), which is said to use a guided inquiry method and to provide more structure during small-group sessions than PBL, which uses open inquiry (Srinivasan *et al.*, 1982). Tutors who initially delivered lectures have progressively become facilitators. Students are given patient related material and a clinical vignette; they are then required to assess, diagnose, devise and discuss an appropriate treatment plan and support their discussion with references. These assessments simulate the situation students eventually face in clinical practice; as such they are both formative and summative in nature. This development of suitable assessments which

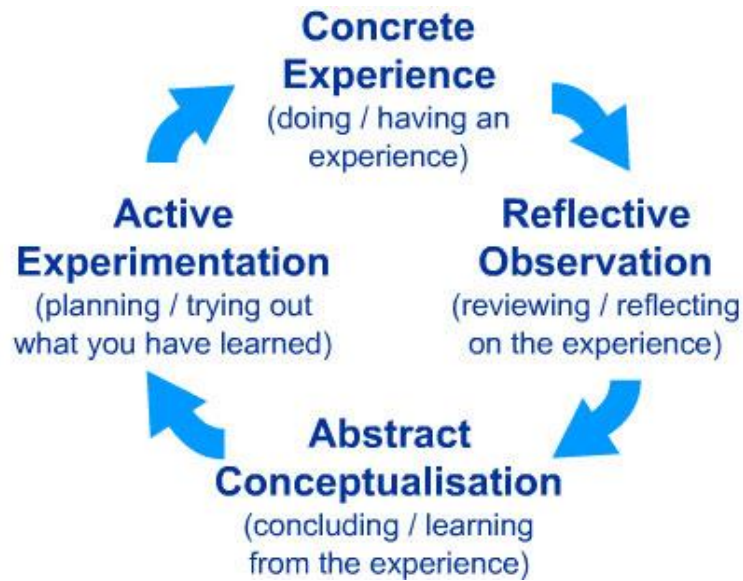
determine the level of students' reflective judgement that can be applied to written assignments is valuable (Kitchener & King, 1990). The concept of clinical case discussion and subsequent use of cases as assessments was initiated as a means of simulating the real patient environment; PBL and CBL theory would, therefore, appear to offer a viable explanation of this aspect of pre-clinical learning in LSO, with students activating prior learning achieved from lectures, literature analysis and peer discussion.

At the outset, educators had no knowledge of Knowles (1990) theory of andragogy. However, they quickly recognised that expertise within the learning group could be a valuable resource. Engaging students in group work appears to increasingly motivate participants and give them more influence over their own learning. The experience and expertise within learner groups is proving to be a resource, which may be an explanation of how certain clinical skills are learnt. PBL has been described as a form of experiential learning (Barrows & Tamblyn, 1980).

3.10 Experiential learning

Kolb (1984) proposed the theory of experiential learning and suggested that learning is the process whereby knowledge is created through the transformation of experience. The theory presents a cyclical, sequential model of learning (Figure 2):

Figure 2: Kolb's learning styles and experiential learning cycle



Kolb's theory appears to draw from Dewey (1933), who stated that the perplexity of learning leads to reflective thinking and consequently, learning and also Mezirow (1981), who advanced the theory of transformative learning, in which he suggested that a disorienting dilemma can lead to critical reflection and from there to transformative learning (Mezirow, 1981). Mezirow's theory does not deviate too far from Dewey's reflective thinking theory (Wang, 2012). Learning from experience has a long history in education and is something of an ideology (Brah & Hoy, 1989). Experience is subjective and a form of thought, which is constructed and influenced by biography and the social and cultural conditions in which it occurs (Jarvis *et al.*, 2002). Neurological research suggests experience episodes consist of two phases: the first a direct encounter with the situation and the second, a form of mediated experience since the encounter is qualified and modified by previous knowledge (Greenfield, 1999). This latter phase could therefore relate to the concept of unlearning, as discussed on page 140, relating to

acceptance of experiential learning. The underlying principles of experiential learning have also been summarised as:

- Experience is the foundation of, and stimulus for, learning
- Learners actively construct their own experience
- Learning is holistic
- Learning is socially and culturally constructed
- Learning is influenced by the socio-economic context within which it occurs (Miller & Boud, 1996).

The history of progressive education is student centred, using learners' experience (Brah & Hoy, 1989). Utilising previous experiences is at the heart of andragogy (Knowles, 1980). Learning from experience offers a valid explanation for development of manual dexterity competencies required in clinical dentistry; reflection again appears to be vital to improvement and the attaining of competence. There appears to be significant overlap between PBL and experiential learning, with both viable explanations of learning in LSO, albeit not exclusively. Other theories of learning could be applicable and the following sections will discuss the evolution of education at LSO, synthesising those theories of education and learning that may be relevant.

3.11 The evolution of LSO education

The first orthodontic nursing course was delivered by two specialist orthodontists and took a didactic approach, paralleling their own education.

Students were young adults, with some previous experience; the educators brought significant experiences of their own education but little acknowledged context of educational theory. This, however, allowed innovation in terms of course design and delivery, albeit the learning outcomes were pre-determined by the awarding body.

This more didactic approach to education is commonplace in traditional, teaching hospital-based dental education, where most dental tutors consider themselves as teachers, subject specialists or experienced practitioners, thinking of teaching as a process of passing on knowledge and students learning by receiving it; alternatively they see themselves as experts showing students processes and treating them like apprentices (Sweet *et al.*, 2008a).

Relating to Knowles' (1990) theory of andragogy, formal learning took place but students had little or no influence on the style of education. Due to the clinical environment, they could see applications for new learning; as such, Minter's (2011) description of a mixed model, intuitive approach to education delivery, describes LSO at this stage. For this cohort of learners, Bandura's (1977) Social Learning Theory of people learning from one another, via observation, imitation and modelling, is a potential explanation of knowledge acquisition. This may be a relevant theory for how, at the outset of LSO education, 'junior' learners with minimal past experience, learnt but, may be less relevant as the dynamics and expertise of individuals within the LSO environment developed.

The Masters level qualification for postgraduate dentists has been discussed on page 116 relating to PBL. Initially a didactic approach was again taken, but this has reduced, with increasing involvement of the whole LSO team. Educators have recognised that, by increasing active learner participation, group dynamics improve. This has led to a re-design of programme delivery, with an increase in group work, promoting more interaction between students, with the educator role shifting increasingly towards facilitation. These developments find support in the literature, where learning is said to occur by the educator acting as a facilitator (Rogers, 1969), by establishing an atmosphere in which learners feel comfortable to consider new ideas and are not threatened by external factors (Laird, 1985), by students working together (Sweet *et al.* 2008a) and by those educationalists who feel peer tutoring enhances learning (Vygotsky, 1978b). Rogers (1969) does not believe that teachers can teach others directly; they can only be facilitators. Learners have to take the initiative in learning, which could lead to its' ownership, with evaluation by the learner also required (Wang, 2012).

For adult learners to maximize learning, teachers must stimulate them by encouraging self-direction; learners cannot be submissive followers of their teachers (Wang, 2012). LSO educators appear to have recognised that more emphasis must be placed on the learner; less on the educator. Without knowledge of Knowles' work at that time, course progression has followed the principles required for adult learning (Knowles, 1990). There is also an increased emphasis on providing pre-study day material and post-session reflection. Giving students an initial overview of a topic is thought to enhance

their learning (Ausubel, 1978); the importance of reflection has been discussed on page 109.

Clinical teaching initially takes the form of observations of treatment processes and, subsequently, carrying out treatment on patients. This provides a context for experiential learning. Formative assessments have been developed to assess these clinical competencies. Direct Observation of Procedural Skills (DOPS) and short clinical examination exercises (Mini CEX) (COPDEND, 2013) are used for formative assessment and feedback, together with clinical reflective e-portfolios, which students use to present their cases to their peers and engage in ensuing group discussion. LSO education would therefore appear to have become increasingly interactive, involve more of the team, integrate learning with assessment and be aiming to empower students to become increasingly self-directing.

The next educational development came in 2007, when, in conjunction with the GDC and NEBDN, LSO developed a pilot education modular programme and subsequent assessment for orthodontic nurses to take dental impressions. LSO qualified orthodontic nurses volunteered to take part in the programme and summative assessment. This pilot was subsequently ratified by the NEBDN and GDC as a post-registration dental nurse education course and qualification. This was the first occasion where LSO had developed a 'complete' educational process, including learning outcomes and associated summative assessments and for it to be accepted as a

national qualification. It was also the first time that other members of the LSO team were engaged in aspects of course development from the outset.

This is potentially a significant development in the evolution of LSO education, as it actively involved team members, who, initially, were learners in the first ONC student cohort, further developing their roles. Also, it was the first occasion where LSO led the development of summative assessments relating to an externally validated qualification. Style of education delivery and content are directly related to end of course assessment. For effective summative assessment, it is important to ensure alignment of assessment with teaching (Biggs & Collis, 1982; Fincham & Shuler, 2001). As a result of developing assessments, LSO could also influence the educational process, giving further opportunity for the team to design teaching and assessment material. The latter may be especially important as it could be perceived by team members as a significant professional status progression.

3.12 Formative and summative assessment

In many dental schools there is confusion about the nature of formative assessment, with mini summative assessments often used (George & Cowan, 1999). The essence of formative assessment is that undertaking it constitutes a learning experience in its own right; summative assessment is a judgement of students' performance that can, in dentistry, be used as evidence that they can perform a task (Stenhouse, 1985). Alignment of assessment and teaching in dentistry is an area for research and

development, with the possibility of sharing of good practice (Sweet *et al.*, 2009). This would seem to support the views of D'Amour and Oandasan (2005) relating to interprofessionality, already discussed on page 38. It is hypothesised that, if appropriately designed, all assessments can and should have a formative element; LSO reflective clinical case e-portfolios have been so constructed. Their use would appear to be underpinned by PBL assessment strategies (O'Neill, 1998; Chaves *et al.*, 1998), experiential learning and reflection and may deepen understanding.

By this stage of LSO development, orthodontic nurses were now becoming increasingly integrated into the education process, including its design, delivery and evaluation; they were moving from a peripheral to a core involvement. This could be perceived as the start of a conducive community of practice, as described by Lave and Wenger (1991) and discussed further on page 127. Their initial involvement centred around teaching and assessment of nurses. Further progression followed, when some orthodontic nurses trained to become Orthodontic Therapists on a new course, developed to GDC regulations, delivered at LSO.

3.13 Diploma in Orthodontic Therapy and GDC registration

In 2008, The University of Warwick Diploma in Orthodontic Therapy course was accepted by the GDC for registration. The programme was the first GDC approved outreach based Diploma in Orthodontic Therapy course, which is still unique, being of a modular structure and based in primary care. It is also

the only Diploma in Orthodontic Therapy course where the awarding institution is a University, as opposed to a Royal College (Cure & Ireland, 2008). This one year course consists of study days at LSO and workplace based training in the students own orthodontic practice, under the supervision of University approved, specialist orthodontist trainers. The course follows GDC learning outcomes (GDC, 2011); its original modular format was guided by the course developers experience with the education of orthodontic nurses and the student's capacity to assimilate and digest new knowledge in a set time-frame (Cure & Ireland, 2008).

Initially, taught material was again developed and delivered by the same two educators. Formal lectures were interspersed with practical demonstrations of clinical procedures, which students then practised on dental typodonts, before carrying out the same procedures on each other in the surgeries (Cure & Ireland, 2008). In subsequent student cohorts, this process is now supported by LSO orthodontic nurses and orthodontic therapists. Little information is available on how early clinical experience and the presence of relatively inexperienced students in a dental clinic impacts on clinical teaching, or how clinical teaching has had to adapt to various cohorts of students with different education experiences and expectations (Sweet *et al.*, 2008b). However, the LSO approach to progressively integrating past students into clinical education finds support, where the involvement of qualified staff, plus other students from each level of the course with the necessary nursing and dental tutor support is recommended (Gilmore, 1973; Bellanti *et al.*, 1973; Lawton, 1976).

Continuing course modification includes the reflective input of LSO team members who are previous students. This is potentially beneficial not only to students and course development but also to those team members involved, who are gaining further experience. Relating to experience, in a survey of dental tutors, Sweet (2008:501) highlighted that:

Experience does not make one competent; competence must always be linked with the capability of explaining why.

By further involvement with education, DCPs at LSO have to explain their roles and clinical responsibilities to others. This is potentially embedding their own knowledge and helping their development. The concept is that students start as novices and work their way up through beginner, competent and proficient practitioner and, finally, to expert level (Dreyfus & Dreyfus, 1986). Defining an expert is not in the remit of this thesis; it is sufficient to suggest that individual professional development is enhanced by teaching others and that this increases understanding and competence. The original educators reflected upon their experiences with previous courses and used this experience in conceptualising and planning the new course, which was innovative in its design (Cure & Ireland, 2008). Potentially these senior educators had undergone a process of experiential learning to this point. This could also be seen as a key development in their own evolution. They recognised the importance of reflection, introducing it into LSO education, initially with MSc students, then the Orthodontic Therapist group.

3.14 Management qualification and administration

Administration and organisation of LSO procedures also involve non-clinical team members. In 2012, LSO was approved by the Institute of Leadership and Management (ILM), as a centre for a Level 3 Management course for dental administrators. This was the first occasion where a structured programme leading to a formal qualification had been delivered to non-clinical students. It provides a qualification to the LSO co-ordinators supporting education. Administrators are LSO and University based; they not only inform students but timetable the LSO team, patients, clinical surgeries and lecture theatre, co-ordinating student placements as assessed by their individual training needs analysis. A series of activities, including pre-clinical skills development, new patient assessment clinics and patient treatment sessions are organised related to student progression. Administrators explain use of the e-portfolio to students and aspects of its development. As such, administrators are also learning facilitators and have an integral role in LSO education. They and all the LSO team appear to have evolved symbiotically as education in LSO has developed. As initially discussed on page 121, this aspect of team member progression could also be seen as underpinning the development of LSO as a conducive community of practice.

3.15 Community of practice and situated learning

Lave and Wenger (1991) originally developed the idea of communities of practice through an analysis of situated learning. The concept of a

community of practice has its roots in attempts to develop accounts of the social nature of human learning inspired by anthropology and social theory (Vygotsky, 1978b; Lave, 1988). It is part of a broader conceptual framework for thinking about learning in its social dimensions. A community of practice can be regarded as a simple social system; a complex social system can be viewed as interrelated communities of practice (Wenger, 2010). Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Lave & Wenger, 1998), are social learning systems and, arise out of learning (Wenger, 2010). Three characteristics are crucial: a domain of knowledge, a notion of community and a practice, which develop in parallel, thus cultivating a community of practice. It is through the process of sharing information and experiences with the group that the members learn from each other and have an opportunity to develop themselves personally and professionally (Lave & Wenger, 1991).

A domain of knowledge generates common ground, inspiring members to participate, guiding their learning and giving meaning to their actions. The community creates the social framework for that learning, fosters interactions and encourages sharing of ideas. The practice is the specific focus around which the community develops, shares and maintains its core of knowledge. Members of a community of practice are practitioners who develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems - in essence a shared practice. This takes time and sustained interaction (Lave & Wenger, 1991).

Another important aspect and function of communities of practice is increasing organisational performance, including: decreasing the learning curve for new employees; responding more rapidly to customer needs and inquiries; and; spawning new ideas for products and services (Lesser & Storck, 2001). Communities of practice can become an integral part of the administration structure (McDermott & Archibald, 2010), thus supporting the full integration of LSO administrators into education processes.

Situated learning was first proposed by Lave and Wenger (1991) as a model of learning in a community of practice. It is learning that takes place in the same context in which it is applied. Learning should not be viewed as the transmission of abstract and decontextualised knowledge from one individual to another but a social process whereby knowledge is co-constructed. Such learning is situated in a specific context and embedded within a particular social and physical environment (Lave & Wenger, 1991).

This type of learning allows an individual student to learn by socialization, visualization and imitation. Situated learning has been linked with PBL in communities of practice. Learning begins with people trying to solve problems; when learning is problem based, people explore real life situations to find answers (Hung, 2002). This could describe events in LSO. In believing that learning is social, learners who navigate to communities with shared interests tend to benefit from the knowledge of those who are more knowledgeable than they are. These social experiences provide people with authentic experiences; when students are in these real-life situations they

are obliged to learn. Taking a PBL approach to designing curriculum carries students to a higher level of thinking (Hung, 2002), thus underpinning the suggestion that PBL in LSO enhances understanding.

Learning can be seen as social participation, with the individual an active participant within social communities, and in the construction of his/her identity through these communities (Wenger *et al.*, 2002). In this context, a community of practice is a group of individuals participating in communal activity and experiencing/continuously creating their shared identity through engaging in and contributing to the community practices. Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger *et al.*, 2002).

In situated learning, knowledge needs to be presented in authentic contexts - settings and situations that would normally involve that knowledge. Social interaction and collaboration are essential components of situated learning - learners become involved in a community of practice which typifies certain beliefs and recognises those behaviours to be acquired. As the novice moves from the periphery of a community to its centre, he or she becomes more active and engaged within the culture and eventually assumes the role of an expert. Developing an identity as a member of a community and developing competence are part of the same process, with the former motivating, shaping, and giving value to the latter, which it incorporates

(Lave, 1991). Although the original theory was not developed in healthcare environments, development of a community of practice may be crucial for teamwork, which has been recognised by the GDC (2013a) as important for high quality patient care.

Researcher observation at LSO would suggest that this evolution occurs but that it is not a straightforward process; other factors need to be in place, which facilitate this progression. This thesis may unearth more evidence but it is hypothesised that LSO's evolution has enabled situated learning to take place and that a conducive community of practice has developed. It is also proposed that, to be an IPE environment, both are required. Certainly, during the educational evolution, many of the team have become increasingly involved in the process and are integral to all aspects of learning in LSO.

3.16 Development of the LSO team as educators relating to theories of learning

The evolution of LSO education has been discussed earlier in this chapter; synonymous with that progression is team development. As clinical team members received further training and qualifications on the respective courses, their scope of clinical practice increased, which progressively changed not only the clinical skill mix within LSO but also the educational opportunities, as the senior orthodontists could devote more time towards course development. As the extended duty team became more experienced, they delivered lectures for ONC students, and demonstrated clinical

procedures to trainee nurses. Subsequently, they have modified taught material, developed new material, including formative and summative assessments and increasingly contributed to the overall ONC course development.

Qualified orthodontic therapists and orthodontic nurses have further progressed to involvement with both the Diploma in Orthodontic Therapy and the MSc courses, by delivering lectures and facilitating group sessions in the lecture theatre, plus demonstrating all aspects of orthodontics in clinics. They have been assessed by University educationalists and some have formal education qualifications. Team members are actively involved in education delivery for all student levels, including observations, giving feedback and formative and summative assessment.

There is little evidence of the personal journeys that experienced practitioners go through to become clinical teachers (Radford *et al.*, 2014). This progression of individuals in LSO could be explained by Vygotsky's social development theory. Vygotsky (1978) believed that properly organised learning results in mental development and sets into motion a variety of developmental processes that would not occur without learning (Vygotsky, 1978b). Vygotsky's theory promotes education contexts in which students play an active role in learning. Roles of the teacher and student are therefore shifted and learning becomes a reciprocal experience for student and

teacher (Vygotsky, 1978a). The concept of learning being a two-way process is thought to be a pre-requisite for a genuine IPE environment.

Teaching and learning activities at LSO are evaluated by both students and tutors. All feedback is analysed and appropriate actions taken. Evaluation by learners is supported in adult learning (Knowles, 1990; Wang, 2012); MSc postgraduate dentists appear to benefit from qualified orthodontic nurses guiding them in both pre-clinical studies and supervised clinical practice, a view upheld in a student survey by Sweet *et al.* (2008a). Qualified orthodontic therapists demonstrate clinical processes and formatively evaluate students; their own evaluation feeds into the continuing reflection process, which underpins change.

Relating to learning theories, the principle of reflection is not only applied to students, but to everyone in LSO. This cyclical process may motivate teachers, who consider and analyse feedback and use it to plan and develop further. This process is underpinned by Kolb's experiential learning theory (Kolb, 1984). Kolb further suggests that, through reflection, experience is translated into concepts. This is supported at LSO, where the team initiate ideas for continuing course development; they hypothesise based on their ongoing interactive experiences. At times, this process can involve negative comments relating to individuals, who have to recognise that as part of overall progress. This can apply to learners too; as such, individual characteristics can therefore influence learning in an IPE environment.

3.17 Learner and tutor characteristics and relationships

LSO students have increasingly varied backgrounds and circumstances. Cultural differences may affect acceptance of IPE. For example, Wang (2012) found that Asian students in authoritarian cultures acceded more readily than students from democratic cultures. By contrast, Western educators suggest that the Western education system leads to more creative thinkers, problem solvers and better scientists, which Wang (2012) feels is true to a certain extent. Sweet *et al.* (2008a), however, found little literature on how students from diverse backgrounds adapt and conform to the specific culture of assumed and expected standards in dentistry. Further evidence relating to culture is beyond the remit of this study but could unearth aspects relating to student attitude to tutors who they perceive to be less qualified than themselves. A possible explanation for this comes from constructivism.

The constructivist paradigm suggests that learning is an active, constructive process and learners do not start with a clean slate. This may be observed at LSO in the adult learner; most have different experiences and motivations for learning. They react in different ways to education – this applies mostly in the MSc group, who are invariably older, have longer professional histories and life experiences. Historically in dentistry, the education process has centred on the dentist alone, as opposed to the team, and consisted of a didactic approach to teaching, from a more senior and clinically more qualified colleague (Sweet *et al.*, 2008b). Acceptance of different styles of education and learning, including the IPE environment, in itself therefore could, as

discussed further on page 140, require an unlearning of predetermined conceptions. Younger, less qualified members of the team may accept the IPE environment more easily. From a constructivist view, they have less past experiences and, therefore, less to unlearn and also have previously received less didactic education than older learners. Positive interactivity between learners and teachers may be critical for learning and development of an IPE environment.

This view is supported by Vygotsky (1978a), who believed that learning becomes a reciprocal experience for students and teacher. Observation in LSO suggests that a deepening of learning may coincide with active participation in educating others. As the educational format progresses from competency based teaching carried out in the clinical skills laboratory, to clinical case based peer discussion, a more reflective element is introduced. This would support Gagne's (1965) view that learning is cumulative and results in different kinds of behaviours. However, it is observed that not all individuals progress at the same rate; some are more enthusiastic, enthused and, as such, their deepening of learning happens more quickly. A positive attitude and enthusiasm is proposed as a pre-requisite for the adult learner; this is underpinned by Burns (1995), as discussed on page 112, relating to adult learner self-direction.

A philosophy of continuing or lifelong learning may be present in the LSO environment: essentially everyone is still a student to some degree. Perry

(1999) suggests a path of cognitive progression for students, where development is enhanced as much by the processes of learning as by the curriculum content. He suggests that tutors often think they have two options, to praise or blame but there is also the option of recognition. This is the acknowledgement of the learners' engagement with the learning process, which creates conditions of respect and encouragement for the students that can help them to integrate new knowledge and improve their practical skills (Perry, 1999). This continuing engagement and recognition of a dual responsibility allows and supports the individual's continuing progression. Such growth and development related to adult learning is also supported by Merriam & Caffarella (1999). It is hypothesised that, teamwork within LSO is built upon mutual respect and recognition, that the continuing learning philosophy of the tutors is symbiotic to all and that this helps and encourages both students and the LSO team to mutual benefit. This thesis aims to discover whether this is indeed the case.

Reflection can be seen as a recurring theme; reflective learning appears to have become embedded in LSO education, which may overcome the limitations raised by Eraut (1994), discussed on page 107, relating to lack of reflection time in clinical situations. Learning is seen to be enhanced by building elements of reflective practice into courses (Schön, 1983; Boud *et al.*, 1985), thus supporting this process. Behaviour change may be significantly influenced by the time spent in LSO and the level of 'immersion' into the LSO IPE environment may be critical to learning. If so, this learning could be due to operant conditioning, or a continuing reinforcement of

reflective practice. It would be interesting to know if any behaviour change would continue once outside the LSO environment.

The importance of teachers as facilitators has already been discussed on page 116. This is particularly relevant in orthodontic education. As a dental specialty, the complexity does not lie solely in the manual dexterity of the operator but in his or her assessment, diagnostic and therapeutic treatment planning skills. Development of understanding within learners is a key outcome. A didactic approach to teaching would not allow evaluation of the capability of learners to problem solve in relation to the unique demands required in patient diagnosis and treatment planning. However, traditional approaches to dental training have been based upon the submissive follower approach; teachers have usually been clinicians of experience and expertise in the field, but with little formal training as educators (Sweet *et al.*, 2008b). Equally, there is no evidence in the literature of IPE in orthodontics; yet, as discussed, teamwork is recognised as being essential for quality patient care (GDC, 2011). LSO has reduced this didactic teaching approach in favour of tutors who are trained as educators facilitating student self-expression and reflective practice; success however may be dependent upon the establishment of a good rapport between learners and facilitators.

Learning has been equated with performance change with eight phases of the learning process identified (Gagne, 1965). Given the appropriate positive environment, the early phases of motivation, apprehending, retention and

generalisation are said to be achievable by students themselves. Later phases, relating capabilities learned at one level to higher levels and performance and feedback, are far more easily achievable with help from a tutor or mentor (King & Kitchener, 1994). Sweet *et al.* (2008a) identified that, at certain stages of learning, dental students prefer help from peers or DCPs. This underpins the use of all the members of the LSO team in supporting roles of tutors and mentors and the positivity which may result from the desire to develop others, which at the same time could be seen as an opportunity for self-progression within the LSO environment.

A key function of higher education is to equip students with the knowledge, skills and attitudes they will need in their future professional roles (Baxter Magolda & King, 2004). Dental tutors are important in facilitating professional behaviour in dental students (Sweet *et al.*, 2009). Providing opportunities to explore different organisational structures and individual approaches to teaching within a clinical environment helps promote good practices and enable positive changes (Olson & Eoyang, 2001). This study may show the importance of the commitment, enthusiasm and knowledge of the LSO team, together with the infrastructure and styles of learning, to student progression, which could subsequently promote change in adult education elsewhere. The team, if empowered, may in turn empower the learner to be self-directing.

Self-directed learning is an effective adult education model. Students however must take the initiative to become self-directed learners (Wang &

Cranton, 2012). There is variation in the level of self-direction students have when they start LSO programmes. Observation and feedback suggest that students employed at LSO full-time may have a greater level of self-direction than those of a similar age and professional experience based elsewhere. This leads to a hypothesis that the degree of immersion in the LSO environment is a factor in the capability for self-direction, which would suggest the LSO environment not only supports self-direction but that it is a pre-requisite to progress at LSO; it then becomes self-perpetuating. LSO aims to be a learning environment throughout, even for those who are not registered students. Teachers do act as facilitators, who may encourage and stimulate learners but at times transmit information. Administrators are also integral to the process and facilitate aspects of education by organisation. Evaluation will determine whether these views are supported.

Deci and Ryan's (1981) Self-Determination theory suggests the importance of the social environment related to function and growth. The environment can either stifle or allow individuals self-determination to be fulfilled (Deci & Ryan, 1985). Some degree of motivation is required to learn and improve (Dunn, 2002). Use of more public reflections to enable students and staff to share their experiences of the learning process is a useful strategy to circumvent barriers to learning (Cowan, 1998), thus supporting a process of feedback and reflection. Tutors within LSO also maintain their own personal development portfolios (PDPs), which enables them to self-reflect and plan. Self-reflection helps widen learning perspectives and supports achievement of personal development goals (Progoff, 1992), including with individual

clinical dental students using reflective journals (Mullins *et al.*, 2001). Study days where cases are presented for peer discussion encourage clinical reflection. Wider reflection also occurs in LSO weekly team meetings. The literature supports this approach; encouraging staff and students to share views on learning and teaching resulted in a greater understanding of how student clinics could be improved (Sweet, 2009).

Adopting a more learner centred approach, rather than teachers focusing on delivery and content, enhances the student experience (Prosser & Trigwell, 1998). Facilitative learning allows learners not to feel threatened and to consider new ideas. LSO may have created an atmosphere which encourages innovation and re-evaluation *ad infinitum*. However, for some this is a new concept, which may require significant change; unlearning may be a necessary process for some adult learners, to enable them to progress.

3.18 The concept of unlearning

Definitions of unlearning include: the discarding of obsolete and misleading knowledge (Hedberg, 1981), the process of reducing or eliminating pre-existing knowledge or habits that would otherwise represent formidable barriers to new learning (Newstrom, 1983) and a process that shows people they should no longer rely on their current beliefs and methods (Starbuck, 1996). These definitions acknowledge the potential for existing knowledge or behaviours to interfere with learning and, therefore, recognise the importance of unlearning within the process of acquiring new knowledge and behaviours

(Becker, 2005). Other views suggest that knowledge is not overwritten but remains (Bouton, 1994; Bouton, 2000), or that individuals choose an alternative behavioural response which is context based (Klein, 1989). This adaptation to a different concept may vary from person to person, which could partly explain why some students accept IPE more easily than others and could be relevant to the longevity of behaviour change. It would appear to contradict behaviourism and the student having a 'clean slate' theory.

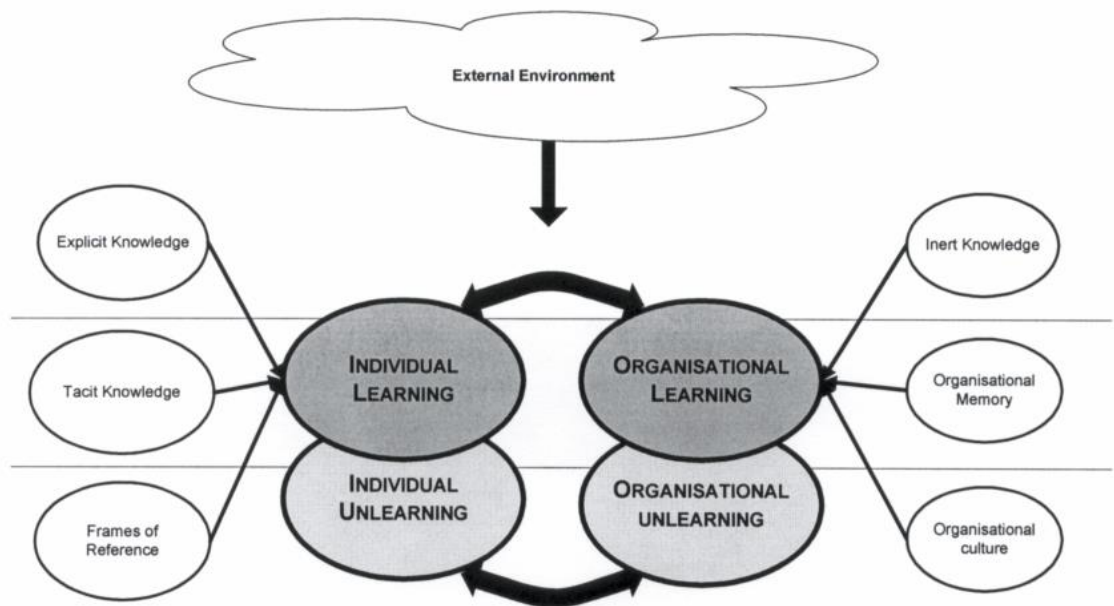
The process of unlearning appears to be a significant barrier for some students and educators. Observation suggests that this applies to some older and more qualified individuals, especially if the teacher is someone who they perceive to be younger and 'less qualified,' which is often the case in LSO and potentially in any IPE environment. Students may not initially recognise the experience, expertise or ability to teach of the educator. Detractors of IPE could be more qualified individuals who refuse the concept of learning from a lesser qualified professional. There is a lack of empirical studies of unlearning (Becker, 2005), with the concept only recently considered in adult learning (Delahaye, 2005). LSO team members are flexible, adaptable and able to handle change. This is seen as a process of unlearning, required in adult learning (LePine *et al.*, 2000). Some learners may have these attributes, yet still refuse to unlearn.

A model of unlearning at both an individual and organisational level (Figure 3), has been developed (Windeknecht & Delahaye, 2004), which suggests

that there are a number of factors considered to be parallel, that impact upon learning and unlearning (Becker, 2005).

Figure 3: A model of individual and organisational unlearning

Figure derived from Windeknecht & Delahaye (2004)



An individual’s experience and prior knowledge is valuable to any learning process (Knowles, 1980). However, it may also be the case that this knowledge can serve to inhibit unlearning, due to the psychological phenomenon known as proactive inhibition, which has been shown to protect knowledge already acquired by disregarding conflicting information; as such, a major issue preventing learning or the transfer of knowledge may be the existence of prior knowledge, not an absence of knowledge (Lyndon, 1989).

All learning theories are valuable in guiding actions in a particular culture, subculture, or even a particular setting. Although scholars have different

interpretations of learning theories, the goal of any learning theory is the same (Wang, 2012) and, as discussed on page 104, should change and evolve, based upon new evidence (Freeth *et al.*, 2005b). A synopsis of how current learning theories may relate to LSO education is now proposed.

3.19 Synopsis of theories of learning relating to LSO education

The overall context of LSO IPE is within an orthodontic clinical environment. Knowles (1990) theory of andragogy states that the learner needs to be able to see applications for new learning. All LSO education is related to clinical practice and geared to the professional role for which the student is preparing. The integration of the clinical environment and the learning processes ensure all is contextualised and bears similarities to traditional apprenticeship training, as described by (Brown *et al.*, 1989). Since the first formal course in 2005, education has become more student centred, with changes in the style of teaching, structure of courses, development of facilities, including a wider range of educational tools and assessments and, importantly, development and involvement of the LSO team. This student centred approach is supported by Schön (1983), who suggests that, to maximise learning, students need to know why and how they learn and that learning can be more effectively achieved by active engagement.

Scholars have never stopped debating which learning theories are superior to others for a certain group of learners (Wang, 2012). Integral to all LSO learning processes is the principal of reflective practice. Dewey's reflective

thinking theory supports this (Dewey, 1933), so the theory behind LSO's use of clinical reflective portfolios in its assessments for all student groups appears to have support from other sources. Reflection as a core LSO philosophy is also demonstrated by regular team appraisals centred on each member self-appraising both past performance and continuing aspirations. This developmental process of learning by returning to thoughts and actions also finds support from Dreyfus and Dreyfus (1986).

Wang (2012) discusses the concept that humans learn in relationship with others. The involvement of the LSO team as facilitators, mentors and assessors is proposed to enhance learning. There must be a change from the traditional views of learning as a solitary and isolated activity that allows for the recognition and acceptance of students becoming directly involved in peer tutoring (Falchikov, 2001), assessment (Falchikov, 2005) and also research (Jenkins *et al.*, 2003). LSO team members choose which aspects of education they wish to deliver. As such, they presumably involve themselves in subjects in which they feel most proficient. This process is supported by the recognition that, at an organisational level, dental tutors need to be appropriately matched to different clinical situations and that, if properly channelled, the range of different skills will enhance students' learning experiences (Sweet *et al.*, 2008b).

Behaviourism as a paradigm assumes that a learner starts with a clean slate; this view would not be supported by observation of adult learners in LSO, who bring a variety of past experience with them. However, the behaviourist

view of Bandura's Social Learning theory finds support at LSO when learners are taught new skills (Competency Based Training). This is seen when nurses with very little previous experience learn new clinical skills. It is less obvious in more mature students with previous experience of certain tasks and would potentially therefore have to unlearn first.

In considering the development of LSO as an IPE environment, the development and progression of individuals but, within the wider team infrastructure, is potentially a key factor. As individuals have become more professionally qualified and experienced, so they have seemingly become more confident to impart their knowledge, initially to LSO team members but progressively with students from outside. The more the educational involvement, so their capacity to reflect may have improved and set in motion a self-perpetuating development process, including influencing its further progression. This process could be explained by the theory that shared experiential learning occurs where shared experience is translated through reflection into concepts, which in turn are used as guides for active experimentation and the choice of new experiences (Cox, 1984).

Team members within LSO now potentially see educational involvement as a personal goal; it may be seen as recognition of their own competence and ability. This could stimulate them to become actively involved in not only carrying out their own team duties but in seeking to help others educationally. As such, the IPE process has evolved. Physical developments such as the clinical skills laboratory and improved audio-visual links have

aided this process but are suggested to be secondary in importance. Different theories may underpin this team involvement in LSO education. Social learning (Bandura, 1977) and situated learning (Lave & Wenger, 1991) are both but two viable explanations of the progression.

The importance of interrelationships has been documented; the creation of an atmosphere of enthusiasm by the LSO educators may be a key factor in learning. There is theoretical support for this hypothesis. Learning is seen not only to be based on activation of past knowledge (Schmidt, 1993) but is also socially and culturally determined (Bruffee, 1995). Bruffee (1995) also recognises the added value of small group working in co-operation and collaboration; Sweet (2009) suggests that learning is about the process of social adaptation - of adopting the accepted patterns of behaviour of a discipline or profession. Successful teaching needs to take place as an open dialogue, in a supportive environment that enables critical constructive feedback to be both given and received (Jarvis *et al.*, 2002). These theories all underpin the LSO environment seemingly created by the educator team.

Part of this evolution may be due to educators becoming progressively more aware of student needs; this may have improved as the LSO team, as previous students, become more influential in the educational process. Empowering individuals in this way potentially encourages them to mind map their way through a process, consider alternatives and to offer full solutions. Thinking through and visualising a process to completion will lead to a better understanding and the ability to communicate this better to students. This

visualisation of sequential steps or a knowledge of the expected range of common errors related to a skill is important in PBL (Mayberry *et al.*, 1993).

LSO education started as an intuitive model, as described by Minter (2011). It is suggested that: LSO has evolved through a community of practice, into an IPE environment, where the student is at the centre of the process. Indeed, this may be a pre-requisite for all IPE. There is seemingly a significant element of PBL and CBL embedded in teaching, with the teachers facilitating this process. Self-direction is required for PBL to be successful. The time spent and level of immersion in LSO may be critical to this progression and to learning. Motivation is not only essential to the learner (Wang, 2012) but also to the teacher. The core philosophy must allow individuals to develop and not be limited by senior figures being protective of their own status, which may be important in LSO education. Wang (2012) suggests learner energy must be released for self-direction; the energy of teachers to be also self-directing must also be released in IPE. If this is not present, then there may not be a true IPE environment. Indeed, IPE potentially could be seen as a paradigm in its own right.

3.20 Initial programme theories

Following analysis of theories of education, it is hypothesised that:

- the team delivery of education 'works' at LSO
- this can be beneficial for all concerned, namely students, educators, the LSO team and patients
- this success is dependent upon a core philosophy within the organisation to facilitate a positive attitude amongst all involved
- this philosophy encourages people and motivates them to succeed
- the concept of lifelong learning may have become embedded in the LSO philosophy and as such potentially influences the team delivery of both education and patient care
- the attitude of educators and learners is critical to maximising the educational opportunities provided
- organisation is also a key factor and relies upon administrators having a good understanding of all LSO processes
- different theories of learning may interrelate, or indeed be a different perception of the same process, and underpin how learning takes place in LSO
- the facilities are also integral to the process
- an IPE environment has to evolve and understanding aspects of the development of LSO education may explain key factors in that progression.

3.21 Summary

The literature suggests the LSO environment is unique in delivering education to the whole orthodontic team in a primary care IPE environment. Adult learning is dictated by developmental tasks and is contextual (Wang, 2012). No one learning theory alone seems to explain the learning process in the context of LSO; indeed several may overlap and give plausible rationales. This thesis aims to explore what aspects of the LSO environment are promoting (or inhibiting) learning, for whom, in what circumstances, why and how. This chapter has discussed theories of learning and how they may be related to LSO education. In the following chapter, the rationale for the research methodology chosen to answer the questions posed by this thesis is discussed.

Chapter 4: Research Methodology

4.1 Introduction

Medical education is a complex, diverse field with effective practice often defined by contextual factors and relies on powerful networks of personal relationships (Bunniss & Kelly, 2010); educational practice also needs to become evidence informed (Davies, 1999; GDC, 2013a). Educational research is an enormous field (Borg & Gall, 1989), where experimental studies of efficacy need supplementing with a range of study designs that will help to unpack the 'how' and 'why' questions and illuminate the many, varied and interdependent mechanisms by which interventions may work, or fail to work, in different contexts (Wong *et al.*, 2012:89). Building theory about the link between education interventions, learner outcomes and service impacts is needed (Rees & Monrouxe, 2010), as it may impact on patient care. Outcomes of health professional education are highly context-dependent: the impact of the same intervention varies considerably depending on who delivers it, to whom, in which circumstances and with which techniques (Pawson & Tilley, 1997; Pawson, 2006). The requirement for applied, contextualised, healthcare professional education research, therefore supports the need for this thesis and its unique contextual focus. Evaluation of practice-based IPE within an orthodontic centre is hugely relevant and timely, as new models of integrated education and healthcare delivery are being sought by governing bodies and the IPE movement has documented the need for integration of theory into practice (Reeves & Hean, 2013).

Ethnography is the study of social interactions, behaviours, and perceptions that occur within groups, teams, organisations, and communities (Reeves *et al.*, 2008a), which is relevant for this evaluation. A methodology is a theory of how an inquiry should proceed; analysing assumptions, principles and procedures; defining what forms a researchable problem, what constitutes legitimate evidence and explanation and how generalisability should be viewed (Freeth *et al.*, 2005b). This chapter describes the process of choosing an appropriate research methodology for the thesis and the factors influencing the decision.

4.2 Background

A growing body of practitioner-researchers have embarked on medical education research and have adopted social sciences methodologies in the realisation that education and research in education are fundamentally humanistic endeavours (Gill & Griffin, 2009). Medical education research should not only aspire to inform theory and policy as well as practice but also contribute to knowledge building conversations (Eva & Lingard, 2008). The purpose of much of what is researched and studied in medical education is less about clearly advising practice and more about understanding processes and theory building (Gill & Griffin, 2009). Research design needs to be appropriate to the research questions posed; qualitative methods are well suited to explorative studies which seek to develop theories or models and studies aimed at better understanding lived experience in complex social situations, or the reasons underlying behaviours (Bullock, 2010).

Evaluation and research exist on a spectrum and have blurred boundaries (Freeth *et al.*, 2005b). In some examples, the two terms have been combined (Rossi & Freeman, 1993:5):

Evaluation research is the systematic application of social research procedures for assessing the conceptualisation, design, implementation and utility of social intervention programmes. In other words, evaluation researchers (evaluators) use social research methods to judge and improve....

Accurate description is an important part of the evaluation process but evaluators must make judgements and recommendations, based on their findings (Freeth *et al.*, 2005b). In an educational context, evaluation is the term used when considering the overall effectiveness of teaching and courses (Preskill & Catsambas, 2006). However, not all evaluations consider effectiveness. For example, a methodology such as realist evaluation is avowedly theory-driven, searching for and refining explanations of programme effectiveness; as such exploring more of the why (Pawson & Manzano-Santaella, 2012). Learning, cognition, knowing and context are irreducibly co-constituted and should not be treated as isolated processes (Barab & Squire, 2004). Education evaluation, therefore, should not simply be an external application but fully integrated into an organisation's work practices, since it engages staff, allowing them to use their critical skills and so aid personal and professional growth within the organisation (Preskill &

Catsambas, 2006). Engaging staff includes seeking and acting upon their opinions. Ethnographic studies typically gather participant observations and interviews; through using these methods ethnographers can immerse themselves in settings and can generate rich understanding of the social action that occurs (Reeves *et al.*, 2008a).

In educational contexts, there is a need to ensure a wide range of qualitative data, including interviews with the stakeholders, collected with the specific purpose of determining how things could be improved (Patton, 1978). Learning analysis may also focus on the context where learning takes place (Merriam & Caffarella, 1999). This would seem to apply to LSO, which is constantly evolving and, such qualitative data collection from a spread of stakeholders involved in LSO education would provide rich data. This raises the question as to the position of the researcher in the evaluation, as this individual is integrally involved in the educational development. As such, this is discussed prior to methodology.

4.3 Role of the researcher

Whatever the chosen methodology, all research is to some degree shaped by the researcher (Gill & Griffin, 2009). Participating in education places researchers in the role of curriculum designers and theorists, who are accountable for the consequences of their research programmes (Messick, 1992). Clear declarations of the researcher's perspectives are therefore needed to enable the reader to interpret the research approach and findings

(Gill & Griffin, 2009). Integrating evaluation into organisational work practices (Preskill & Catsambas, 2006), implies some form of evaluation from within, or participant observation.

Traditional participant observation is usually undertaken over an extended period of time, enabling the researcher to obtain more detailed and accurate information about the population under study (DeWalt *et al.*, 1998). Time in the field adds rich rigour to a qualitative study (Tracy, 2010). A researcher's discipline based interests shape which events he considers are important and relevant to the research inquiry (Emerson *et al.*, 2001). Participant observation is a complex method with many components and the researcher has to decide what kind of participant observer to be (Spradley, 1980). In this thesis the researcher was completely integrated in the population of study beforehand and, as such, an ethnographer. Owing to the relationship the ethnographer shares with research participants, reflexivity (whereby ethnographers describe the relationship they share with the people and world they are studying) occupies a central element of this type of research (Reeves *et al.*, 2008a). Such researchers are insider evaluators who need to recognise their own bias and potential influence on evaluations.

4.3.1 Researcher bias and reflexivity

Reflexivity is an important means toward sincerity across paradigms. Self-reflexivity about subjective values, biases, and inclinations of the researcher

adds trustworthiness to qualitative research (Tracy, 2010). In this study, the researcher owns LSO, employs several stakeholders and, as an insider evaluator, has in-depth knowledge of the organisation and its contextual position in healthcare and dental education. These factors could have led to a particular perspective on process and findings. Sincerity in qualitative research requires transparency relating to challenges and choice of methodology and methods (Tracy, 2010). These choices are important in attempting to minimise researcher bias, enabling theories to be tested and refined predominantly by participants, such that their views increasingly determine knowledge construction throughout the research process. Every effort has been made to integrate this transparency throughout this research, aiming to ensure findings and discussion are as objective as possible. A truly reflexive stance recognises that ultimately it lies with the reader to decide upon the sincerity this thesis achieves.

4.3.2 Insider evaluation relating to choice of paradigm, methodology and methods

The choices about paradigm, methodology and methods influence the evaluation and position of the evaluator (Bullock, 2010). One methodology which involves the researcher in a participatory role is Action Research, which seeks both to inform and influence practice (Reason & Bradbury, 2006). Its' purpose is to bring about change in specific contexts (Parkin, 2009). Practitioners can research their own practice to identify problems, implement practical solutions, monitor and reflect on the process and outcomes of change (Meyer, 2000). This methodology was considered but

rejected as not ideal for answering the 'what works, for whom, in what circumstances, why and how,' questions asked by this thesis and placed the researcher in too integral a position to the process. Action research also assumes some form of change is required which involves a degree of implementation during the research; the emphasis of this thesis is to explore and understand LSO education, prior to implementing any modification.

Pedagogies for IPE have yet to be clearly formulated; by not investigating explicitly the impact of the underlying pedagogy and process, evaluations will find it increasingly difficult to correlate changes in practice to particular interventions (Payler *et al.*, 2008). Evaluating whose interests are being served by programmes, who can access them and who is able to make changes (Merriam & Caffarella, 1999) can all help the dental education team examine their own beliefs, assumptions and biases in relation to teaching and provision of dental care (Sweet *et al.*, 2009). Evidence therefore supports evaluation of practice-based IPE, in a context such as LSO, where research is integrated into organisational working practice and undertaken by an insider evaluator. How this is carried out is influenced by the beliefs of the researcher; as such, a further discussion of research paradigms helps to explain the rationale behind the choice of methodology for this thesis.

4.4 Research paradigms

Research paradigms, or perspectives, describe the social world of evaluation (Rugg, 2009). Paradigms are sets of beliefs and practices, shared by

communities of researchers, which regulate inquiry within disciplines (Weaver & Olson, 2006). The research paradigm is often defined by contextual factors and is, in itself, a grand theory (Reeves *et al.*, 2008a).

In social science, there are two dominant research paradigms which have implications for the way the world is seen: the nature of reality (ontological assumptions) and what counts as knowledge (Henwood & Pidgeon, 1992). The positivist approach assumes that the principal purpose of research is to test theories or hypotheses (deductive reasoning) and is associated with experimental research designs and quantitative methods; by contrast, the interpretivist approach assumes that reality is a social construction, is fluid and open to multiple interpretations and that a central focus of research is theory generation (inductive reasoning), often associated with qualitative methods (Bullock, 2010). Over simplistically, quantitative research analyses data in terms of numbers, whereas qualitative research describes events, persons and processes scientifically, without using numerical data (Hughes, 2006). Qualitative research explores, in as much detail as viable, smaller numbers of examples which are seen as being interesting or illuminating and aims to achieve depth rather than breadth (Blaxter *et al.*, 2006).

These alternative paradigm perspectives allow for a degree of uncertainty within the study design; as such, research approaches with epistemological and ontological assumptions that reflect change and complexity are well suited to inform medical education research (Bunniss & Kelly, 2010). However, the literature shows a variety of theories as to how learning takes

place. Taking too polarised a position of either positivism or interpretivism for an education evaluation may, therefore, limit the unearthing of relevant information from participants (Westhorp *et al.*, 2011). A ‘middle ground’ rationale appears to offer the ideal basis for this evaluation, which allows a qualitative approach to data collection, to explore in depth the mechanisms involved in LSO education, by the generation and testing of theories. Realism is a school of philosophy which sits between positivism and interpretivism, combining some aspects of both but rejecting others (Pawson & Tilley, 1997); as such, it offers a less polarised philosophical standpoint.

4.5 Realism

Realism asserts that both the material and the social worlds are ‘real’ and can have real effects and that it is possible to work towards a closer understanding of what causes change (Westhorp *et al.*, 2011:1). It suggests that social structures have a form of independent existence which influence behaviour and are themselves the product of specific social relationships (Pawson & Tilley, 1997). The world is organised in systems which, in turn, are embedded in larger systems, connected to other levels, which can interact with each other (Westhorp *et al.*, 2011). Realism suggests that understanding of reality can be improved because the ‘real world’ constrains the interpretations that can reasonably be made of it (Wong *et al.*, 2012:91) and that social structures are real but only in their effects, which change with context (Pawson & Tilley, 1997). Contextual evaluation of LSO education is fundamental to this thesis.

Realist concepts have been used in the evaluation of complex social phenomena, such as education (Archer, 1995). Every outcome of a programme is a result of multiple causes and every programme may have many different outcomes (Westhorp *et al.*, 2011). Realism in philosophical discussion takes many forms which differ in detail (Honderich, 2005). However, a realist requires a causal description, which means an attempt to uncover generative mechanisms operating at the level of the real (Connelly, 2007). As such, realism appears to recognise the importance of context to actions, therefore, offering the ideal philosophical base for evaluating LSO education and linking context and mechanisms to outcomes.

To understand the relationship between context and outcome, realism introduces the concept of mechanism. A mechanism may be usefully defined as:

...underlying entities, processes, or [social] structures which operate in particular contexts to generate outcomes of interest (Astbury & Leeuw, 2010:368).

Certain contexts in the social world around us 'trigger' mechanisms to generate outcomes (sometimes abbreviated to CMO). Mechanisms are not visible but must be inferred from the observable data; they are context sensitive (Wong *et al.*, 2012:91). Mechanisms describe what it is about programmes and interventions that bring about any effects, or changes. Realism suggests that it is not programmes that work but the resources they

offer to enable their participants to make them work (Duguid & Pawson, 1998). This process of how participants interpret and act upon the intervention strategies is known as the programme mechanism and is the pivot around which realist research revolves (Westhorp *et al.*, 2011). Dissecting these varying interrelationships is obviously of vital importance to the evaluation of LSO education.

A number of approaches can be taken to unpacking this 'black box' (the ifs and buts in the chain of causation) of an educational intervention (Wong *et al.*, 2012:91). Realism assumes that programmes are 'theories incarnate' so, when a programme is implemented, it is testing a theory about what 'might cause change', even though that theory may not be explicit (Westhorp *et al.*, 2011:1). This thesis wanted to explore the importance of these effects to learning, and what potentially changeable contextual aspects affect learning; as such, the chosen methodology was realist evaluation.

4.6 Realist Evaluation

Realist evaluation is primary research that is firmly grounded in and applies the realist philosophy of science (Wong *et al.*, 2012). It aims to come to a sociological understanding of the balance of resources and choices available to all participants involved in a programme (Pawson & Tilley, 1997) and changes the basic evaluation question from what works or does this work? (Westhorp *et al.*, 2011), to: what works, for whom, in what circumstances, why and how? (Pawson & Tilley, 1997). A realist evaluation of an education

intervention is an iterative explanation building process (Wong *et al.*, 2012). Realist research design produces a clear theory of programme mechanisms, contexts and outcomes and then uses them to design the appropriate empirical measures and comparisons. The common thread is to produce ever more detailed answers to the question of what works, for whom, in what circumstances, why and how? (Pawson & Tilley, 1997).

Realist evaluation often begins with the researcher hypothesising the potential processes through which a programme may work as a prelude to testing them (Westthorp *et al.*, 2011). It aims to make the theories within a programme explicit, by developing clear hypotheses about how and for whom, programmes might work; the implementation of the programme and the evaluation of it, then testing those hypotheses (Pawson & Tilley, 1997). This means collecting data about the specific aspects of programme context that might impact on the programme and about the specific mechanisms that might be creating change (Westthorp *et al.*, 2011).

Realist evaluation allows for a varied approach (Pawson & Tilley, 1997). For example, the context (C) of the social situation is first described in the detail relevant to the research question, including a historical perspective, to allow an understanding of the forces and changes that brought about the existing state of affairs. Then, the mechanisms at work (M) in the given context are investigated, drawing upon large-range theories as well as local work using qualitative methods, designed to build a theory of causation by the detailed description of generative mechanisms (Connelly, 2007). Mechanisms

operate at all levels of reality and the outcomes of any mechanism are usually at a different level from the mechanism itself. Therefore, mechanisms need to be hypothesized and tested (Westthorp *et al.*, 2011). If a mechanism is functioning it is said to fire. Whether mechanisms fire or not depends on the context. Realist evaluation aims to find which mechanisms are present, which ones fire and in what contexts they work (Westthorp *et al.*, 2011).

A mechanism is not intrinsic to the intervention but is a function of the participants and the context and, refers to the ways in which any series of steps brings about change. Mechanisms happen in people's heads and are best articulated at a somewhat abstracted level. The same educational opportunity (context) may provoke different reactions and, therefore, different mechanisms in different learners (Wong *et al.*, 2012). This approach recognises the importance of the historical development of LSO education and the drivers for change which initiated the educational process, as discussed on page 179, which may be of relevance to the development of LSO as an IPE environment and relate to what causes change.

Realist evaluation therefore is essentially about hypothesising, theory testing and refinement. Context-mechanism-outcome pattern configurations (CMOCs) comprise models indicating how programmes activate mechanisms, amongst whom and in what conditions, to bring about alterations in behaviour or events. Realist evaluation develops and tests CMOC conjectures empirically (Pawson & Tilley, 1997). Realist research is distinctive in its understanding of the research relationship between

evaluators and stakeholders, who are key sources for determining programme theory and providing data, have experience of and expertise in, particular phases and process within an intervention, thus providing an extensive spread of data from which to develop these hypotheses (Pawson & Tilley, 1997; Pawson, 2006). As such, the gathering of information from a wide range of stakeholders is a key element in realist evaluation, providing illumination through tacit knowledge, transparency, and credibility through description, triangulation, multivocality and reflections (Tracy, 2010). It overcomes researcher bias, as the process of testing and refining programme theories ensures final theories are based on stakeholder opinion.

Collecting relevant data involves explaining to participants the particular programme theory under test, allowing relevant responses to CMO configurations under scrutiny. Having understood the theory under test, participants can teach the evaluator about programme components in a particularly informed way (Pawson & Tilley, 1997). This stage would appear to apply especially to the focus group stages of the evaluation, as discussed further in chapter 7.

There is no such thing as the perfect inquiry (Pawson & Manzano-Santaella, 2012); however, realist evaluation deepens working hypotheses by consulting those on the receiving end of programmes (Pope & Mays, 2006). Such research design offers several benefits: research results that consider the role of social context and have better potential for influencing educational practice, tangible products and programmes that can be adopted elsewhere;

and research results that are validated through the consequences of their use (Messick, 1992). As such, gathering the views of the varied stakeholders involved in LSO education and the integration of evaluation into routine practice is an approach well recognised within research literature.

4.7 Methods

Evaluation methods are tools, procedures or techniques of data collection (Freeth *et al.*, 2005b). Realist evaluation allows flexibility in methods used to collect data (Wong *et al.*, 2012); this thesis utilised qualitative methods. Qualitative data can be divided into its three main forms - text, images and sounds (Ryan & Bernard, 2000). Face-to face interviewing is appropriate where depth of meaning is important and the research is primarily focused on gaining insight and understanding (Gillman, 2000). This realist evaluation was carried out in three phases (Table 6). In phase one: semi-structured interviews were conducted with key participants (Table 7) to elicit the programme theory. Initial hypotheses were drawn from the literature and informed the semi-structured interview questions, as discussed further on page 179. Subsequent hypotheses were formulated from data collected from participants, during interview by a research assistant; thus, from the outset aiming to minimise the effects of the insider evaluator. At phase two: these theories were tested using focus group interviews. In the final phase the programme theories were refined using further focus group interviews and through analyses and interpretation of the data.

Table 6: Outline of stages of research

<p>Realist Evaluation Phase 1: Identifying the programme theories</p>	<p>Researcher hypothesises potential theories → Formulation of semi-structured interview questions → Data collection by individual interviews → Transcription and indexation → Data analysis → Coding framework developed → Identification of themes → Linking of themes → Develop preliminary framework → Apply to other transcripts → Iterative development of new categories of codes, themes and sub-themes, until → Saturation → Search for similarities/differences → Regroup into higher order themes, sub-themes and linkages → Emergent patterns → Synthesis of themes, sub-themes and linkages → Developing initial programme theories supported by data in the form of CMO configurations →</p>
<p>Realist Evaluation Phase 2: Testing the programme theories</p>	<p>Formulation of focus group questions → Data collection by focus groups → Transcription and indexation → Data analysis → Modified programme theories supported by data in the form of CMO pattern configurations →</p>
<p>Realist Evaluation Phase 3: Refining the programme theories</p>	<p>Formulation of focus group questions → Data collection by focus group → Transcription and indexation → Data analysis → Refined programme theories supported by data in the form of CMO pattern configurations → Recommendations for IPE</p>

4.8 Data collection tools

Interviewing is an ideal method to collect data on participants' experiences.

Semi-structured interviews allow use of a written topic guide to ensure that all question areas are covered, while allowing the participants to talk freely;

ensuring what participants view as most important is captured (Polit *et al.*, 2001). Interview findings provide a rich description of the lived experience (Bearn *et al.*, 2002); they are well suited to exploring the opinions of respondents regarding complex issues and, enabling probing for more information and clarification of answers (Barriball & While, 1994). Interviews and focus groups build an understanding, from the bottom up, including the reasons for people's attitudes and behaviours (Williams *et al.*, 2004) and give insight into students' experiences (Bearn & Chadwick, 2010).

Face-to-face, in-depth qualitative interviews or focus groups are used for pursuing the why questions (Douglas, 2002). Semi-structured interviews allow more flexibility than structured questionnaire interviews but remain focused on the research objectives (May, 1991). Focus groups are a form of group interview that capitalise on communication between research participants and explicitly use group interaction in order to generate data (Kitzinger, 1994). The use of focus groups is similar to other qualitative techniques (Barbour, 2005); they are a rich source of information (McLafferty, 2004) and an effective technique for exploring the attitudes and needs of staff (Denning & Verschelden, 1993). They are particularly applicable to nurse education, including students' perceptions of their educational experiences (Kevern & Webb, 2001). By analysis of consensus, dissent and examining narrative, the researcher can identify shared and common knowledge (Hughes & Dumont, 1993). Group discussions often generate more critical comments than, for example, interviews (Watts & Ebbutt, 1987).

Ethical concerns in focus groups are similar to all qualitative research (Punch, 1986), demanding the same attention to detail as other means of data collection (Morgan & Krueger, 1993). Focus group participants are often chosen based on a pre-existing group of people who know each other and have worked together on a project (Webb & Kevern, 2001) and by occupational group, because knowing one another facilitates the group discussion and prevents intimidation by professional hierarchies (Kitzinger, 1994). Researchers themselves may act as facilitators by clarifying and exploring issues (May, 1991); in this thesis, a research associate carried out this task. Interviews were audio-taped (Allan *et al.*, 2005) and transcribed by a clerical assistant (Kitzinger, 1995); the transcribed data were subsequently analysed using manual thematic methods (Boyle & McEvoy, 1998). Use of a research associate limited researcher bias and minimised opportunities for provoked responses (Babbie, 2007). Using an evidence-based data collection approach, minimising the potential influence of the researcher, increased trustworthiness, validity and reliability of the study.

4.9 Validity and reliability

In qualitative research, 'the researcher is the instrument' (Patton, 2002:14). Historically, maintaining validity has been seen as a major challenge when a project is based upon semi-structured interviews (Brink, 1989). Although reliability and validity are treated separately in quantitative studies, these terms are not viewed separately in qualitative research (Golafshani, 2003). Instead, terminology encompassing both, such as credibility, transferability, quality,

rigour and trustworthiness is used (Davies & Dodd, 2002; Golafshani, 2003). The credibility of qualitative research depends on the ability and effort of the researcher (Golafshani, 2003), by concrete detail, triangulation or crystallisation (Tracy, 2010) and by allowing interviewees to comment upon interpretations drawn from interview analysis (Newton, 2010). In this regard, reliability is a consequence of the validity in a study (Patton, 2002). Sustaining the trustworthiness of a quantitative research report depends on the issues discussed such as validity and reliability (Lincoln & Guba, 1985). In qualitative research, the idea of discovering truth through measures of reliability and validity is replaced by the idea of trustworthiness (Mishler, 2000), which is 'defensible' (Johnson, 1997:282), thus establishing confidence in the findings (Lincoln & Guba, 1985) and credibility (Tracy, 2010). For trustworthiness, the number of participants in a qualitative study must reach a point of sufficiency, which is obtained when a representative number of participants who have experienced a phenomenon are selected (Smith, 2003).

Sample sizes are typically smaller in qualitative research because, as the study progresses, acquiring more data does not necessarily lead to more information; indeed too large a sample size does not permit the deep, naturalistic, and inductive analysis that defines qualitative inquiry (Huberman & Miles, 1998). In quantitative research, any exception may lead to a disconfirmation of the hypothesis, whereas exceptions in qualitative research help modify the theories and are fruitful (Barbour, 1998). Ethnographers commonly triangulate interview and observation methods to enhance the

quality of their work; this technique is important as what people say about their behaviour can contrast with their actions (Reeves *et al.*, 2008a).

From a critical realist position, it is possible to recognise the collaborative qualities of research data, in revealing knowledge beyond itself of the social world where the interview occurred (Banfield, 2004). Validity and reliability in the realism paradigm, which relies on multiple perceptions about a single experience, is achieved by evaluation of several data sources and interpretations of multiple observations (Healy & Perry, 2000). Methods chosen in triangulation to test validity and reliability of a study depend on the research criteria and conceptualized as trustworthiness (Golafshani, 2003). Triangulation is therefore seen as:

a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study (Creswell & Miller, 2000:126).

Reliability and sincerity are established through researcher transparency and by allowing interviewees to comment on interpretations drawn from interview analysis. Personal relationships developed through sharing increase trust and mutual respect, which legitimise the research argument in the public sphere (Newton, 2010; Tracy, 2010). The stakeholder population group span the full spectrum of LSO stakeholders, selected by purposive sampling (Glaser & Strauss, 1967; Patton, 1990), as discussed on page 186, recruited

by invitation letter (page 173) with data collection in the natural setting of LSO, or by audio conference where participants could not attend LSO.

4.10 Data analysis

In realist evaluation, data analysis is related to outcome patterns and aims to see which can and cannot be explained by initial theory (Pawson & Tilley, 1997); in IPE and IPP, objective measures of higher level outcomes are necessary to ensure comprehensive evaluation (Gillan *et al.*, 2011). This study uses manual methods of analysis, allowing in-depth immersion in the data. A theme is used to describe elements identified from text and is typically the approach meant when identifying themes in the data as a method of analysis (Bazeley, 2009). Burnard's thematic approach to analysing qualitative data from interviews (Burnard, 1991), a process of encoding qualitative information (Boyatzis, 1998), is recommended for use in IPE by Freeth *et al* (2005); this parallels the thematic analysis in realist evaluation and, facilitated the development of themes in this study (Appendix 5). Identification of themes in qualitative research is a starting point in a report of findings. Effective reporting requires using data and ideas generated from the data, to build arguments that establish the points the researcher wishes to make. Themes only attain full significance when linked to form a coordinated picture or an explanatory model (Bazeley, 2009).

The pursuit of rigour in realist evaluation relies upon achieving immersion, collecting data meticulously and analysing systematically, developing themes

from the data, thinking instinctively about findings, developing theory iteratively as emerging data are analysed, seeking disconfirming instances and different explanations. Data may suggest that a particular resource is vital and that a specific way of interpreting it is the key to success. Initial hypotheses may infer the type of individual who is better placed to succeed and specific contexts where this is most likely to happen (Pawson & Tilley, 1997). By thorough reading and rereading of carefully transcribed interview documents, data analysis rigour is achievable (Burnard, 1991).

A coding framework was initially developed using data from the interview transcripts from the programme architects. The researcher read and re-read each transcript thoroughly and assigned codes to each section of the text. Codes of the programme architect's transcripts were considered together and similar codes grouped under higher order categories and themes which were integrated into a cohesive and purposeful analysis (Bazeley, 2009). This process went through several iterations and revisions resulting in the development of a preliminary framework, which was then systematically applied to the remaining participant transcripts, adding new categories emerging from the data as needed and continued until theoretical saturation was achieved, that is, when no new themes or issues arose regarding a category of data and when the categories were well established and validated (Cheyne *et al.*, 2013). This linking process is critical to understanding of data relevance (Bazeley, 2009). Finally, the coding framework was refined by searching for similarities and differences among themes and re-grouping into higher order themes. These data were then

summarized and synthesized to generate further hypotheses about what mechanisms could or would be generated by the programme components, in what circumstances, to achieve what outcomes. The process was supported by reading and reflecting on the data. Through this iterative process, hypotheses about CMO configurations were generated (Cheyne *et al.*, 2013).

Data analysis articulates the preliminary theories into context-mechanism-outcome pattern configurations (CMOCs). Discussions of programme successes and failures can lead to hypotheses about what works, for whom and in what circumstances and respects. What is involved is using the imagination to think through how a programme works (Pawson & Tilley, 1997). Context-mechanism-outcome pattern configurations are reassessed based upon data analysis from the first round of data collection. This leads to hypotheses concerning education at LSO and allows tailoring of further data collection to help confirm, refute or refine emerging programme theories; comparisons between and within groups can act as powerful tools with which to raise questions about CMO relationships (Pawson & Tilley, 1997).

In order to help organise the data from the interviews and focus groups, NVivo software was used. NVivo is a software package designed to assist in the analysis of qualitative data, enabling a researcher to analyse research items such as transcripts of interviews, focus groups and other literature (NVivo, 2012). Interview transcripts were imported into NVivo and placed in designated source files. It can be used by researchers to make observations

in the software and build a body of evidence to support their project (Dearne, 2008). In this study, Nvivo was used to simplify the data coding process only. Data from all stakeholders were analysed manually by the researcher, hypotheses generated and discussed with supervisors. The findings are reported in a narrative form and are derived from an understanding of the data within their own context.

4.11 Ethical considerations

4.11.1 Approval

This study received formal approval from the University of Warwick Biomedical and Scientific Research Ethics Sub-Committee (Appendix 6).

4.11.2 Consent

Potential participants in the study were approached by means of an invitation letter outlining the research project. For those who expressed an interest in participating, there was an introductory session to outline the roles of the researcher, research associate and participants. It was explained that this research study was part of a PhD thesis and that the research associate would collect the data so that the views would be de-identified from the researcher; as such, all views would be anonymised as much as possible. Due to the nature of the professional groups, it may be possible that the researcher could identify a participant from the data.

All potential participants had the purpose and nature of the research explained to them, verbally and in a written document (Appendix 7). They understood what the research involved, its potential benefits, risks and burdens, that they could choose whether to partake freely, had the capacity to understand any decisions they made and were assured that their views and opinions would be confidential and be, as far as possible, anonymous. All prospective participants were fully familiar with the need for appropriate consent as part of their professional obligations; as DCPs, the majority of participants fully understood the principles of informed consent, as this is fundamental to all patient care. They had this specific process explained to them in relation to the study prior to agreeing to participate. Participants were given time to consider whether or not to take part and to ask any questions before signing the consent form (Appendix 8).

Participants were asked to give their opinions freely to questions asked by the research associate, who independently collected the data. Participants were invited to be involved of their own free will and allowed to withdraw at any time from the process. Data collection took place at LSO. Participants were informed that their participation or non-participation would have no detrimental influence on the assessment of their personal abilities or their employment or student status. The design of the study had been discussed with potential participants.

If a participant, who had given informed consent, were to lose the capacity to consent during the study, the participant would be withdrawn from the study.

No further data would be collected and the participant would exit the study. Participants were informed that, having accepted the invitation, should they decide that they no longer wished to continue, they could leave the study at any time but that data already collected would remain part of the study.

4.11.3 Risks, burdens and benefits

There was no anticipated risk in terms of pain, discomfort or distress to participants, who were involved in the research during their normal working time. Timetabling ensured no adverse effects to the participants or the running of LSO. All responses were anonymised as far as possible. The relationship between the researcher and the participants could have been perceived as a potential risk. The researcher was an employer, supervisor and co-educator for many of the participants. The employer-employee relationship in many organisations is not only perceived as a risk but, due to the philosophy of the organisation, would be a risk. Part of the research was to investigate the philosophy of LSO as to whether this is a factor in learning. All participants recognised that their role was not under threat as the methods used for data collection were a core part of LSO structure. Using a research associate for data collection anonymised the opinions of the participants as much as possible. Also as a GDC registrant, the researcher has to comply with very strict regulations related to equality and diversity; as such, it would be seriously professionally damaging should the researcher in any way compromise or penalise any participant in this study. The potential personal benefit to participants was an improvement in their educational environment.

Participants were asked their opinions with regard to education and what factors they felt may influence learning at LSO. There were no material risks or burdens to any participants; the possible benefits would be to improve aspects of education to improve learning. Those potential participants with whom the study had been provisionally discussed saw the research as an opportunity to influence the environment for their own and others benefit. Consultation with those potentially involved provided enthusiastic support for the study.

4.11.4 Confidentiality

No identifiable data not already in the educational environment domain was used. All participants were either registered care professionals and or administrators who had Criminal Records Bureau (CRB) accreditation as a pre-requisite to working in healthcare. At all times the research understood and complied with the law. All data were confined to collecting opinions on factors which may affect learning.

Participants had the process explained by means of a short presentation and associated documentation (Appendix 7). Participants were asked their opinions in relation to education. Data collection was by interviews and focus groups and undertaken by a research associate. Participants were coded for anonymity. Despite this, anonymity could not be guaranteed and this was explained to participants as part of the consent process and documented in the ethical approval. A sound recorder was used to record interviews and

focus groups, which were transcribed by an independent third party transcriber, who sent the word documents to the researcher for analysis. There were different participant groups but individual participants, due to the nature of their answers, could potentially be identified by role.

All data storage was on password protected computers. Hard copy documentation was stored in locked cabinets with access only for the researcher and research associate. All data were de-identified and stored in accordance with the Data Protection Acts 1998 and 2003 to maximise anonymity and confidentiality and will be stored for a period of 10 years in line with the University of Warwick protocols. The data are reported in the researcher's PhD thesis and will be in other publications but de-identified. Only the research associate had access to participants' personal data during the thesis, consent having previously been given by the participants.

4.12 Summary

This chapter outlines the rationale behind the chosen research methodology, the ethical approval application process and the procedures relating to participant involvement. The research questions sought to explore in depth the LSO education intervention; as such, a qualitative approach was preferred. The internal position of the researcher within LSO required a methodology which recognised his participatory nature within the evaluation. Action research, where both researcher and practitioners are involved in the research process, was considered but rejected, in part because of the

greater pro-activity and potential influence of the researcher on the evaluation. The realist philosophy and the questions asked by realist evaluation, sat comfortably with the researcher's philosophy, the aims of the thesis and informed the research questions posed relating to LSO education, namely: what works, for whom, in what circumstances, why and how?

Realist evaluation initially seeks to identify the programme theories, that is, how the programme is expected to work (Cheyne *et al.*, 2013). In the next chapter, the data collection in phase 1 of the evaluation is described, including the context of LSO from a historical perspective, to allow an understanding of the initial drivers for the programme and how they helped formulate the programme theories.

Chapter 5: Phase 1: Identifying the programme theory – data collection

5.1 Introduction

In realist terms, programmes are sophisticated social interactions set amidst a complex social reality (Pawson & Tilley, 1997). As discussed on page 162, realist evaluation develops particular kinds of programme theories, structured as Context-Mechanism-Outcome Configurations (CMOCs), which are progressively tested for the purpose of refining them. Programmes are shaped by a vision of change; interviews with programme architects can help articulate the programme theory in CMOC terms. This stage is the launching pad for realist evaluation and is, in many ways, its most distinctive phase, as the researcher thinks through how a programme works, in order to initiate the theorising process (Pawson & Tilley, 1997; Pawson & Tilley, 2009).

Potential programme theories were initially hypothesised, based upon evidence from the literature relating to theories of learning, the historical context of the educational setting and the original drivers for change. This, together with the realist framework, helped formulate the semi-structured interview questions, which were then used with the programme architects and other key stakeholders, to identify the initial programme theories. This chapter discusses this process plus other aspects of data collection, including the selection and training of the research associate interviewer, choice of and engagement with participants and data collection.

5.2 Selection of the research associate

The semi-structured interview is a managed verbal exchange (Ritchie & Lewis, 2003). Its effectiveness depends on the communication skills of the interviewer, which include the ability to listen attentively (Clough & Nutbrown, 2007), pause, probe or prompt appropriately (Ritchie & Lewis, 2003) and encourage the interviewee to talk freely (Clough & Nutbrown, 2007). Interpersonal skills, such as the ability to establish rapport and trust with participants are also important (Opie, 2004). Such motivation is vital, as a non-enthusiastic participant is less likely to think through the reply to questions and, therefore, provides less reliable data. Using an appropriately qualified and trained research associate to interview participants also minimised the risk of researcher bias. The interviewer role and expertise is critical to the success of data collection using semi-structured interviews (Moser & Kalton, 1986). Validity of data collection is significantly affected by the ability of the interviewer to interpret the meaning of answers given and to clarify with participants where required. In this thesis, the research associate was a dentally qualified, experienced educator. Training of the research associate for this role is important (and is discussed on page 183), as is question content.

5.3 Developing the semi-structured interview questions

In semi-structured interviews, validity and reliability depend, not upon the repeated use of the same words in each question but upon conveying

equivalence of meaning (Denzin, 1989), which helps standardisation and comparability (Barriball & While, 1994). The ability to structure questions clearly is critical (Cohen *et al.*, 2007) so that any differences in answers are due to differences among respondents rather than in the questions asked (Gordon, 1975). Every word may not have the same meaning to every participant and each participant may use different vocabulary, so the opportunities to change the words but not the meaning of questions in a semi-structured interview is significant (Treece & Treece, 1986).

To ensure that data are reliable, freedom to probe all unclear or ambiguous words is essential (Treece & Treece, 1986; Ritchie & Lewis, 2003). The semi-structured interview technique provides the flexibility to validate the meaning of respondents' answers (Barriball & While, 1994). It allows probing, or defining discussion, thus ensuring data reliability (Hutchinson & Skodol-Wilson, 1992). Probing provides opportunities to explore sensitive issues (Nay-Brock, 1984; Treece & Treece, 1986); can elicit valuable and complete information (Gordon, 1975; Austin, 1981; Bailey, 1987); enables exploration and clarification of respondents' accounts and help them recall information (Smith, 1992; Ritchie & Lewis, 2003). It maximises interaction between the participant and interviewer, establishing rapport and reducing the risk of socially desirable answers (Patton, 1990; Ritchie & Lewis, 2003). Breaking down interviewer-participant barriers and reducing tensions encourages participants to keep talking (Oppenheim, 1992), which is critical to data collection. Thus the expertise and subject knowledge of the interviewer is synonymous with the development of the interview questions, as the ability to

probe is critical to obtaining sufficient valid data from semi-structured interviews, underpinning the use of a dentally qualified educator as interviewer in this thesis.

A faulty design in any research tool will distort the final results (Denzin, 1989). As such, the interview structure has to be both exploratory, in order to elicit abstract concepts such as perceptions, as well as sufficiently standardized to facilitate comparability between respondents during analysis (Barriball & While, 1994). The research questions for this thesis, as documented on page 23, were:

In relation to LSO education:

- What works?
- For whom?
- In what circumstances?
- Why?
- How?

Realist evaluation research methodology guided the development of the semi-structured interview questions, which were based upon the context of LSO education and included in the interviewer guide (Appendix 9). Development of the guidance notes for each question were informed by the literature and by the nature of realist evaluation, where the researcher's

theory is the subject matter of the interview and the stakeholder participants are there to confirm, falsify and most of all to refine that theory (Pawson & Tilley, 1997; Pawson & Tilley, 2009). Throughout the thesis, emphasis was placed upon collecting depth of data from a smaller number of participants, in order to develop emerging themes within a realist evaluation methodology.

Semi-structured interview questions were therefore, designed so that themes could be developed from the data and, once formulated, part of the ethical approval process discussed on page 173 and, required piloting prior to use with participants. Piloting of the semi-structured interview process is discussed on page 184 and formed part of the research associate training.

5.4 Research associate interviewer training

The rationale behind the use of semi-structured interviews for the first phase of data collection has been discussed on page 164. The success of this method relies upon the skills of the interviewer in making a number of difficult field decisions. Adjusting each interview in order to obtain accurate and complete data, yet maintaining sufficient standardization to secure validity and reliability of data is a major challenge and depends upon thorough training (Moser & Kalton, 1986). This training includes establishing competent use and understanding of the specific interview schedule being used and developing awareness of the errors or bias which can arise with the personal interview technique (Barriball & While, 1994). Interviewers need knowledge of the subject domain being explored to avoid important data

being missed (Moser & Kalton, 1986). Having an interviewer with a dental and educational background ensured that participants could have questions explained and clarifying questions asked where necessary.

5.5 Piloting of the semi-structured interview questions

Internal testing, or piloting with colleagues allows ambiguities, leading questions and criticisms to be discussed and corrected. The final pilot draft was exposed to the rigours of the field under similar conditions to the main evaluation, to assess whether participants could answer the questions asked and the performance of the interviewer in real situations (Barriball & While, 1994). Piloting involved the research associate firstly interviewing non-participants and, subsequently interviewing the researcher, to determine if changes were required and to familiarise the research associate with the overall process, including use of the audio recorder. This ensured the process was valid and reliable for use with participants. No changes to the questions were required; the piloting was felt to be valuable familiarisation for the research associate. It also reinforced the value of probing, thus underpinning the choice of method for this stage of the evaluation.

Piloting not only benefits the interviewer but helps ensure the participant role is as simple as possible (Barriball & While, 1994). Participants should be considered in any interview schedule, since they are doing the majority of the work by supplying answers to the questions (Mann, 1985). Researchers may

fail to assess whether a question is ambiguous or too complex, or whether the question sequence is likely to correspond logically with participants' experiences. Piloting enables informed changes and adjustments to the interview schedule to be made before main data collection. Analysis of pilot data establishes the efficiency of the interview schedule and helps inform how data will respond to analysis (Barriball & While, 1994). Piloting also provides valuable preparation and was part of the further training process for the research associate interviewer.

5.6 Participants

Individual participants and the circumstances surrounding each research project also impact upon validity and reliability (Barriball & While, 1994). Individuals may be motivated to participate in research projects for a number of reasons (Morse, 1989). Altruism on the part of the participant towards the interviewer, or intellectual and emotional satisfaction may influence the decision to participate (Nay-Brock, 1984). If the research topic is not important to the participant, the motivation to give accurate answers may be low (Gordon, 1975; Moser & Kalton, 1986). The most important determinant of response quality may be participant motivation (Oppenheim, 1992).

Interviewer friendliness and manner towards respondents can help enormously with securing data validity and reliability (Barriball & While, 1994); the quality of information obtained during an interview is largely dependent on the interviewer (Patton, 1990). Reliable participants are

comfortable in interactions with the interviewer; are generally open and truthful; provide solid answers with good detail; stay on the topic; are thoughtful and willing to reflect on what they say (Dobbert, 1982). Therefore, the capability to obtain a good rapport between participants and the interviewer (Opie, 2004), as discussed on page 180, needs to be considered before confirming use of semi-structured interviews for data collection.

As documented on page 179, individuals invited to participate in this evaluation were from the whole range of stakeholder groups and been involved in education at LSO for varying lengths of time in different capacities, as opinions from a full cross-section of stakeholders were required. The various groups (Table 7) reflect their particular roles relating to the educational process at the time of the evaluation. These include programme architects, educators, students from the different courses and administrators. For the student groups, purposive sampling has been used for selection purposes. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable answering of the research questions (Babbie, 2007). The sample size is based upon the numbers of available participants from the various groups, the practicality of carrying out the evaluation and achieving saturation.

Stakeholders were invited to participate through a personal letter explaining who the researcher and research associate were and the purpose of the research project. The two course architects were first interviewed and

constituted the first participant group. The second group consisted of administrators, two of whom were based at the University of Warwick but actively involved in LSO education, the others based at LSO; the third group were educators, including previous students and others external to LSO; and the fourth group consisted of students from the various courses. As such, this provided a broad spectrum of opinions related to the LSO educational intervention. Each participant fully consented to involvement in the evaluation prior to engagement (page 174).

Table 7: Table of stakeholders interviewed

Group	Professional Role	Why Interviewed
Course Architects	Specialist orthodontists (2)	Initiated education at LSO and developed all original courses. Unique views of processes from outset of value
Administrators	Within LSO (5) External to LSO (2)	Views of administrative factors both within the University and LSO. Unique stakeholder perspective.
Educators within LSO	MSc qualified (1) OT qualified (3) ONC qualified (5)	Perspective from educators of different qualification levels who have evolved through LSO education themselves.
Educators external to LSO	Specialist orthodontists (2)	Perspective from dental educators external to LSO.
Students	MSc in Orthodontics (5) Orthodontic Therapists (5) Orthodontic nurses (5)	Views of all professional levels of students, some based full-time at LSO, some part-time at LSO, both observing the IPE experience and working clinically for sessions at LSO over the duration of their clinical cases. Others receiving pre-clinical education, observing clinical IPE process at LSO but carrying out their clinical cases elsewhere.

5.7 Data collection

In order to ensure identical replication of the contents, interviews were audio taped, which facilitated analysis (May, 1989). Audio taping provides a detailed insight into the performance of both participant and interviewer, helps validate the accuracy and completeness of the information collected by reducing the potential for error (Barriball & While, 1994) and allows analysis to identify any use of persuasiveness by the interviewer (Gordon, 1975).

Interviews were carried out at LSO, except where participants were based elsewhere, where, in order to enable their participation, interviews were carried out by web conference, which were audio recorded. All were arranged during normal working hours. Participants were asked not to share their views with colleagues post interviews. Digital audio recordings were subsequently transcribed *verbatim* into word documents by an independent transcriber, indexed and coded to minimise the potential for recognition by the researcher during data analysis. Despite this, as previously discussed on page 176, anonymity could not be guaranteed, which was explained to participants as part of the consent process and documented in the ethical approval process.

5.8 Summary

This chapter describes the development and background to data collection. It highlights the importance of matching methods not only to research

questions and methodology but also to available resources. In this thesis, the capabilities and expertise of the research associate were critical to the chosen methods of data collection and the trustworthiness of the findings is significantly related to the skill of the interviewer in understanding the subject matter, interpreting answers from participants and being able to probe further when required. Data analysis is reliant upon the quality of data collected. Use of semi-structured interviews has been shown as a suitable method but reliant on the availability of an interviewer with appropriate expertise.

Realist evaluation normally begins by eliciting and formalising the programme theories to be tested. There can be various sources of these including programme architects, practitioners, previous evaluation studies and social science literature. Interviews with programme architects can help articulate the programme theory in CMOC terms; interviews with practitioners are especially important as discussions of apparent programme successes and failures can lead to fine-grained hypotheses about what works for whom and in what circumstances and respects (Pawson & Tilley, 1997; Pawson, 2002). This evaluation started by the researcher hypothesising potential theories, which helped formulate the semi-structured interview questions for participants. In the next chapter, the findings from the first phase data analysis are described, in order to identify the programme theories.

Chapter 6: Phase 1: Identifying the programme theory – data analysis and findings

6.1 Introduction

Realist evaluation has the potential for analysis that systematically tracks outcomes, the mechanisms that produce the outcomes, the contexts in which these mechanisms are triggered, and the content of the interventions (Kazi, 2003). Such evaluation not only addresses the effects but also the inner workings and operations of the components of a programme and how they are connected (Scriven, 1994). As a starting point, the evaluation questions are realist in nature, with an ongoing process of categorising during data analysis (Westthorp *et al.*, 2011). This thesis collected and analysed the opinions of stakeholders involved in LSO education, initially aiming to find themes emerging from the data, subsequently identify programme mechanisms and hypothesise in which contexts they may generate particular outcomes.

Data analysis has been described on page 170, allowing classification and organization of data in terms of key themes, concepts and emergent patterns (Richie & Spencer, 1994). Contextualisation and making connections between themes, enabled building of a coherent argument supported by the data (Bazeley, 2009). Immersion in the data was achieved by reading and re-reading the interview transcripts and categorising the themes within. Categories were grouped under higher-order themes, transcripts subject to

further re-reading alongside the list of themes and sub-themes and coded. These coded sections of transcripts were thematically grouped together and used to support the writing of this chapter, which discusses the themes, sub-themes and how they informed the identification of initial programme theories in the form of CMO configurations.

6.2 Findings

Twenty seven participant interviews were analysed (Table 8). Interviews were concluded when it was clear that saturation had been achieved.

Table 8: List of interviews by participant group

Participant group	Number of invited participants	Number participated	Length of interviews (minutes)	Length of transcripts (pages)
Programme architects	2	2	147	30
Educators (external)	3	3	121	37
Educators (internal)	6	6	334	107
Students	12	10	416	134
Administrators (external)	2	2	98	41
Administrators (internal)	4	4	218	64
Total	29	27	1334	413

All participants were initially asked what they felt about LSO education, and the analysis of these data is initially described, supported by quotes from the interviews. LSO education was perceived positively by participants:

'I found the education absolutely fantastic. The setting; number of people in the group; the varied expertise and enthusiasm of tutors; it helped me. Had I been doing the same thing elsewhere I don't think I would have done as well as I did.' P16

'There is a learning atmosphere throughout LSO. Patients are also learning. It is unusual for the whole team to be involved and it's very positive. It develops the team and drives the teamwork philosophy which is at the forefront of everything.' P5

'It has evolved, become more interactive and organised and the opportunities available for the team and students are great.' P10

The importance of the setting, the expertise, range and attitude of tutors, the student group, style of learning and good organisation was identified. Participants suggested there is a learning atmosphere and teamwork culture within LSO which creates opportunities, contributes to professional development and that the education process is continually evolving. The iterative process of data analysis led to the development of initial themes; subsequent re-immersion in the data and continued analysis led to their further refinement and categorisation. These emergent themes, sub-themes and linkages subsequently led to the formulation of programme theories in the form of CMO configurations.

6.3 Themes and sub-themes

The main themes and sub-themes emerging from the data were as documented in Table 9:

Table 9: Themes and sub-themes emerging from the data

- attitude;
 - *enthusiasm*
 - *motivation/driver*
 - *unlearning*
- skill mix;
 - *role models / mentoring*
- educational setting;
 - *physical facilities*
 - *clinical patients*
 - *learning environment*
- professional development;
 - *courses*
- organisation;
 - *planning time*
- administrators as educators;
- educational delivery;
 - *interprofessional education (IPE)*
 - *experiential learning / problem based learning (PBL) / situated learning / community of practice*
 - *reflection*
 - *time in LSO environment*
 - *evolution*
 - *catalyst for change*
- philosophy or culture within LSO;
 - *teamwork*
 - *leadership*
 - *personal development*
 - *lifelong learning*
 - *empowerment*

6.3.1 Attitude

The attitude of team members, students and patients was seen to be integral to maximising the opportunities that LSO offers:

'You must have the right attitude, to understand the ethos. It is about personal development for the benefit of the team. [LSO leader] wants people to benefit themselves personally and professionally which in turn will benefit the team. Attitude is definitely the key at LSO. The passion comes from the top and that is what drives it forward.' P12

Personal attitude is seen as a key factor in LSO, with an underpinning core philosophy, which derives from the leadership and supports individual progression but for overall team benefit. Continuing evolution was also highlighted, plus the passion driving it. The importance of a positive attitude and how it impacts upon the environment found further support:

'LSO success depends upon people and their mentality, the passion they have. They either see it or they don't.' P11

Individual drive and motivation was vital and in turn affects others:

'Working with people that didn't care would really demotivate me. They all want to help so they are learning whilst helping me.' P23

Team attitude was therefore linked to the philosophy of helping others and learning at the same time:

'The leaders drive and vision makes it work and that's really important. Things get thrown in everybody's way and it still moves forward.' P26

Data described the LSO team, suggesting the importance of driving forces and leadership, recognising that, when helping others to learn, individuals are developing and learning at the same time, which are discussed as linked themes later in the chapter. To maximise LSO educational opportunities, students from outside also need an appropriate mind set:

'If students are not interested they won't benefit as much.' P11

Attitude was linked to personal development. A silo-mentality has been recognised as a barrier to IPE (McMichael & Gilloran, 1984); arrogance and negativity towards less qualified educators was thought to limit the potential of education in LSO:

'Some students really want to learn; others are completely the opposite. Some men don't like a female trying to tell them what to do, or a nurse telling a dentist what to do. You try to help them but sometimes they just don't want you to.' P19

Attitude emerged as a key theme within the LSO team and students, including that there may be professional and/or cultural barriers for some to being taught by a colleague perceived to be inferior, in terms of status or qualification, and/or by some male dentists to being taught by a female. A recurring pre-requisite was enthusiasm, which is linked as a sub-theme.

6.3.1.1 Enthusiasm

Certain individuals were consistently highlighted as having this quality, which had far reaching positive effects; a lack of enthusiasm was detrimental:

'The key is passion. We all enjoy what we do and share that enthusiasm with learners and encourage them. They thrive off that. If the enthusiasm isn't there students can easily lose interest.' P10

Participants identified that teachers must be enthusiastic, which can motivate students and become self-perpetuating:

'Learning from someone really enthusiastic about orthodontics helped to enthuse me and made me want to do more.' P20

'The passion that the teachers have, their enthusiasm and the desire to share their knowledge, is fantastic.' P21

Data further suggested an underpinning culture within LSO, which stimulates continuing learning and enhances job satisfaction. Enthusiasm and a desire to help others were seen as a requirement for tutors and students and a driver or motivator within LSO and identified as a linked sub-theme.

6.3.1.2 Motivation / Driver

This was a perception in individuals from LSO:

'It's an infectious environment. Everybody is so keen and enjoys education, you get carried along and I'm proud to be involved. Everyone is so motivated, it rubs off on you.' P3

Attitude within LSO encourages the team and stimulates individuals to want to be a part of the team. The environment generated by an enthusiastic team appears to motivate others from outside. This is part of the culture driven by the leadership:

'[Programme leaders] motivation and enthusiasm to pass their knowledge on is a real asset. They're inspired, which rubs off. [OT colleague] was keen to expand her knowledge, skills and role which enthused her into education. It's been very beneficial.' P4

Enthusiasm feeds from and to the team and students, has a motivational impact and shows how these themes are linked. Not everyone is initially enthusiastic, not everyone in dentistry shares the LSO philosophy relating to teamwork and part of the educator role is to try and change attitude. This may involve the process of unlearning, previously discussed on page 140.

6.3.1.3 Unlearning

LSO education may be different to that previously experienced by many students. To gain maximum benefit may require a change of attitude, a willingness to question previous beliefs and to 'unlearn' old processes:

'If dentists are arrogant they will not comprehend that the team can deliver quality care and think they can't learn from an orthodontic nurse or therapist. Student mentality is the key to successful education. Those that overcome this attitude are pleasantly surprised how much they actually learn; those that do not learn less.' P2

Changing the attitude of some students was, therefore, seen as a challenge by the LSO team:

'We engage with negative students, try and empower them to improve, give support to help them recognise what is required.' P10

A positive attitude was identified as integral to personal development and to maximising opportunities offered by LSO education. This develops extended competence, creating a team of personnel capable of carrying out a wide variety of required tasks. Data also focused on the importance of their collective abilities, or skill mix, which was seen as a core theme.

6.3.2 Skill mix

The skill mix within LSO appeared to be an important factor for team delivery of integrated clinical care and education:

'Different tutors bring different clinical ideas, which is good for other educators and students. I like more of a one - to - one role and being watched clinically. We've all got our niches and it works well.' P11

Diversity of skills within the team was seen to broaden the spectrum of education, with recognition that this is enhanced by the team involvement:

'When I was a student [programme architects] lectured. The skill mix now, teaching as a team and interacting with students, is so positive. The therapists are absolutely fantastic, a credit to their training! Students respect them, because they know what they are doing, and see the bigger picture of how an integrated team works.' P26

The quality of the individuals, their clinical, communication and teamwork skills as a product of LSO education was recognised, together with their capabilities being appreciated by students. This skill mix was seen as an outcome of LSO training. The ability to work as an integrated team, together with their importance to the delivery of clinical care and education in LSO, was further identified:

'You have a good team and everyone knows what they are doing. To make a punch all fingers are required. All of you are single fingers making one big punch. No one particular person is more important than anybody else. You are all important.' P13

These data reinforced not only the importance of the competencies available but also the team approach to delivery of education and clinical care, which was enhanced by the LSO skill mix. Students often see tutors as role models and also require their support as mentors, who can help, motivate and understand their particular requirements. A sub-theme relating to the skill mix available relates to these roles, seen as vital for the student journey.

6.3.2.1 Role models / Mentoring

Students found that, having a team member who they felt was on their wavelength and understood their needs, was hugely beneficial:

'Qualified therapists are best to answer questions for trainee therapists. Therapists and orthodontic nurses all had a massive part in our clinical teaching. They have done it so you learn from their experiences. There was empathy between students and therapists. Individually they all spent time with you but also as a group. They all got on well as a team; we learnt from all of them at LSO.' P15

Although students learnt from everyone in the team, the skill mix within the LSO team allowed a suitable role model and mentor for each student:

'What worked really well was one therapist there to support and take on the role of problem co-ordinator. It gives you the one specific person to go to which worked really well.' P23

The range of expertise within the LSO team was a key theme, especially in relation to role modelling, mentoring and experiential learning. Students felt more reassured by team members who had completed similar training to themselves, over and above more qualified members of the team. The broad skill mix and individual attributes link to other themes. Data analysis recognised the importance of the educational setting as a key theme.

6.3.3 Educational setting

The LSO primary care specialist practice educational setting, including the

physical facilities and patient environment, was perceived to be important. This could be described as situated learning, as previously discussed on page 127 and related to other themes, including professional development:

'In a classroom, you don't get the same opportunities. Having it all onsite is a huge bonus because it's hands-on learning. There's only so much you learn from a textbook. We are in the real world here.' P6

Students are being taught in a primary care environment where they are most likely to work. This enables continuing modification of teaching and immediate implementation of any required changes:

'We constantly adapt the way we teach, linked with clinical practice. The primary care setting allows students to see and interact with more patients than in hospital. Students get more experience and variety, in the same environment as their own clinics. They get first-hand experience of real clinical problems and how we solve them.' P14

Teaching with clinical cases, allows problem based learning and experiential learning. Other facilities also enhance the student learning experience:

'They provide things which the university can't, like the phantom head room, the camera link and the whole team being there.' P4

These data compared the overall setting related to a traditional University setting, and how that facilitates continuous evolution of evidence-based clinical education. The physical facilities available at LSO have been previously described on page 41. Their importance to educational delivery was seen as a sub-theme of the overall education setting theme.

6.3.3.1 Physical facilities

Having full educational and clinical facilities in a University approved, primary care specialist practice and, with team delivery of education, appears to be unique in orthodontics. The physical facilities were identified as being important to the process of integrated patient care and education:

'The clinical skills lab, lecture theatre and surgeries with camera link are fantastic. Training students whilst routine patient care is continuing allows manpower to have shared roles. The IT, clinical case e-portfolio and team of educators at all levels are unique at LSO.' P2

'The clinical skills lab means you don't have to travel elsewhere; you do it all here. You learn the theory, see it, practice it in a simulated environment in the clinical skills laboratory, then on patients.' P24

The integrated facilities were perceived to be important to LSO education, enabling a combination of teaching techniques and modes of learning to take

place. Further benefits include facilitating organisation, allowing the team to maintain their combined clinical/educational roles, which was integral to their professional development and job satisfaction, as discussed on page 207, and to practice in a pre-clinical, simulated environment, prior to treating patients. The clinical case e-portfolio was highlighted as a valuable learning and assessment tool. Clinical patient availability was also recognised as a sub-theme of importance to the overall LSO educational setting.

6.3.3.2 Clinical patients

The previous sub-theme includes the clinical surgeries at LSO. Participants recognised the importance of clinical patients to education:

‘The teaching facilities are here but patients are also needed, NHS and private patients and team clinical experience, too.’ P10

‘Patients contribute to the teaching and learning process because you have to look at the whole picture: patients are smiling and happy. It shows why we learn orthodontics – it links everything together.’ P26

Patient contact was perceived as key to learning and is a further example of situated learning, experiential learning, problem and case based learning. The difference in the inter-relationship with patients as professional roles change was also recognised as important to professional development:

'Contact with patients is so important to course progression. It is good that before therapy you do orthodontic nursing so you get used to dealing with patients.' P23

'Live clinics show knowledge being applied; teachers delivering hands-on treatment impacts on teaching. It would not work as well without patients. Students get better understanding. Sometimes things occur clinically that you wouldn't necessarily think to discuss.' P21

The ability to show students applications of learning in patient clinical situations was identified as a key factor to learning. Patient attitude to this process was important. Although patients were not direct participants in the evaluation, data indicated that their feedback recognised that continuing professional development was part of LSO philosophy and seen as a positive process. LSO was perceived as a learning environment by patients, team members and students, where all functions involve education. This was identified as a 'state of mind' as opposed to a physical entity, and a sub-theme within the main educational setting theme.

6.3.3.3 Learning environment

This sub-theme also linked to attitude and is further support for an underpinning philosophy within LSO. All within LSO recognised that education and continuing learning, both formal and informal, permeate every action:

'Everything that is done has an educational side to it.' P12

'LSO is a learning atmosphere all the time; patients learn as well. Education is an ongoing process; the involvement of the whole team and the practice facilities facilitate a structured learning process.' P2

The seamless link between delivery of care and education was highlighted and symbiotic, facilitating personal development and enhancing patient care. This relates to the concept of interprofessionalism, as previously discussed on page 38 and not just confined to formal teaching:

'The debate goes on at lunchtimes or coffee times and then I will come back later with an article or a letter from a journal – it is very positive. All students are really willing to enter into discussion.' P26

This view underpins the importance of formal and informal learning in LSO and ownership by students. Data also highlight a culture where continuing learning is embedded as the norm and an automatic, subliminal process:

'When in clinic I don't think of it as teaching because I am doing my normal job, with somebody observing. I'm just explaining what we are doing but I suppose it is teaching. I learn the most chair-side so that is what I enjoy doing.' P20

Interprofessional learning would, therefore, appear to be taking place in the LSO clinical environment:

‘Staff not directly involved in teaching are learning by being in the environment where teaching is taking place. You pick up things from hearing discussions, some new and reaffirming others.’ P25

LSO would appear to promote lifelong learning, which is further evidence of a proposed philosophy being embedded within the organisation. This continuing learning leads to professional development.

6.3.4 Professional development

Professional development relates to individuals, the team and the wider dental profession. Dental professionals are seemingly attracted to work and/or study at LSO because of the opportunities it offers. Due to the spectrum of education, LSO has facilitated a career pathway that previously did not exist for dental care professionals. This is explored by the sub-theme relating initially to the courses offered:

6.3.4.1 Courses

The qualification structure provided by LSO courses gives dental care professionals the opportunity to enhance their scope of practice and provides a structure for career development in orthodontics:

'The opportunities available for different levels of students are great, from orthodontic nursing, orthodontic therapist, to MSc. Dental nurses can do impression courses and progress their careers.' P10

The range of courses offered was recognised as being significant, but also their content and quality:

'Course quality is a key factor but also the variety of courses, covering the full spectrum of orthodontics. There is a complete package.' P17

'Courses are really proactive, very informative. Course content is very important. There is always a course to do to better yourself.' P21

The overall package and integration of LSO courses was thought to facilitate continuing professional development and offer the potential for significant career progression. The growing numbers involved makes organisation increasingly complex, which was seen as an important issue by participants.

6.3.5 Organisation

Organisation was identified as a key theme relating to the success of LSO education and is a further example of a 'situated' process. With the extended duty team involved in educational and clinical roles, student sessions and observation clinics, administrators require a good understanding of both

educational and clinical requirements:

'This year we have really got to grips with the organisation for the practical elements of the therapy course and it's been so much better, because team organisation and planning have improved.' P10

Organisation was critical and also acknowledged by students:

'The LSO staff were well organised - when I applied for the course in [another University] they only told us 5 days before the interview whereas Warwick gave enough time with great communication.' P13

Good organisation does not simply happen; a pre-requisite would appear to be key people devoting sufficient time for planning.

6.3.5.1 Planning time

Organising time for appropriate people to be available to meet is complex, as personal development includes assuming greater levels of responsibility for planning:

'We have to balance clinical and educational responsibilities. Planning and co-ordination needs time, which is a limiting factor for leaders.' P2

Time for those leading educational processes was recognised as a restricting factor. For improvement of the delivery of education, reflection is also vital:

'It is very useful to have pre-course planning meetings and post-course evaluation meetings.' P10

'It's frustrating if it goes wrong because we haven't planned properly and then everything becomes less positive. Everyone must be in the right place at the right time for it to work. It is getting better.' P5

Organisation is critical, relying on key people having sufficient time to plan and reflect. Developing more people capable of taking more leadership responsibility could enhance the educational process. This links to the previous theme of professional development, plus to development of a conducive community of practice and is further discussed on page 215. A crucial task for administrators, therefore, is to ensure the overall process is planned and timetabled appropriately. However, in LSO they also have an educational role, which was perceived as a key theme.

6.3.6 Administrators as educators

In many educational institutions, administrators are seen to have clerical, secretarial and timetabling roles. In the LSO IPE environment, however, they are seen as an integral part of the educational team:

'Administrators may discuss with a student about consent or how to structure their appointment book. They may not actively deliver education but advising, thus facilitating effective education.' P2

Some courses involve students obtaining their clinical experience based within training practices external to LSO:

'Practice visits were a very positive experience because we started building a relationship with people in the trainee practice team. Having them on-board is essential for student and trainer but often they get left out and for most students that's where problems arise.' P5

Administrators feel, once they have more experience within LSO, they are seen as student mentors, thus reinforcing the importance of administrators having some subject understanding and being an integral part of the team:

'Because I'm quite close in age to a lot of the students, I can have a friendly, supportive mentoring role, especially with this cohort that I was with from the start. They see me as integral to their learning now. That didn't apply to the last cohort because I probably wasn't so forthcoming with help, being new to the Co-Ordinator role. Now I understand it a lot more and can talk their language.' P3

Administrators require a degree of knowledge about educational and clinical processes in order to maximise organisation and advise other practices. This underpins the team involvement in all aspects of teaching and the importance of education by and for administrators. Team delivery of education and clinical care requires a high level of organisation to maximise quality, irrespective of the style of teaching. A key emerging theme related to the delivery of education which, in turn, linked to certain theories of learning.

6.3.7 Educational delivery

This key theme is split into sub-themes, relating to relevant potential theories of learning within LSO. There are many theories as to how learning takes place and the emerging sub-themes suggest that several may be relevant within LSO. There is a recognised progressive evolution of education in LSO, which is also discussed, together with the drivers for this change.

6.3.7.1 Interprofessional education (IPE)

IPE has been previously defined on page 17. Teamwork does not automatically mean that IPE is taking place. However, data suggest that IPE was regularly taking place at LSO:

‘Even new nurses that come in, are doing assessment clinic records within a few weeks. That is because the team has taught and developed them and the team, in turn, are learning as they teach.’ P2

'Everyone learns from everyone. Everyone has a different role.' P11

Within LSO, learning is taking place, irrespective of professional qualification but it is suggested that good teamwork is required for IPE to occur:

'Because of the team approach we learn from everybody. Nurses will show me something different and vice-versa; on a clinical basis not necessarily a hierarchical learning. We all learn from each other.' P12

Learning from and between fellow students is also recognised to occur:

'Students themselves create momentum because they enjoy coming. Sharing the learning process with others is so fabulous.' P26

Peer learning is also seen to take place:

'Sometimes it is easier to understand from a student colleague. We learned a lot from each other, because we can understand each other on our own level. I remember my PAR scoring; when [lecturer] taught it I was confused, so I asked another boy on the course and he explained, which helped me.' P15

For an IPE environment to be created and maintained, good teamwork appears necessary. Associated themes of attitude, skill mix, professional development, organisation and the emerging core philosophy are also contextual requirements to enable IPE. This will be further discussed on page 223. IPE may facilitate different ways of learning, which in LSO are taking place at the same time. As such, the following learning theories are grouped together as a sub-theme:

6.3.7.2 Experiential learning / problem based learning (PBL) / situated learning / community of practice

Participants had clear opinions on how they felt learning took place and what processes enabled student progression. As the majority would not be sure of specific theories of learning, those potentially occurring are deduced from the data:

'Students start by observing the team carry out patient case assessment records. Students then do the assessment and one of the orthodontic nurses records the notes with another nurse observing. When they present the case to me, they are given feedback and advised how to improve.' P2

These opinions suggest that experiential, problem based and situated learning is happening:

'It's easier to see things clinically than reading a book. I'll show a student clinically and explain rather than him reading the definitions. A light bulb comes on and they say: "Oh, I get it now."' P11

The importance of the clinical environment and patient involvement in learning is reinforced, as is the practical teaching, reflective peer discussion and the satisfaction derived from positive student experiences:

'I get them interactive. Students go through the process and practice it; they understand things a lot better by doing it and the way we talk around it. If you are enjoying something you will learn it, so I make it more hands-on for them. They enjoy it, which is positive for me.' P17

The significance of learning being an enjoyable student experience was recognised. Situated learning, as previously discussed on page 127, could describe the whole process relating to LSO education. Alongside this is the development of a conducive community of practice, also discussed on page 127 and the professional development of individuals whose emergent roles move them into positions of increasing influence and towards the core. This progression has allowed a different delivery of education, with more interaction and group work, with tutors facilitating. Size and content of groups was perceived to interact with teaching style:

'Students are put into groups of 5 to analyse scenarios. They are given a task, with an observer ensuring they are on track. They get far more from it because they can discuss things in a group and compare practices, because everyone does things in different ways.' P19

For some, this approach is different to previous education they have received. The importance of students accepting the need for self-direction in learning links to student attitude, discussed on page 232, relating to who LSO education may not work well for:

'Tutors wouldn't just tell us what we needed to know - we had to go out and research. They would guide us in the right direction and we had to come back with what we'd found. Doing things proactively is better for me because that is how I learn quicker. The structure was good: some theory, some practical; the mix was beneficial.' P21

The increasing involvement of the extended duties team in LSO education would appear to be driving the development of more pro-active aspects of delivery and overall evolution of education. Self-direction is synonymous with elements of reflection. The benefit of looking back at what went well and what was less successful has been discussed relating to organisation as a theme. Reflection was also seen as a sub-theme in relation to learning.

6.3.7.3 Reflection

Reflection emerged from the data as being beneficial to learning and organisation. Use of patient based, reflective, clinical portfolios was felt to enhance orthodontic clinical education, plus the personal development and increased depth of understanding which educating others brings:

‘Explaining something to somebody else helps you. This is shown in the clinical environment, so we need patients and get ideas from them. We can discuss something with students by saying: “That patient we saw; let’s get their photos and use them to explain.”’ P23

‘After each taught day we reflect on how well it’s gone and what we might do to improve for the next time.’ P2

This participant opinion relates to learning but also links back to organisation. Reflection is also part of evidence-based practice and personal development:

‘There is a lot of reflection on how you learn and I’ve learned so much about my own learning. It has given me confidence. Lecturing helps me because I revise subjects, looking at evidence so it is up-to-date. I hope that my own experience and my own enthusiasm can bring students up to a higher level and I really enjoy it.’ P26

The importance of attitude has been reinforced, together with the enjoyment which sharing knowledge gives. Taught material is placed on the LSO virtual learning environment (VLE), which underpins face to face teaching, promotes reflective learning and underpins the need for self-direction:

'We had everything uploaded; that is one of the ways I learn - by writing my own notes, going through them, pulling out the key points. It was fab having material when you got home and in your own personal space so you can look at everything again.' P16.

Reflection would appear to be a pre-requisite for further development of LSO education and learning. It could, therefore, be seen to form a part of what increasingly appears to be a philosophy underpinning LSO. Time spent in LSO could be significant and discussed as a sub-theme.

6.3.7.4 Time in LSO environment

Some students are based in LSO full time; others part time. This sub-theme discusses whether the degree of time in LSO is a critical factor:

'Students observe how LSO works by being in the practice and part of the integrated team process. They see the whole team delivering patient care and education. The greater their level of immersion in LSO, the greater the change in their clinical practice.' P1

This observation recognises experiential learning taking place and suggests situated learning and the possible evolution of a conducive community of practice. A further observation relates to the effect of education on the LSO team, compared with those from other environments:

'It works for the team in LSO as, by being involved in education, they're continually learning. Some students have problems due to their training practice, which doesn't work like LSO. It's not just the student's enthusiasm; the relationship with the trainer is critical. The trainer either gets the whole practice involved, or has the attitude, "You do the course, I'll supervise you when you come back to us."' P3

A further participant opinion compared LSO with the other programme leader's practice, DSO, where the majority of processes are similar, but has less integrated education:

'DSO processes have improved significantly because of education. It is better at LSO because the team see students all of the time, whereas being more remote from it at DSO, they have to be reminded that cases need to be just right. However, they enjoy it when students come and their compliments boost team morale. They would never have felt confident to actually do that before but now they are.' P2

Where individuals are fully immersed in LSO, the required attitude and

processes become a part of individual and team culture and are more deeply embedded. When students are part-time in LSO, they accept the philosophy when there but, if returning to an environment which does not have the same values, the effect becomes diluted. Some individuals have sought to work at LSO full-time, presumably because they want full immersion; others, presumably, are less empowered to seek permanent change.

The theme of educational delivery and its associated sub-themes relates to the style of teaching and theories of learning. These themes link reflection, personal development and the need for continuing immersion in an IPE environment to embed and maintain its effect. These themes are linked to the evolution of LSO and the development of individuals by self-reflection is also a catalyst for this change.

6.3.7.5 Evolution

The data support the importance of individual and team development being a key theme in LSO and an integral aspect of what is an emerging theme of a core culture or philosophy within LSO:

'My role is constantly evolving. The support that orthodontic nurses and therapists provide has enabled the course structure to develop. Group-work sessions have improved; students do more practical tasks, using case records and moving away from didactic teaching. This makes students think and work more during taught days.' P2

The evolution of LSO is seen to be inextricably linked to individual personal and professional development, attitude, skill mix progression, education delivery and development of a conducive community of practice:

'Teaching is now more interactive and student-led, with group discussions. Senior members of the clinical team are taking more of a leading educational role, leading to change through their different ideas. We bring new ideas and are allowed to run with them.' P10

Thus principles of andragogy and increased problem based learning appear to be enhanced by the greater involvement of the LSO team. Individual evolution is linked to whole team development, as driven by the proposed core philosophy:

'The team constantly evolve, updating themselves as they are teaching others. They get qualifications and build on that recognition and experience, which they filter back into teaching others.' P14

The increasing involvement of the team in planning and delivering education is reflected in less didactic teaching, more group-work, peer group case discussions, problem based and experiential learning, thus enhancing team involvement and IPE. This is a continuing process.

6.3.7.6 Catalyst for change

The catalyst for this continuing progressive evolution appears to be the LSO team, whose members are taking an increasing role in all aspects of education as they become more qualified and experienced:

'The continuing catalyst for change has been developing the orthodontic team. More people wanted to do the orthodontic nursing qualification as a pre-requisite to orthodontic therapy. It also released me from doing all the clinical work, allowed me to step back, reflect and take a more objective view of how LSO could develop. Education is more interactive including using the e-portfolio for case based learning. As orthodontic therapists became more experienced, they have become increasingly involved in more aspects of teaching and assessment. This and LSO have progressively evolved.' P1

'During that period of time, nurses became ONC trained. Their understanding and knowledge increased. Anybody that subsequently started in the practice would step up and pick up that course. It still is a busy practice but now the whole dynamics have changed.' P9

It is recognised that there is a self-perpetuating catalyst for continuing change at LSO, initiated originally by the leaders developing education but increasingly driven by the emergence of new leaders within the team, who are empowered to develop as individuals but within an environment aiming to

ensure that such progression benefits the whole team. This has allowed the leaders to reflect and modify education and associated assessment. The increased team involvement in core processes could describe the development of a conducive community of practice. Individual development, for the benefit of the team was seen as an underpinning philosophy, ethos or culture, which is a core element to procedures within LSO.

6.3.8 Philosophy or ethos within LSO

The data suggested that there is an underlying core philosophy which underpins LSO, is fundamental to the infrastructure throughout the environment, influences everyone and the whole, integrated, clinical and educational process within LSO:

'The LSO motto is: "individual development for the benefit of the team" with the team more important than any individual, irrespective of status. Everyone is encouraged to help and learn from each other and has an integral role for delivery of patient care and education.' P1

The team, appears to be a core element of this philosophy, together with the principle of lifelong learning:

'[LSO leader] says: "you never know everything. I'm always learning and you are. Nobody knows it all." LSO has made people step up.

You have to continue to improve because there is always somebody out there that will if you don't. It's that sort of philosophy.' P9

A consistent theme has emerged where the core philosophy within LSO is teamwork, which empowers each individual, who is given opportunity, support and training to develop and improve, within an overall team infrastructure. This philosophy was seen to emanate from the leadership, who believe in the team and are motivated to provide opportunity:

'[LSO leader] obviously thinks he has a good network of people around him capable of taking on that [education] role. It is trust to let go of the reins of something so big. [LSO leader] has a lot of drive and ambition. People around him have got a lot of ambition, enthusiasm and passion to drive it forward for him. His motivation and ours was to better ourselves; he saw that in us and knew he could do it.' P12

Attitude has been discussed as a key theme; as such ambition, drive and enthusiasm are all recognised as important. The concept of lifelong learning is embedded throughout LSO and, together with leadership, personal development and teamwork were perceived as sub themes within the overall philosophy underpinning each and every process within LSO.

6.3.8.1 Teamwork

The involvement of the whole team is fundamental to the integrated LSO clinical and educational processes:

‘Students see the patient journey, involving all the team. They see the integrated approach and how the team deliver care and education. Team interaction is important in making education successful.’ P14

Students are immersed in LSO and recognise that it is totally team driven. LSO education values learners and places them at the core of the process:

‘Everybody is involved, including the administration team who meet and greet students. Students, having a warm welcome before starting the day are generally in a better mood and more responsive.’ P25

LSO has developed the scope of practice of everyone in the team, together with students from elsewhere, which relates to individual and professional development, evolution of LSO and interprofessionalism:

‘The team factor drives it because it is how LSO runs. With the expertise of the extended duties team, that have gained all their qualifications here, we are all actively involved clinically and

educationally. The whole approach works really well. Everyone is on board. It is all in-house and everyone is driving to the same place.' P9

The importance of the LSO skill mix and how teamwork maximises opportunity and performance has, therefore, been recognised.

'It is unusual to have the whole team involved. Elsewhere in education it is all about one person.' P12

Team delivery of education in dentistry is unusual but beneficial. Also the effect a non-team player can have on the group was identified:

'A non-team person has a negative impact on the rest. Many dentists do not view the team and training as important as we do. They think only they should do clinical work and their team are just support.' P2

The recognition that not all dentists shared the LSO team culture provided a challenge to learning in their organisations and linked back to attitude.

6.3.8.2 Leadership

This sub-theme is linked to teamwork; for everyone to put the team before self, the example must be shown by those leading the organisation:

'It's about the team and being enthusiastic, which comes from the top and disperses down. You need that positivity, for it to constantly stay there, be focused and for all of us to remember what we are doing and where we are going. We are all together and want it to happen.' P11

Team members look towards leaders for continuing guidance; the whole team gain confidence to progress if they see that the leaders show by their actions they believe in them. This filters through, drives and empowers the team within LSO. The process then becomes self-perpetuating:

'The leader is a good role model, motivator and a mentor for the team and students, with good people-management, because it is not just teaching. You've got to have a passion for it and that is his [LSO leader] biggest plus - that he has got passion for the profession.' P17

The leaders believe that, given opportunity and appropriate training, others can carry out tasks, which previously have been their sole domain, to a comparable level:

'Whatever the status of the tutor, they are as competent in that process as anyone. Orthodontic nurses take more photographs than anyone so they're the best at it; therapists put more brackets on than anyone, so have the expertise to do that role as well as me.' P1

This philosophy gives those with skills the opportunity to teach them and allows individuals to continually develop within the LSO environment.

6.3.8.3 Personal development

The sub-theme of personal development is linked to attitude, notably the motivation to progress, professional development and to the effect that recognition of individual achievement can have to status. Although, at first, it may appear a contradiction to team work, the balance of how individuals can progress whilst synergistically adding to the overall team development was highlighted relating to educational involvement:

‘Teaching on different courses varies the people I mix with. This broadens my knowledge, understanding and ability to work with different professionals. I learn off all levels of students. I have really benefitted from LSO education, am self-motivated to progress, feel optimistic and am more fulfilled. I enjoy education and always praised for my work so I feel really valued and want to do more.’ P10

This perspective underpins how personal development is symbiotic with team development, attitude and evolution, benefitting all at LSO:

‘Everyone here has bettered themselves at some point. I can’t think of anybody who hasn’t. He [LSO leader] has developed as well.’ P12

'Whenever you teach you develop: academic, clinical, communication skills all improve, your confidence improves and that positive attitude from the team rubs off on the students and they definitely benefit.' P26

Personal development in LSO would appear to be associated with progression as a conducive community of practice and the concept of paradigmatic learning trajectories. It also appears to be hugely motivational and reinforces positive attitude traits:

'The education here has been really beneficial to me; the more I learn the more enthusiastic I become and the more confidence I get.' P21

This sub-theme clearly shows how the involvement with education becomes self-perpetuating and automatically delivers continuing development and encourages a desire for lifelong learning.

6.3.8.4 Lifelong learning

Lifelong learning is a linked sub-theme to personal development and was seen as an associated theme and a core aspect of the LSO philosophy:

'Being involved in education means I am more familiar with latest technologies and apply them clinically and in teaching. It makes my work more challenging, uplifting my goals. I recognise my weaknesses

and alter my personal development plan to improve them. As I raise targets, my job becomes more satisfying in trying to meet them.’ P14

As such, lifelong learning enhances personal and professional development, which is passed on to students. This cyclical process stimulates recognition of individual career goals which reinforces a positive attitude:

‘I’m quite involved [in education], feel very passionate and get huge pleasure from it. After a really good day, everyone goes home on a high and feeling upbeat. The education is still developing me. Being here has had a very positive personal impact and it’s certainly identified what I want to do and what I enjoy doing.’ P5

Team philosophy within LSO was seen as a key factor, creating an environment which promotes lifelong learning and providing opportunity for individuals to develop.

6.3.8.5 Empowerment

LSO gives everyone the chance to make the best of their skills but does not force any individual. The philosophy requires self-motivation and direction:

‘The option is there for everybody to get involved. It’s whether people take that opportunity or not.’ P11

'There are lots of opportunities and support. [LSO leader] is really keen on everyone doing as much as they want to educationally. If you really want it he'll help motivate and steer you in the right path.' P23

There is a genuine desire from the leaders to allow others to develop, which appears to set the example to all in LSO to follow and sets down the ground-rules which trigger the attitude required for LSO to be successful. Team members need to show personal drive and are supported appropriately to their own motivation and performance.

The above themes and sub-themes were seen as key factors related to LSO education. Participants were asked who they felt LSO education worked for and who it did not. A résumé of participant views further supports the emergent key themes from the data.

6.3.8.6 LSO works for

'Students who are enthusiastic, have a desire to be educated, are prepared to accept a different style of education delivery and recognise the need for self-directed learning. It works for team members who are enthusiastic, motivated and committed. Newer team members benefit as they learn from the rest. Patients benefit because, since my involvement in teaching, I teach them at the same time, and they are getting better treatment because we are continually developing our knowledge and skills.' P10

'Everybody benefits. The whole LSO team, students and ultimately everyone's patients benefit. I benefit - I'm a better communicator with everyone and more thorough in everything I do. It is very good for the profession as a whole. There's a group of committed individuals doing a lot of academic training who then dissipate their knowledge.' P26

'It works for everyone. Patients because we are always continually educating and developing expertise so they've got a highly skilled team treating them. The LSO team and students - It has created a career pathway and helped them go further in dentistry. Education in LSO isn't just about educating others, it's educating internally as well, because of the way that we work, with entire team involvement to the full scope of practice.' P5

6.3.8.7 LSO does not work for

'Anyone not prepared to help those needing support to improve and to learn. Any educator who does not really want to help the learner and any learner who doesn't feel they can learn from anyone in the team, or does not have the capacity for self-directed learning. If a student thinks: "I only want to learn from a specialist, I don't want to learn from an OT or a nurse," that would hinder learning at LSO.' P1

'LSO education is not going to work for people who are not committed to lifelong learning, who are put off by the learning process and don't

embrace it and who come with preconceived ideas about their own abilities and an attitude of “I know it all anyway.” P26

‘Students based outside LSO without support in their own practices. It is important that you get support from your trainer back home.’ P15

These perspectives come from the full spectrum of stakeholders, including programme architects, students, educators, administrators and the LSO team, some of whom have evolved from one role to another over time. The process by which the themes and sub-themes were developed has been discussed on page 170. These themes were derived from participant data analysis, informed by IPE, theories of learning and realist evaluation literature. Having identified the above themes from the data, in order to identify programme theories, realist evaluation requires the development of CMO Configuration hypotheses. Re-reading of participant interviews alongside the themes and sub-themes allowed further analysis of linkages and categorisation of themes into contexts, mechanisms and outcomes and helped formulate hypotheses of how they might inter-relate – programme theories in CMO configuration format.

6.4 Programme theories: Context Mechanism Outcome (CMO) configuration hypotheses

The original introduction of the LSO education intervention in 2005 was in the context of a need to educate internal team members, the belief in the concept of the extended duty clinical team and a leadership philosophy to

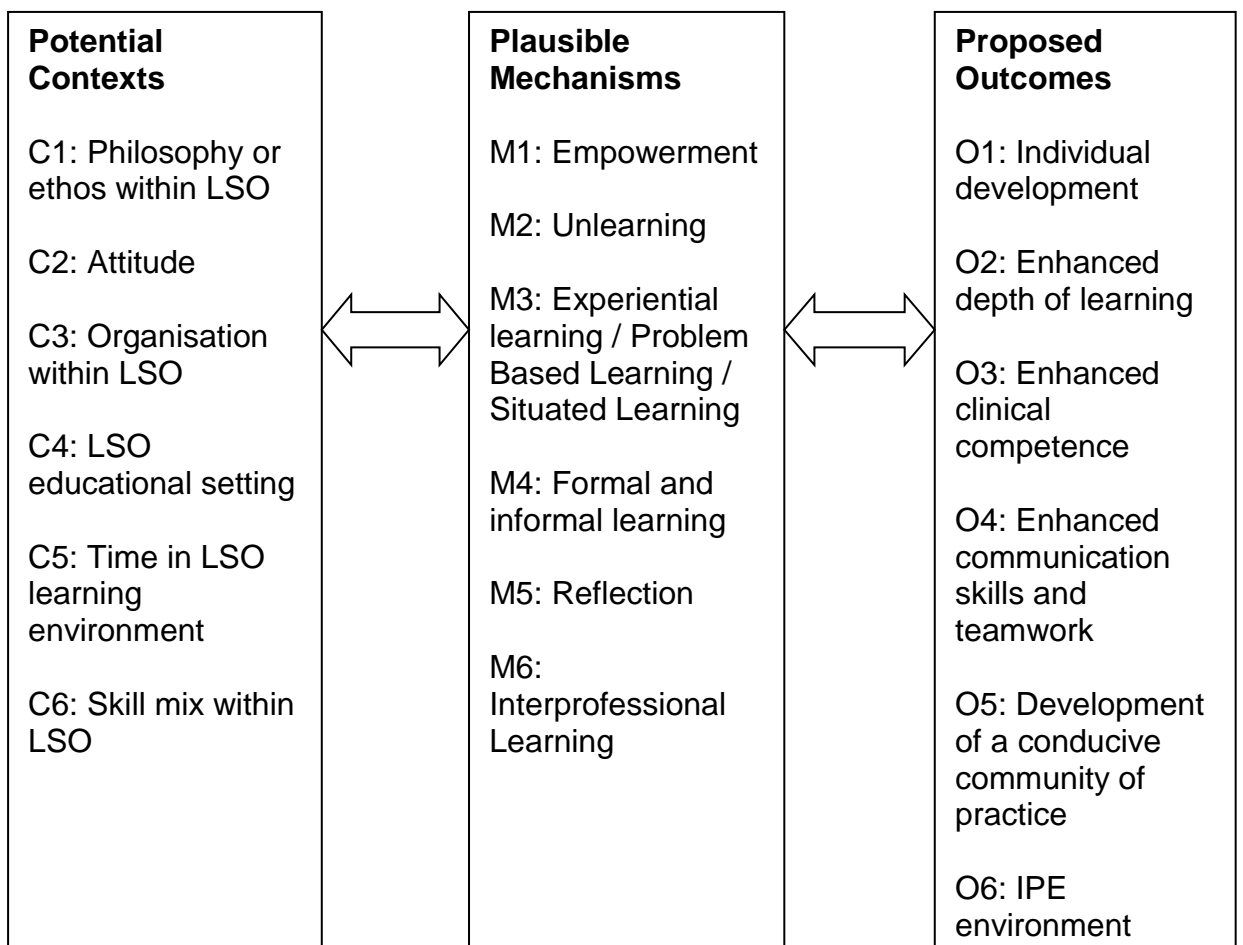
create opportunity and to promote both individual and team development. Programmes fire multiple mechanisms, having different effects on different participants in different circumstances, therefore producing multiple outcomes (Pawson & Tilley, 1997). Data analysis suggests that LSO education has evolved significantly over subsequent years and identifies key themes which have led to the CMO Configuration hypotheses.

The first hypothesis relating to CMO Configurations was to propose the various contexts, mechanisms and outcomes (Figure 4, page 235) and that any of the potential contexts could be associated with the firing of any of the plausible mechanisms, leading to any of the proposed outcomes. In turn, certain mechanisms could cause change of certain contexts, as can outcomes, as shown by the double ended arrows in Figure 4. Subsequently, further programme theories evolved: that contexts were founded on one key factor, on which other contextual factors were built; that mechanisms could be independent, linked or sequential; that outcomes could also be independent, linked or sequential; that IPE could be a potential outcome, mechanism or a context, or was a progressive evolution from one to another.

The emergent themes, sub-themes, linkages and resulting hypotheses were discussed with the research supervision team for transparency of thought and analysis, adding sincerity and rich rigour (Tracy, 2010). The first phase of this realist evaluation identified the programme theories by hypothesising contexts, mechanisms and outcomes of LSO education and further

suggested potential interrelationships between them - the CMO configurations. The overall programme theory was that these contexts, mechanisms and outcomes were indeed present in LSO and that there was an interrelationship between them, which was time dependent. Whether these contexts, mechanisms and outcomes were present and if the interrelationship between them was a hierarchical, linear, cyclical or spiral type of progression, was to be tested by phase 2 data collection and analysis.

Figure 4: CMO Configuration hypotheses



6.5 Phase 1 programme theories

The programme theories identified by phase 1 are documented in Table 10.

Table 10: Phase 1 identified programme theories

- the contexts, mechanisms and outcomes are as documented in Figure 4;
- contexts may be founded upon one key factor, on which other contexts are built and that there is an inter-relationship between contexts, which could be sequential;
- there is a two way inter-relationship between contexts, mechanisms, and outcomes;
- mechanisms could be independent, linked or sequential;
- outcomes could be independent, linked or sequential;
- a conducive community of practice has evolved in LSO;
- development of a conducive community of practice is required for the development of IPE, which is time dependent;
- IPE could be a potential outcome, mechanism or a context;
- IPE has progressively evolved.

6.6 Summary

This chapter documents relevant data obtained from the various participant groups individual semi-structured interviews, which were subject to thematic analysis, in order to identify potential key elements relating to LSO education. This analysis systematically organised the subject matter into linked themes and sub-themes, which aided formulation of CMO Configuration hypotheses. Figure 4 summarises the initial proposed CMO Configuration hypotheses which aim to identify the programme theories in

realist terms. Whether these contexts, mechanisms and outcomes were present and if the interrelationship between them was a hierarchical, linear, cyclical or spiral type of progression, were to be tested by phase 2 data collection and analysis; and the former is described in the next chapter.

Chapter 7: Phase 2: Testing the programme theory - data collection

7.1 Introduction

Phase 2 stage of data collection involved the use of two separate focus groups, with participants drawn from those already involved in the semi-structured interviews and facilitated by the same research associate as in phase 1 data collection. As this phase of realist evaluation requires 'teasing out' themes of emerging theories, a group discussion situation was believed to be the most suitable method for such data collection. All participants in the study had previously formally consented to engagement in focus groups if requested but this process was reaffirmed with each participant prior to involvement. As with semi-structured interviews, it would appear that the expertise of the research associate, discussed on page 180, is equally important in facilitating focus group discussions.

7.2 Choosing the focus group participants

Although it may be possible to work with a representative sample of a small population, most focus group studies use a purposive sampling model, whereby participants are selected to reflect a range of the total study population, or to test particular hypotheses (Mays & Pope, 1995a). Focus groups are frequently conducted with purposively selected samples in which the participants are recruited from a limited number of sources (Morgan, 1997). The ideal focus group size is between four and eight people (Powney,

1988). Recruiting participants with appropriate information and an interest in the topic, together with selection of a trained and knowledgeable interviewer is vital for data collection (Morrison & Letrell, 1999). Group composition should ensure that the participants in each group both have something to say about the topic and feel comfortable saying it to each other (Morgan, 1997).

Purposive sampling was therefore used for both focus groups, with a participant from each of the semi-structured interview groups, except for the programme designers, in both. This aimed to enable participants to suggest why a programme may work differently for the different population groups, to discuss key features of context that were hypothesized to affect whether and how a programme works and specify why those features matter (Westhorp *et al.*, 2011). The invited participant groups are shown in Table 11.

Table 11: Phase 2 focus group invited participants

Focus group 1	Focus group 2
LSO educator / administrator	LSO administrator
University administrator	University administrator
LSO educator	LSO educator
Student / educator	Student / educator
Student	Student
Length of interview: 88min	Length of interview: 71min
Transcript pages (A4): 30	Transcript pages (A4): 24

7.3 Designing the focus group questions

Questions for the focus groups were designed to explore in greater depth the emergent theories. These were discussed between the researcher and supervision team, then with the research associate. A focus group research

associate guide was developed, which included explanation of the process for the participants. Since all focus group participants had taken part in the semi-structured interviews and the subject matter and questions were of a similar nature, further piloting was deemed unnecessary.

7.4 Data collection

Focus group discussions were carried out at LSO during participant normal working hours. The discussions were audio-taped and subsequently transcribed verbatim into word documents by an independent transcriber. No comments were directly attributed to any individual participant but, as previously discussed on page 176, anonymity cannot be guaranteed, especially as the participants in the focus groups were known by the researcher. This was reiterated to participants as part of the consent process and documented in the ethical approval. All participants were asked not to share their views with colleagues after their respective focus groups.

The research associate explained to participants that the individual interviews had led to themes being generated relating to LSO education and that the researcher had suggested some programme theories in the form of contexts, mechanisms and outcomes, called CMO configurations, together with an appropriate explanation. Participants were initially asked if they agreed that the proposed contexts, mechanisms and outcomes were operating in LSO, if and how they interacted and how they related to IPE in

LSO. Data analysis to test the programme theories is described, supported by quotes from the focus group interviews.

7.5 Summary

This chapter describes the rationale behind and use of focus groups for phase 2 data collection. Having identified the programme theories in CMO configuration terms, this stage involved testing these theories by gathering data from stakeholders on the way in which the programme unfolds in real life contexts. This stage adds triangulation and member reflections, reduces the risk of researcher bias, thus adding rich rigour, sincerity and credibility to the evaluation (Tracy, 2010), and the next chapter discusses the focus group data and its' analysis.

Chapter 8: Phase 2: Testing the programme theory – data analysis and findings

8.1 Introduction

Analysing data from focus groups is similar to any other qualitative data. The researcher draws together and compares discussions of similar themes and examines how these relate to the variables within the sample population (Mays & Pope, 1995a; Britten, 1995). Group data are neither more nor less authentic than data collected by other methods but, focus groups can be the most appropriate method for researching particular types of questions, such as the study of attitudes and some experiences (Mays & Pope, 1995b).

The programme theories, identified in phase 1 and discussed on page 233, were that the contexts, mechanisms and outcomes shown in Figure 4, page 235, were present in LSO and that there was a time related interrelationship between them. The CMO configuration hypotheses were tested by two separate focus groups. This chapter discusses the findings, supported by quotes from the focus group conversations and diagrammatic representations of theoretical CMO configurations.

8.2 Data analysis – findings

The data analysis is a progression from phase 1, using manual methods of thematic analysis (Burnard, 1991). The logic of analysis in realist evaluation

is 'intra-programme, inter-group, or inter-context' comparison; that is, realist programme theory expects that there will be different outcome patterns for different groups or contexts within the programme and the analysis tests those theories (Westhorp *et al* 2011:11). Data analysis focused on proposed contexts, mechanisms and outcomes. They were initially explained to participants in the groups, discussed as separate entities, with further participant suggestions as to CMO configurations. Participants were initially asked if they agreed with the proposed contexts, if they were all important to LSO education and if one was more important than another:

8.2.1 Contexts

Potential Contexts:

- C1: Philosophy or ethos within LSO
- C2: Attitude
- C3: Organisation within LSO
- C4: LSO educational setting
- C5: Time in LSO learning environment
- C6: Skill mix within LSO

Participants observed that all proposed contexts were extremely relevant:

'They are all inter-related. A good attitude is needed from everyone. Without the philosophy for education; without the patients to work on for the team to

develop their skills and to then teach those skills, it wouldn't work. If you significantly altered any one of them it would impact on all the others.' FG1

'The philosophy is very important. The LSO mission statement from years ago was: "Continuing personal development for the benefit of the whole team." That is what has happened - the team has evolved and progress into education. People go from having no qualifications to gaining each one and then helping deliver the next course. It's a cycle. That is certainly LSO's philosophy. You better yourself which benefits the practice and so on.' FG2

Initial participant views therefore supported the proposed contexts and that all were of similar value. Further discussion highlighted the philosophy, how it related to attitude and its importance throughout LSO:

'Without the philosophy, attitude and drive, it would not happen. If everyone's philosophy wasn't the same or attitudes weren't right then the rest would not work. The philosophy is driven by the leaders, the recruitment process is affected by what they think, how they want to work. They attract and employ people who will fit into that philosophy. The philosophy drives it all.' FG1

'You must have people that want to take that philosophy on board and want to be involved in education, otherwise it is not going to work. There always are people that want to do it. They see their peers do it, and it has evolved. It has to be linked with attitude.' FG2

There followed further reinforcement of the effect of a positive attitude, enthusiasm and how this relates both to tutor and student:

'If I'm not getting anything from delivering a lecture listeners aren't either. This is how we have evolved; we all have different strengths and everyone adds something; all learning from each other. Impression courses are now different beasts altogether, with nurses running it, doing some hands on and chatting about our experiences. It was just as much fun and the students loved it. We had some fantastic feedback from that.' FG2

The discussions identified there was a continuing evolution of LSO education, that there was a growing recognition of the benefit of people choosing to be involved in what they were good at, as opposed to being persuaded to be involved, together with reinforcing the importance of team members being enthusiastic:

'Having disinterested, unenthusiastic people involved is detrimental. It is better having people in the right place, happy doing what they want to do. It shows the students that: "Wow, the nurses here are really keen." Students notice if they are taught by somebody who doesn't really want to do it.' FG2

The functioning clinical practice facilities and treating patients were seen to be vital to developing the team with appropriate skills:

'The clinical practice is needed for team members to develop skills to then be able to teach them. You teach what you do; if you didn't do it you couldn't teach it. It would not work as well without everything in this building.' FG1

The development of education alongside clinical practice was seen as beneficial but also a cause of difficulties:

'The practice has grown and changed. It is not just delivering a couple of lectures, it is the whole background to it. It causes some stress sometimes and for those reluctant to change it is a very difficult process, so attitudes and philosophy are linked.' FG2

Dual roles were seen as beneficial, but could be problematical, especially if unforeseen problems arose. Good organisation was reinforced as being critical, together with all facilities in one building facilitating planning:

'It would fail if the organisation and preparation wasn't in place. Being in one building helps as everybody is on site for planning strategies.' FG1

'Everyone tries to organise but then something will happen, like a patient in pain who needs to be seen, or someone is off sick. That's where attitude is important, to be flexible when things do not go according to plan.' FG2

Participants therefore recognised that individual attitude was linked to organisation and critical to coping with unforeseen eventualities:

'Organising isn't enough on its own. You need a contingency plan for the unexpected. It is not just: "This is the timetable," because it doesn't work like that. Planning is complex but it is an essential ingredient.' FG2

Being a clinical practice has been recognised as helping continuing development of students and the LSO team. The resulting skill mix was seen as important to allow team members to have further educational involvement:

'The skill mix is really important because as [colleague] said, she didn't feel confident until she did have those skills, to be able to share them. Then your attitude towards educating changes because you've got the skills.' FG1

'My role now as an OT mentor is really enjoyable, due to the course evolution, which relates to the skill set developed from the onset of education here. It is snowballing along, gathering different skill sets along the way. Because more people are involved, you can evolve your own role and share with others as we are now, which I didn't do even 3 years ago.' FG2

This would appear to reinforce the philosophy within LSO, where individual development was only practically sustainable by the team also progressing

and strengthening the overall skill mix. This process was observed to be self-perpetuating and part of individual progression:

'It has evolved due to the team teaching more, so we needed the skill set to teach. Without it you didn't feel confident to teach, so it wasn't as enjoyable. As we started doing certain lectures we became more confident.' FG1

Sometimes, however, education development could cause personal difficulties, due to the time demands on individuals but the progression of an enhanced skill set has reduced the problems:

'Education takes up a lot of your life. The pastoral role that I do now fits in with my life and helps [the leaders]. It is a nice balance, which there has to be, whereas many years ago there was no balance. I couldn't do what I do now a few years ago - without other people evolving.' FG2

Evidence also supported LSO evolution as an IPE learning environment, based upon the proposed contexts:

'Introducing the skill mix into teaching is essential. A balance of people working with patients and education. The team build the required skills. New members may not have top level skills, which are developed when they start. If their personality and attitude are right they can make the transition.' FG1

The evolving skills within the team, developed by the team, were seen as integral to LSO's continuing evolution:

'At first it was very much: "If you want to be involved [in education] you can be," whereas now it has turned into: "When you are ready you can be involved." People now participate when they feel ready, competent and confident to do it. It has slowly evolved into something that's better.' FG1

It would appear that continuing to develop the skills within the team has taken the pressure off certain team members, who were uncomfortable, at first, with an active role in education. This progression has changed the educational approach and potential mechanisms associated with learning:

'Education could not be delivered now with only one [leader], because of the style of delivery – it's very informal, very interactive, with lots of group work. The OT course now is nothing like the course I did, far more organised, with key people involved at certain stages and students knowing where to go for support. Everyone adds something different to it and that is important' FG2

Participants all identified that all the proposed contexts were needed in LSO and that they were interdependent:

'They are all aspects that need to be there to make anything work.' FG1

'That's why it's a learning environment and the facilities all need to be at LSO, because you get direct, real time experience. That is really strong for students to know they are in a clinical environment.' FG2

It was described that the initial driving factor came from the leaders but that the team have taken increasing responsibility to evolve the process:

'The philosophy comes from the leadership, the motivation of the business. Then leadership comes from the skill set of the team. [The leaders] have the ideas, are driven, but need others to take them forward.' FG1

This progression could be seen as beneficial, allowing the team more control in decision making but, would have a downside if their decisions were not helpful to LSO education. In certain organisations, allowing such a progression would be seen as a shift in power and undermining the leadership. However, this process is part of the philosophy and for IPE to develop in LSO, seen as a positive development.

Participants were asked to discuss whether all the contexts existed at the same time, whether they changed and, to discuss diagrammatic representation of how they perceived the contexts to interact. They were shown diagrams, (Figures 5 and 6), to see if either represented how they imagined contexts in LSO inter-related:

Figure 5: Hypothesised contextual pyramid for development of LSO IPE environment



Figure 6: Hypothesised circular contextual requirements for development of LSO IPE environment



Participants believed that contexts did not sit one on top of another:

'The pyramid version is a hierarchy of importance and there isn't one. The equality of the circular version is better but they don't stand alone - they are integrated. It is an ongoing circle that drives it forward all the time. They need lines in between as well. Like a flower. You could just draw some circles and make it interlink like a big flower.' FG1

Participants drew their own diagrams during the discussion (Figures 7 and 8).

Figure 7: Participant modification of contextual requirements for development of LSO IPE environment



'The analogy where you drop a stone into a pool of water: here the stone is the philosophy and everything else is the ripples. Organisation is very important as well; it isn't the last thing.' FG1

Figure 8: Participant “ripple” concept of philosophy “dropped” into the LSO pond



Participants had further views on the contextual configurations:

'It's not single points – more of a circle. I'm not sure if there is a centre; maybe just a continuous ring. That's always been [LSO leader's] philosophy - there is no hierarchy, just a circle. We need everybody doing everything to make it work. We don't need a shoot-off from the middle unless [LSO leader] becomes the shoot-off.' FG2

Each context was therefore identified as being important and to interrelate, as opposed to being totally separate entities. There was a clear feeling, however, that the philosophy initiated the whole process and its effect, like the ripple diagram, spread:

'The philosophy is no longer owned by [leaders] but is now understood and very integrated into everybody. It is a learned, inherited philosophy almost. Everyone involved will put an idea forward and [leaders] help to drive it forward. They will say: "tell us how to make it work." We drive it forward together.' FG1

There appeared to be a clear feeling that the team had taken ownership of the philosophy and were evolving it, that even though one individual may have been responsible initially, the team was most important:

'[LSO leader] started it but he wouldn't want that as one person but it is his philosophy – it hasn't come from anyone apart from him. If he didn't create the philosophy, he certainly ran with it. Hence, we're around 8 years down the line with the OT course and extended duties team....so maybe it is the philosophy then that drives it.' FG2

There was a belief that the philosophy could now continue, even if the leadership changed, because it had, over time, become integral within the team:

'We understand the philosophy and it would still be driven forward but maybe in a slightly different way. It would be difficult without [LSO lead] because he is so involved in everything. If it wasn't [LSO lead] there would have to be someone with that expertise and same philosophy, not somebody that would change everything.' FG1

This belief was based on their experiences:

'We all go with the philosophy we have because we all came to work here knowing it before you even get the job, so you buy into it.' FG1

This hypothesis could have implications for recruitment in other educational institutions.

'If someone came in with a new philosophy, it wouldn't work, because we all believe that the current philosophy of team delivered clinical care and education is the right one; we can see it working.' FG1

These contextual factors were now felt to be team driven, based upon the core contexts in place and responsible for the continuing evolution of LSO:

'Team ownership of the philosophy drives it forward. If someone new bought into the philosophy but put their own spin on it, the team would

buy into it and evolve. I've been here 5½ years and it has changed loads. Our attitude has become like [the leaders] towards IPE, so if somebody came in with the same general philosophy but a different way of doing it then we would adapt to that. If the team like something they will buy into it 100% but won't if they don't like it.' FG1

These views could describe the development of a conducive community of practice, which is further discussed as an outcome on page 272:

'LSO is about getting the right people in the right place. It works because everybody is different and we have a good balance of those that want to just do clinical and those keen to progress further. We need people that are keen to develop and help others develop.' FG2

Participants supported the proposed contexts within LSO but with a different interrelationship and diagrammatic representation. There was initial debate as to whether certain contexts were more important, or central to the processes within LSO. This could be due to the varied roles of participants, who saw each context from a different perspective initially but appeared to reach a consensus view as discussion progressed. Conceptualising contexts and mechanisms is initially difficult; as such, it could be that a greater understanding of both developed through the focus group process. Discussion and analysis progressed to the mechanisms which were hypothesised to fire as a result of the contexts. Participants were initially

asked if they felt they were all working, if some were not working, or some working more than others:

8.2.2 Mechanisms

Plausible Mechanisms:

M1: Empowerment

M2: Unlearning

M3: Experiential learning / Problem Based Learning / Situated Learning

M4: Formal and informal learning

M5: Reflection

M6: Interprofessional Learning

Participants felt that all mechanisms fired over time but not for everyone. They fired to varying degrees and were context dependent. Contextual factors were frequently referred to, reinforcing participant support for the programme theories relating to contexts. The plausible mechanisms are now discussed, with some comments relating to more than one mechanism.

8.2.2.1 Empowerment and unlearning

There was debate as to whether empowerment or unlearning occurred first, essentially varying between students and student groups:

'Unlearning depends on the group. It happens eventually and mainly in the MSc programme, where dentists are being educated by those they perceive below them in the food chain. It takes time. I've seen the MSc students change their entire opinion of [OT educator] from Day 1 to Day 9. On Day 1 they don't want to interact with her; by Day 9 they are interacting properly. When [OT educator] was talking through cases with them on Day 9, even the most reluctant ones thought: "Actually she knows more than me. It's ok that she is teaching."' FG1

Observation suggested that unlearning was more necessary for dentists as opposed to nurses. Whether this is due to a greater level of subordination within the nurses may be a factor:

'There has never been a hierarchy with us. We are presented as the team. Before students come it's not necessarily accepted. Quite often they say: "So are you an orthodontist?" I'll say: "No, I'm an orthodontic nurse." "Do you do assessment records?" We say: "Yes, we have to get them checked by [LSO leader]." Very quickly, within 30 minutes, they'll say: "Wow this is amazing. I need to get my nurses doing this. You are really knowledgeable." It's the same with the OTs.' FG2

It would appear that unlearning takes place, once students see the LSO processes working. They need proof before accepting new concepts:

'Students always say: "This actually works. [LSO leader] has nailed it here." We get emails and cards saying: "I travelled from Ireland just for the morning and I've had such a great time, learned loads," and everyone has been involved, from junior nurses to [leader]. But if you told them before they came they might only spend 10 minutes with [leader] and the rest of the time with nurses and OTs they might say: "I'm not coming all that way for that." But it is very difficult to describe how this place runs without actually seeing it and being in it.' FG2

LSO is perceived as different to other traditional education environments and has to be experienced by immersion to be accepted. This would imply that 'seeing is believing,' which potentially reaffirms the need for unlearning, as there is a preconception beforehand that there will be little value in spending time with a nurse or therapist. Unlearning would appear to require a change in student attitude, for the process to work, plus a resolute tutor attitude:

'At one point [OT educator] said to MSc students: "I'm an orthodontic therapist, not an orthodontist." A student said: "You wouldn't know it." Therefore unlearning is happening. That's because I have been there every time and my attitude is not to be defeated by them; it has been: "I know what I am talking about and I'm going to carry on and eventually it will turn." It relies on your own attitude and personality. Another therapist or nurse may not achieve that because they will think they shouldn't be teaching these guys as they are dentists.' FG1

With no preconceived bias and no awareness of tutor status, students simply accepted the evidence delivered. Unlearning was again related back to attitude and motivation, thus further supporting the identified contexts:

'It depends on each student and their attitude, whether they are on the course for the right reason. Some come just for the bit of paper at the end because they think they know it all and don't need to learn or unlearn. Some people will not deviate from that.' FG1

The approach of tutors and group dynamics affects unlearning:

'It depends on the attitude of students in the group and the attitude of the educators - they've got to want to help.' FG1

'If there is student negativity, it comes across adversely when you are trying to be positive to help them. Those characteristics, personality traits, behaviours are strong and take the group with them. If you get a couple of really positive people, the whole group is more positive. The positivity of educators can overcome that negativity together.' FG1

Tutor attitude was felt to maximise the chance of changing student opinion, leading to unlearning where needed and also empowerment:

'I think 99% will be changed, even if it takes them longer. There are a few that won't benefit from the education process because they are not receptive. Trust-based nurses are more set in their ways and the unlearning process becomes more challenging.' FG1

Underlying drivers for education could vary individual attitude to the process:

'One said "I don't like orthodontics, I'm doing this because the hospital are paying us to do it." Our challenge was to change her opinion and we did. 3 taught days later she said: "I see what you mean. I'm loving this now." We changed her mind about learning because of our philosophy, so the mechanism was definitely taking place.' FG1

Some nurse students from a secondary care background were found to be more challenging, initially, to motivate and accept alternative learning strategies. It may be not just professional status that affects unlearning but also institutional background. Self - confidence was required prior to involvement with delivering education and it was recognised that individuals needed to decide their level of engagement for themselves:

'Some are empowered and others not. I was here for 2 years before I had the confidence to deliver education. The more you do the more confident you get. You see where you can slot in. Some say they want to be involved but don't have the time or the desire to do it.' FG2

'To have that option to say: "I'd rather not and I'd rather just stick to clinical," is empowerment in itself because you are allowed to make that decision. Therefore, empowerment is working.' FG2

Empowerment was felt to allow individuals the option of being involved in education when ready but to accept they are not expected to know everything, which means they are more confident and of more help:

'Now, if a dentist asks a question about what I know I would answer; if I didn't know I am confident to say: "I'm sorry I don't know but I'll find out for you." The students are very happy with that, whereas before I would have tried to answer, which is so dangerous.' FG1

This process of having people who chose active involvement was seen as significant in LSO evolution:

'We've evolved away from just getting everybody involved to getting the right people involved, which is beneficial for all parties.' FG1

8.2.2.2 Experiential learning, problem based learning, situated learning

Different theories of learning were suggested to take place, dependent upon varying situations:

'In the clinical case study presentations there is evidence of experiential learning taking place. It is when they are empowered, where their informal learning kicks in really strongly and they ask questions and have peer discussions.' FG1

The process of students presenting their own clinical cases to the group and the ensuing discussions showed what they had learnt from the experience within LSO, where they started by observing the team in action:

'Some students, when they come for observation sessions, are petrified because they feel they don't know anything. They are put at ease as they see junior team members doing assessment records and presenting to a specialist. In some practices that doesn't even exist. Having observed, they then assess and present cases on their second observation sessions. They get a huge amount from it. Everybody punches above their weight. It is fantastic.' FG2

'Learning from clinical situations is really important. Even when OTs are working on each other we always say: "We do it in a clinical environment exactly as we would with a patient." When you are learning in the clinical environment it soaks in better because it is like role playing but with patients.' FG2

Participants felt that different styles of learning took place at different stages of the LSO student journey, with the integrated teaching, students presenting and case-based discussions beneficial. They also supported the suggestion that all mechanisms were taking place:

'All mechanisms fire, to varying degrees and at varying stages.' FG1

However, not all mechanisms take place for everyone, at the same time, all the time and in all cases – they are context dependent:

'Most mechanisms are happening for MScs by Diploma stage; some are before but more by then. Many Certificate year students expect to be taught exactly how to treat a patient from start to end and haven't grasped that's not how they will learn. They apply their Undergraduate training to the MSc and it is not the same. For most it takes that full year and some of the Diploma phase to realise: "I'm fighting against something that is not going to change. I've got to learn myself."' FG1

This applied to students who initially expected a didactic approach to teaching and it was recognised that some needed to develop knowledge in this way before they were willing to enter into less formal discussion.

8.2.2.3 Formal and informal learning

An example of the above progression over time relates to formal and informal learning. Different participants seemingly had a different understanding of the meaning of these terms, relating them to a more didactic approach and interaction outside designated teaching time:

'Informal learning comes once core basics and confidence are gained from formal learning. Students need some formal learning before they are confident enough to informally discuss things. All groups are similar. Some students come with more experience and orthodontic knowledge and are much more open to informal discussions than the less experienced. There is always a mix of students, so initially it's hard to do group work but we put those that have experience with ones that have less, so they can help each other.' FG1

'The coffee break is our time to get to know them personally. We get questions fired at us then. If someone doesn't understand a lecture, rather than admit it when the whole group appear to understand, they ask us. As we mingle they are learning and reinforcing learning.' FG2

'Informal learning develops with confidence. Without confidence you don't get informal learning. Group size has an impact as well. We have about 10 therapy students and about 10 nurses; the ability to

instigate and get good informal learning is easier than when you've got maybe 20 or 30 students.' FG1

LSO was thought to enhance informal learning, compared with a larger environment:

'A student can go outside and have a conversation. At the university you leave a lecture room and you are a small fish in a big sea, surrounded by students on different courses and wouldn't have anyone to talk to, whereas here it is a lot more interactive.' FG2

Participants felt that informal learning evolved and was LSO context dependent. This may be related to the skill mix, environment, size, organisation, philosophy and tutor attitude within LSO but especially relating to student attitude:

'With the MSc group of 30 – 35 you still get some informal learning but not everyone participates, at least initially. Some will start talking to [educator] or to [programme lead]. Others go outside. Even through formal parts of the day you get some switch off within the group.' FG1

Participants supported formal and informal learning within the LSO team:

'Informal and formal learning takes place all the time within the team. We are always talking about stuff and on the courses as well.' FG1

'Students talk about cases with tutors at break times. There is a wide skills mix in the MSc group; they are graduates and may feel awkward. Initially, those less knowledgeable don't interact. By clinical skills days they are unlearning the need for formal training. Case presentation days are interactive with more informal learning.' FG1

Informal learning and other mechanisms appear to be enhanced by time in LSO. Clinical case discussions require students to present and discuss their own patient treatments within the group, using their own e-portfolio. This process is formatively assessed and requires a reflective analysis.

8.2.2.4 Reflection

Participants also felt there was evidence of reflection taking place with both those teaching and those being taught:

'We all reflect personally but the opportunities aren't always there to sit down to reflect as a team and not always formally documented. To reflect more frequently as a group would allow us to progress a lot quicker, which is where you need formal and informal processes.' FG1

Reflection allows self – analysis:

‘As a nurse, you start with the perception that you are not as important as [LSO leader] but that changes because you soon realise when you’ve done it a few times that you’ve got a lot to offer students and you do know things that they don’t and you can help them.’ FG2

Reflection was thought to occur and be important to continuing improvement within LSO. Encouraging student reflection was embedded in programmes:

‘Students reflect; formally in SEQs and in one to one’s to consider progress. Students reflect after exams, clinically on cases, on their education and how they’ve learned. Some do more than others and it depends on group interactivity; some are reflective positively; others more negatively, due to the personalities in the group.’ FG1

Equally, the mechanism of reflection varied depending on student attitude and the task being undertaken, which affects the learning mechanism firing:

‘Not every student reflects. They do clinically because it is a part of their role, rather than reflecting on what they’ve learned that day.’ FG1

Participants were asked their opinions on the inter-relationships between the proposed mechanisms. They felt that mechanisms fired sequentially:

'Mechanisms take place progressively, at different stages, for different individuals.' FG1

'At the start of the [MSc] course students aren't into the concept of interprofessional education. To them it is another course they attend and get their CPD. Some students expect to be handed everything they need and there's little empowerment. It takes a long time before they feel empowered to learn. It is a progressive process.' FG1

'Students learn from each other, more with OTs than MScs.' FG2

'Empowerment is linked with how the student then learns. Some ONs on courses have bosses that are supportive, want them to learn and help them develop; others have bosses not backing them. The latter are not really empowered to learn but come because it is the next [career] step. They are very different students.' FG1

'It may be the size of the group. One had 12 students, the other over 30. There is a different dynamic between the two. OT students socialise; they have a common interest and similar career pathway.'

MSc's are a group of people on a different journey. Maybe MScs don't have the perception of what a steep learning curve it will be.' FG2

There is reinforcement of the importance of group size to learning dynamics.

'After a while they think differently and find it quite exciting, because they get a learned empowerment from the group dynamics.' FG1

Certain mechanisms firing led to others firing. Some students appear to change due to the LSO environment more than others. Refinement of this theory could investigate how length of time within LSO affected such change and how sustained such change would be if the student left the LSO environment. There was agreement that everyone learnt from each other.

8.2.2.5 Interprofessional learning

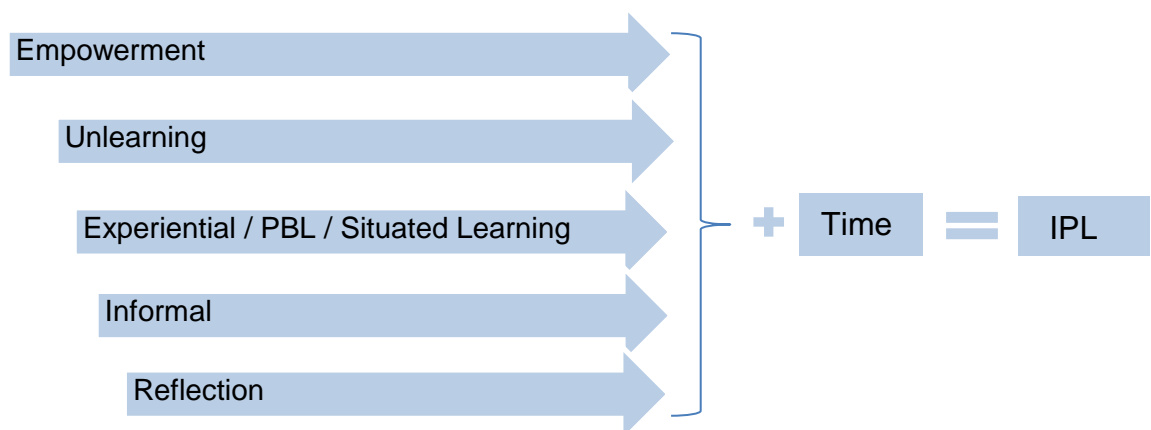
Having decided that all proposed mechanisms were acting in LSO, participants were asked how they related to interprofessional learning: if they all needed to take place; if they all take place at the same time, or if some had more emphasis at one time than another:

'They all need to be taking place. It is not achieved only on formal learning. We need a combination of mechanisms [M1 to M5] to get interprofessional learning.' FG1

‘Mechanisms are shifting; some are more important at certain times than others. They all have a place; at different stages in learning one takes a greater role. They are all equally important.’ FG2

Participants agreed that the interaction between contexts and mechanisms was a dynamic as opposed to a static state, and that both were related to the proposed outcomes. All mechanisms fire to varying degrees, at varying stages for different individuals. Mechanisms fire increasingly, relating to the time spent in the LSO environment. Formal learning is required before informal learning occurs; this formal learning may be derived from any of the M3 learning theories, which potentially fire at the same time but are context dependent as to which and when. All mechanisms M1 – M5 are required to be firing to enable M6 (interprofessional learning) to take place. However, the firing of M6 is reliant upon time spent in the LSO environment (Figure 9).

Figure 9: Hypothesised model of progression of mechanism configuration in LSO



Data supported the hypothesis that, provided the contexts were in place, the proposed mechanisms fired in LSO. This was felt to be a dynamic situation and further supported the programme theories relating to contextual factors. Agreement of participants to the proposed contexts and mechanisms is important in the testing of the programme theories. This may be significant to the contextualisation of IPE within LSO and the wider organisational acceptance of IPE in outside organisations. Participant understanding of the concepts displayed by focus group discussions is suggested to be significant in its' own right and indicative of a 'buy in' to the whole IPE philosophy. Discussion further progressed to consideration of proposed outcomes:

8.2.3 Outcomes

Proposed Outcomes:

- O1: Individual development
- O2: Enhanced depth of learning
- O3: Enhanced clinical competence
- O4: Enhanced communication skills and teamwork
- O5: Development of a conducive community of practice
- O6: IPE environment

Participants were given the suggested potential outcomes and were asked if they thought they occurred, both for the student and teaching group. It was agreed that within LSO the proposed outcomes were achieved and that they were context and mechanism dependent:

'Outcomes occur but it varies, dependent on the students. Internally people are empowered, have done courses and developed their skills. All outcomes are achieved in LSO but it is a dynamic state.' FG1

It was suggested that continuing improvement required reflection:

'All students gain outcomes on the courses and we gain through teaching. However, you don't improve unless you reflect. If I don't reflect I can't improve, which is why I write so much down.' FG2

Experience was thought to enhance certain outcomes, which relates to contexts and mechanisms:

'Year on year, my understanding and communication improves. Confidence helps, as does empowerment, being encouraged that you can do something, but reflection is needed too.' FG2

Experience therefore helps with facilitation of learning. It was described that when students returned to their own environment, outcomes could diminish if the contexts there were not supportive:

'Students do get individual development but when they return to their own practice, often it is not like LSO, so it is questionable whether the

enhancement that they've gained on the course will carry on. Often students haven't got the power to make that [practice] change.' FG1

The contexts of time spent in the LSO learning environment and attitude were identified as affecting outcomes:

'There is enhanced depth of student learning but it depends on their practice environment if it is continued or transitory. They take back things they've learned here, which improves them. They say: "My boss lets us do this now and finds it works well and we enjoy doing it." It depends on the dentists' approach, the reason why they send them on the course and student attitude. It's back to attitude again.' FG1

'Outcomes occur for different people at different stages and last for different lengths of time, dependent upon the background context but, not across the board for everyone.' FG1

Theory refinement could explore the effect of time relating to outcomes and whether the length of time in LSO changed how and if mechanisms fired, leading to outcomes achieved.

Participants were asked if all five outcomes (O1 – O5) were required to maximise learning:

'To promote interprofessional education you need all [O1 – O5] outcomes to occur. Therefore, people that haven't got all of those are not promoters of interprofessional education.' FG1

'All of those and probably another endless list of other things as well. We might not think they all happen sometimes. Everyone makes mistakes but 99.9% of the time they all [outcomes] happen.' FG2

Participants inferred that there were other outcomes of LSO education not within the programme theories. The length of time in LSO education and reflection were reinforced as important for achievement of outcomes:

'We've got to where we are now by learning from last year. You can't throw everybody into education because some people are not suited to it and it doesn't work. Each time we learn more and people come forward. They see their friends develop and think "I can do that."' FG2

It would appear that learning facilitators recognise the need for reflection, how it has led to improvement, especially related to individual empowerment to choose the level of involvement and role:

'You can see how they change over the course with respect to things like communication skills. There are a number of instances where a

student has changed their attitude, so something is happening to them. They are enhanced in themselves but whether that comes through back at work depends on their practice environment.' FG1

The importance of contextual factors within the student's own environment being conducive:

'If they came on the course with a negative attitude, it could slip back into their old attitude. If they have a positive attitude from the start, they will keep pushing. If you could not stimulate change, you would move onto somewhere where you could use that positivity.' FG1

'Some take it with them; some don't have the opportunity to. ONCs say: "We'd love to be doing assessment records, be more involved with patients but our dentists won't let us." Or, "the specialists don't like OTs doing assessment records." Similarly, some MScs go away and say: "I won't let my nurses do that, I've not got enough faith in them." Some people are never going to change their mind.' FG2

Participants suggested therefore, that some individuals, if they could not change the contexts of their own practice environment, would move. Others may appear to have changed philosophy but actually do not change at all:

'If you take the philosophy with you, then you are prepared to drive that philosophy. Some students presumably don't have the philosophy to take back. They've been empowered, enhanced, done all those other things but haven't taken on board the philosophy.' FG1

Some students have no control over their environment; some who do are not motivated to change it:

'Nursing and therapist students have minimal ability to change what happens in their practice; that is limited by the philosophy of their specialist. Some specialists want a therapist just to do the leg work, not to fully develop them. Their philosophy will never be the same as [LSO leaders]. Similarly, the MSc students have different motivations for being on the course, may not be fully enhanced by the programme, because they haven't got the right philosophy and attitude going into it in the first place. They do not adopt the philosophy or become part of the team when they return to their own environment.' FG1

A lack of a conducive community of practice, which is context dependent, is potentially a barrier to outcomes being realised in the longer term. Not everyone has the same team philosophy as LSO, so presumably, even if they have a community of practice, it may not be conducive to IPE:

'We were ahead of the game with OTs here. We have specialists that are training their first and want a book of rules, because they don't know how it will work. Sometimes we need to step back and understand it is an unknown for them but they are moving in the right direction to train an OT. The attitude evolves throughout the course, when they see what a benefit it can be. We are so consumed with: "Look how wonderful [this is], look at what nurses can do." That isn't and doesn't have to be for everyone but it could be. It is changing people's perceptions. If everyone came for a day and saw, we would change 99% but there are some out there who won't change.' FG2

Participants agreed that a conducive community of practice was required to provide an IPE environment. Communities of practice existed in other places but that they needed to be conducive, which required the contexts to be present. It was felt that LSO needed to be experienced before its true value was recognised; it has to be a lived experience over a period of time and for IPE, required immersion which was not diluted by exposure to non-IPE alternatives. Participants also felt that LSO was continually developing:

'Our philosophy and our way of doing things are evolving. [LSO leader] has learned that if you push people you get the wrong people in the wrong place. Let people do what they are good at and accept that some people don't want to lecture but they are absolutely amazing at what they actually do, so let them do what they do well.'

We've reflected and realised that round pegs in round holes is better than square pegs rammed into a round hole. It is a process of evolution that is working and its coming together. Ultimately, that is the philosophy - it has got to continually evolve. But things will stop evolving if that philosophy isn't there.' FG1

Participants were asked if [LSO leader] disappeared, would there be the drive and desire to continue:

'That pathway clinically has always been on the wall and obvious. Personal development for administration to mirror the clinical pathway is not as obvious and needs developing. There is a lot of positivity in LSO. [Colleague] is quite new and has changed the dynamics in the administration team. People with that attitude take it forward.' FG2

The suggestion was that the process was continually evolving, was cyclical in nature and was self-perpetuating the philosophy. The dynamic nature of LSO when viewed over time was suggested:

'Individual development, enhanced depth of learning, clinical competence and teamwork (01–04) are necessary to generate a conducive community of practice. They are achieved for the majority of the time but there are times when some are not achieved. Those outcomes apply more to the clinical team because they have the most

focus on development. For example, as you become more competent and confident so your communication skills develop. As [nurse] has gained clinical competence everything else has improved with it.' FG1

'It is not good all the time and everyone has problems. Sometimes we are all poor and the next minute, all great and it's a rollercoaster. That's the ability of the team to manage and deal with problems.' FG2

The importance of aligning non-clinical team members educationally was reinforced:

'Not just at LSO but across dentistry – clinical teams are fantastic but leave other parts behind. To really move forward all the team need the same pace of learning and development. Individuals within can go at a pace to suit them but you have to push the whole group forward. It is easy for administrators particularly to get left behind, so they're not empowered and you get a divide which holds everything back.' FG1

Participants discussed if there was a one way progression between contexts, mechanisms and outcomes, or a to and fro movement between them:

'It is a circular movement because every time we go up another level of development, of learning, we go through that process again and it

drives everything forward another step. It is like a helical spring; what you learned from last time you apply next time and so on. Students automatically come into an improved programme from the one before. There is a momentum so everyone is actually gaining, because otherwise you would stay flat and nothing would ever get better.' FG1

Course quality therefore was recognised as important. Education was seen to be embedded, beneficial and enjoyed by the LSO team:

'If education stopped tomorrow we'd all have a lot less job satisfaction; it is too integral, too important, part of what we are and what we do every day. It benefits us. You are teaching while you are clinically treating. If education wasn't here and the philosophy to educate wasn't part of LSO we would just be like any other orthodontic practice where you treat and go out the door. Even for our patients it is an enhanced environment because of education and ultimately that's why we do it. The feedback we get from our patients because it is an educational environment is brilliant.' FG1

The effect of education on the LSO environment was, therefore, apparently recognised by patients, which in turn was motivational for the team:

'Patients say they have a much better experience coming here – compared to their other kids at other practices. That's because of the

teaching – they are not necessarily learning but being effectively communicated with. LSO is a happy environment because we've all got great job satisfaction so they feel it is a happy place to be because we are all enjoying it. The majority are really motivated because [LSO leader] comes in really motivated, the other girls will come round and make suggestions. It is that whole mentality that we are always learning and developing.' FG1

IPE was identified as an outcome of LSO education. The evolution of LSO over time would appear to have seen IPE become increasingly embedded within the team:

'The philosophy of interprofessional education is too integrated now. It would change the practice beyond measure if we removed it. It would be boring.' FG1

'It is developing a community of practice. It is [other specialists] allowing themselves to let go. It's protectionism and accepting that somebody else can actually do it the same as you can.' FG2

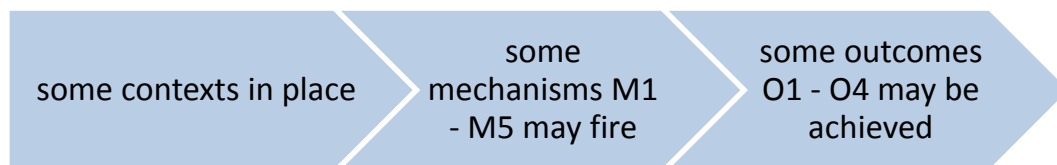
Participants perceived that the LSO team felt that IPE was now driven by the team, who had ownership of the philosophy.

8.3 Tested programme theories

The proposed programme theories in terms of contexts, mechanisms and outcomes were supported. CMO configurations were tested and modified by phase 2. The focus group discussions initiated the refinement processes, allowing the iterative data analysis to continue seamlessly.

It was further identified that: if some contexts are in place, some of the mechanisms M1 – M5 may fire and some of the proposed outcomes O1 – O4 may be achieved (Figure 10).

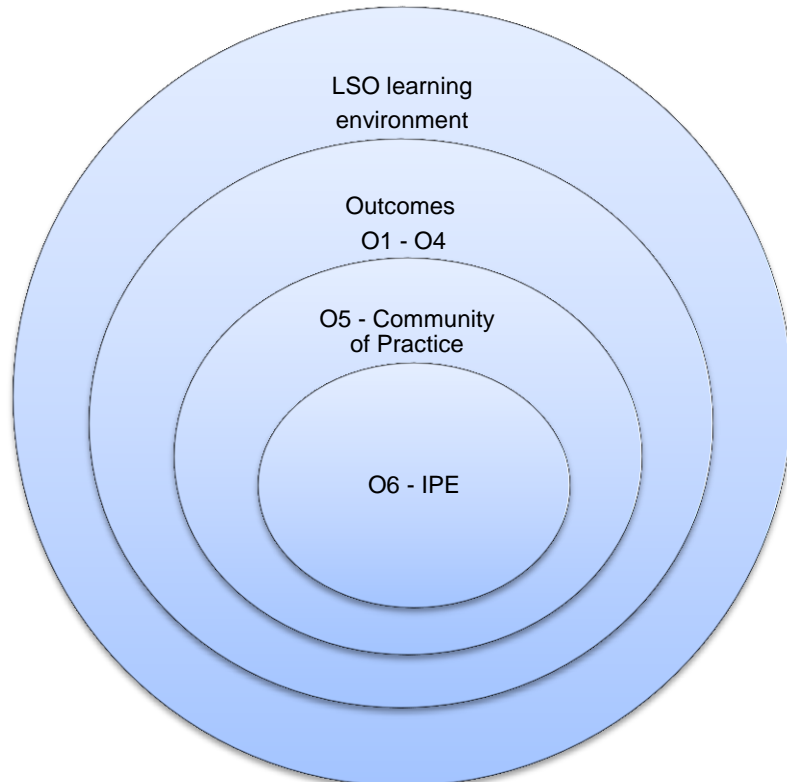
Figure 10: Hypothesised CMO configuration if some contexts in place



The programme CMO theories were modified to suggest that all contexts C1 – C6 must be in place for each of the mechanisms M1 - M5 to fire, which in turn and in time, lead to M6 (IPL) firing. All mechanisms M1 – M6 firing maximizes the opportunities that LSO offers and allows each of the proposed outcomes O1 – O4 to be achieved. Within LSO, if outcomes O1 – O4 are achieved, this, in time, leads to outcome O5 – a community of practice, which is conducive to and, over a further time period, subsequently followed by O6 - IPE. For a conducive community of practice and then an IPE environment to evolve requires all contexts to be present, leading to all

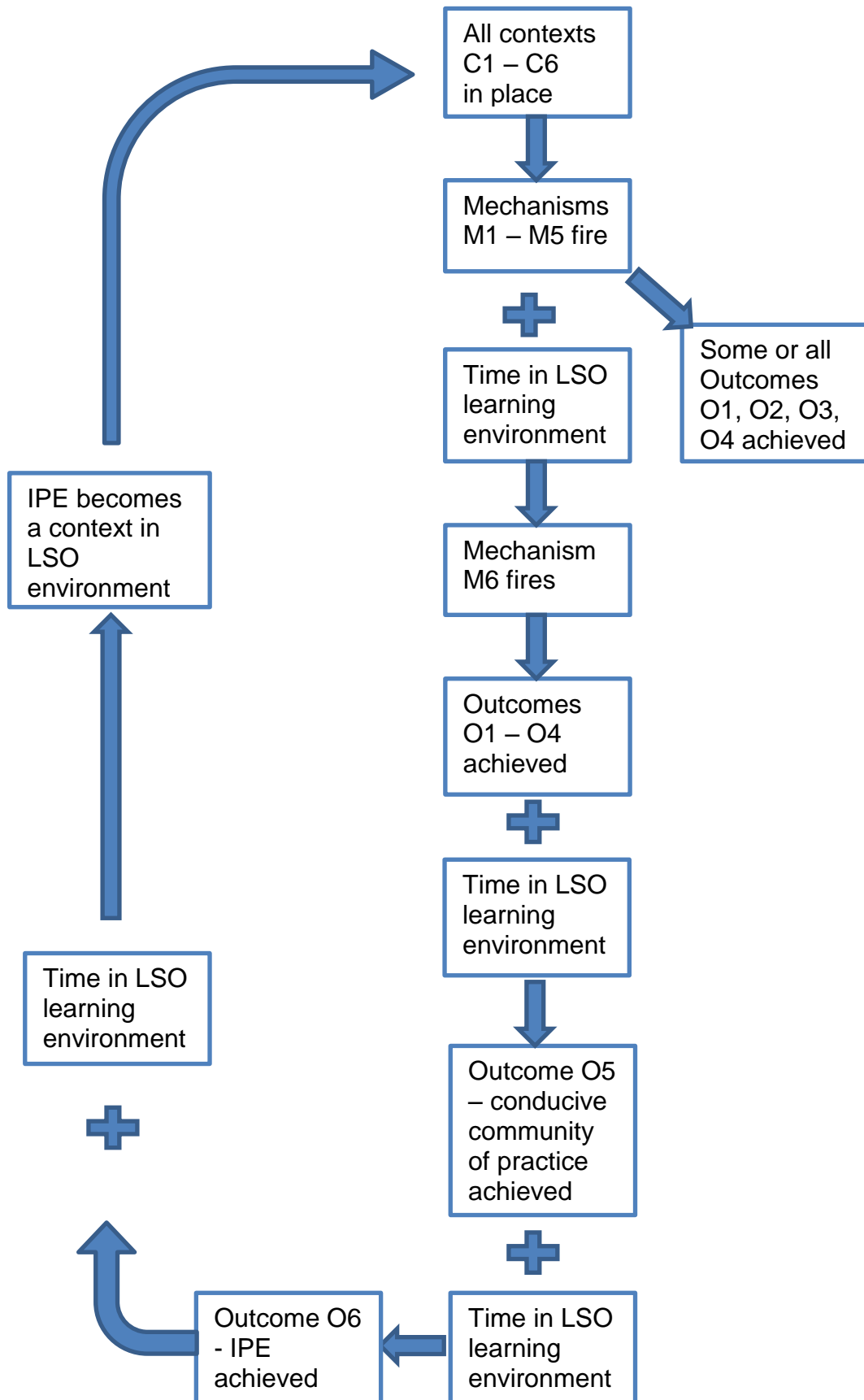
mechanisms firing and time immersed in the LSO learning environment. Figure 11 represents development of IPE as an outcome in LSO.

Figure 11: Hypothesised development of IPE as an outcome



Phase 2 data suggested that, with time in LSO and maintaining all contexts in place, IPE can evolve from being an outcome into a context (Figure 12, page 285). For IPE to become embedded, it must become contextual in organisational philosophy. As such, it is hypothesised that, in LSO, an IPE environment is contextual and an evolutionary progression whereas IPE as an outcome, is potentially a more transient entity. This programme theory is one that phase 3 of the evaluation aimed to refine.

Figure 12: Hypothesised contextualisation of IPE



8.4 Phase 2 programme theories

The tested programme theories following phase 2 are documented in Table 12.

Table 12: Phase 2 tested programme theories

- all contexts interrelate, are not hierarchical but may have a core factor;
- IPE requires all the combined contextual factors to be in place, which facilitates the mechanisms to fire;
- mechanisms fire sequentially, are influenced by time participants are immersed in the LSO learning environment and if all contexts are in place and all mechanisms M1 – M5 fire, then interprofessional learning M6 fires, which leads to outcomes O1 – O4;
- the inter-relationship between contexts, mechanisms and outcomes is dynamic and constantly changing;
- outcomes O1 – O4 are required to allow O5, a community of practice to evolve, which is time dependent;
- a community of practice conducive to IPE has evolved in LSO, alongside individuals developing within a team infrastructure;
- development of a community of practice was required in LSO as a progression in the development of IPE as an outcome, which required all contexts to be maintained, mechanisms to fire and sufficient further time;
- IPE has progressively evolved and, over time, has become contextual within LSO and integrated within the philosophy. This explains the evolution of LSO.

8.5 Summary

This chapter describes the data analysis from phase 2 focus group discussions, testing the programme theories previously identified in phase 1, which suggest that the contexts, mechanisms and outcomes are all present in LSO, that the CMO configurations are dynamic and that IPE has increasingly evolved over time. If this strengthening of IPE within LSO has indeed occurred, the phase 3 refinement of the programme theories will explore whether this progression has continued to an extent that IPE has evolved from being an outcome into an organisational context. Should that be the case, then the refining phase could also explore if this contextualisation of IPE is time dependent, requires the maintenance of required contexts, which allow mechanisms M1 – M5 to fire, thus leading to M6, interprofessional learning, delivering the proposed outcomes O1 – O4, leading to O5, a conducive community of practice, which in turn leads to IPE. Certainly from these focus group discussions, it would appear that IPE in LSO is a dynamic process. These theories were subsequently refined in phase 3 and the next chapter discusses the final phase of this realist evaluation.

Chapter 9: Phase 3: Refining the programme theory - data collection, data analysis and findings

9.1 Introduction

Phase 3 involved refining the programme theories with data collection from one focus group, with participants (Table 13) chosen by purposive sampling from those already involved in phase 2 and facilitated by the same research associate.

Table 13: Phase 3 focus group invited participants

LSO educator / administrator
LSO administrator
University administrator
LSO educator
Student / educator
Student
Length of interview: 70 min
Transcript pages (A4): 27

This chapter initially discusses phase three data collection, including design of the focus group questions, followed by data analysis and interpretation, to provide middle-range theory statements about how, why and for whom programmes work (or not) in what contexts (Cheyne *et al.*, 2013). It includes quotes from the focus group discussion and diagrammatic representations of CMO configurations to support the refined programme theories.

9.2 Designing the focus group questions

This phase of realist evaluation is to refine the CMO Configuration hypotheses generated from phase 2. As such, the questions were based upon the phase 2 findings. Once the programme theories had been tested, appropriate questions to refine them were developed by the researcher, discussed with the supervisor team and then with the research associate, together with development of a focus group phase 3 research associate guide, which included explanation of the process for participants. Since all focus group participants had taken part in the semi-structured interviews and phase 2 focus groups, further piloting was deemed unnecessary.

9.3 Data collection

The focus group took place at LSO, during participant normal working hours. The discussion was audio-taped and subsequently transcribed verbatim into a word document by an independent transcriber. No comments were directly attributed to any individual participant but, as previously discussed (page 176), anonymity cannot be guaranteed, especially as the participants in the focus group were known by the researcher. This was again explained to participants as part of the consent process and had been previously documented in the ethical approval.

9.4 Data analysis – findings

Phase 3 data analysis focused on refining the programme theories relating to contexts, mechanisms and outcomes and CMO Configurations. They were initially re-explained to participants in the group and discussed as to potential interrelationships between them. Participants were initially shown the previously agreed contexts:

9.4.1 Contexts

Tested Contexts:

- C1: Philosophy or ethos within LSO
- C2: Attitude
- C3: Organisation within LSO
- C4: LSO educational setting
- C5: Time in LSO learning environment
- C6: Skill mix within LSO

Participants were asked if they felt one context was more central, on which others were dependent; were in any way sequential; if there was an inter-relationship between the contexts and, if so, were they able to represent this diagrammatically:

‘They [contexts] were all in a circle and linked together. We [previous focus group] discussed if one was more important than another. Philosophy goes in the middle and the others stem from that.’

This prompted a long group discussion; initially participants expressed differences of opinion with respect to the driving factor, some identifying the philosophy and others the educational setting, which some participants wanted to place in the middle of their evolving circle:

'I am not sure philosophy goes in the centre. Now the educational setting drives our philosophy. If we were not an educational setting we would not have the ethos and philosophy that we have.'

'Even if we did not have the educational setting here, [LSO leader] would always have the educational philosophy of learning and developing people and he would just do it somewhere else.'

'It was [LSO leader's] initial ethos and philosophy to have a highly developed, highly educated team. He put that into motion at LSO and what has evolved is a team of people whose philosophy and ethos is education and developing the team.'

'So that means that the philosophy is at the centre.'

There was further discussion based upon the history of LSO education and how it had originally started:

'It started from somewhere and that was his [LSO leader's] philosophy. [LSO leader] saw personal characteristics and attitude in people which he thought could be developed and it has driven forward from there. We qualified and moved that on with other members of the team. Other people saw it and it is that attitude which all stemmed from that philosophy, the drive and that ethos. That has then been perpetuated progressively with others.'

'It was initially [LSO leader and programme architect] philosophy to put this together, their determination to create a team and deliver team focused patient care. Their philosophy, attitude, and personal characteristics are still the driving force behind it. What we now have is the educational setting at LSO and a team of people whose philosophy and ethos is education and development in the team.'

'Anyone who is involved in education has got philosophy at the centre. None of this is possible without that.'

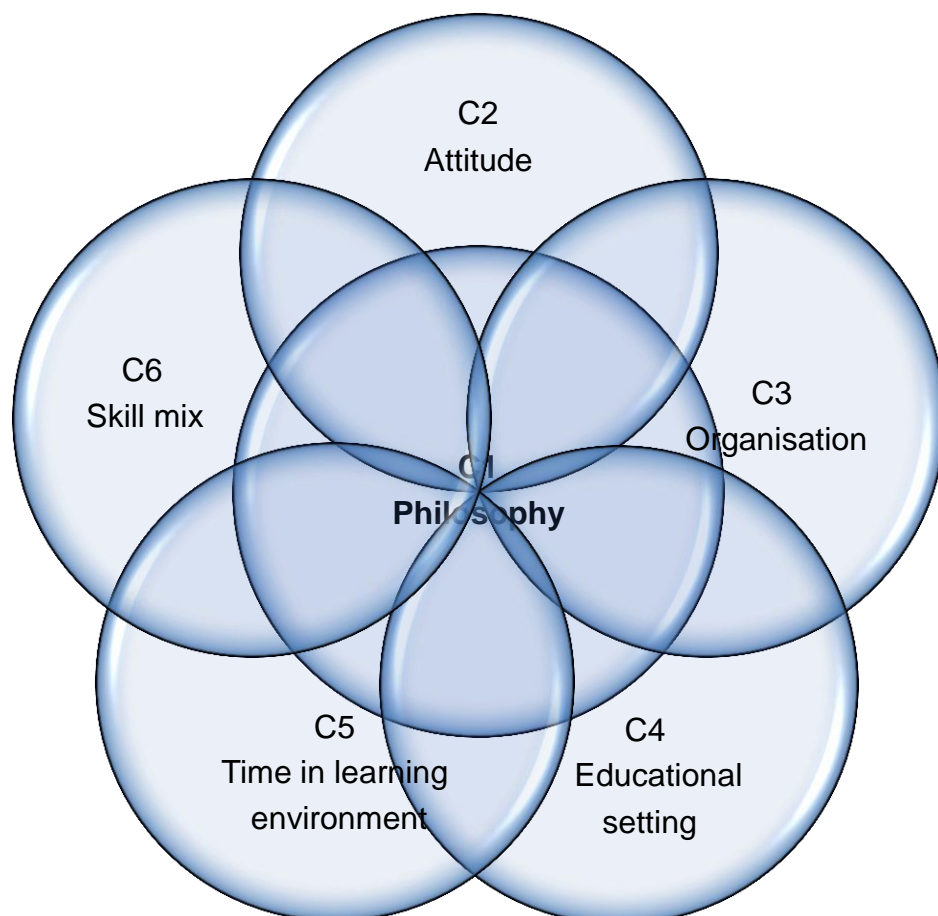
Following the discussion, participants reached a consensus that philosophy was the central context and had to be present at the outset. There followed further discussion relating to the interrelationships between the contextual factors and how this had evolved:

'People come for employment at LSO because they hear ongoing education is our ethos. It goes beyond our world of working here.'

'New people joining the team see the attitude of the team that have learnt from that philosophy. The philosophy underpins it all but you cannot separate any of the rest. They are all linked together.'

The group decided that contexts were all inter-related with a diagrammatical representation resembling a flower, with a centre and linked petals:

Figure 13: Refined LSO contextual theories



There was discussion as to whether some petals were bigger than others, with a suggestion that attitude could be larger and as such, more important. The question was then asked as to who benefits from LSO education?

'Some people don't get as involved as others. Less participation is due to their attitude. Those that are not involved in education now are not going to grasp that philosophy.'

'Not everybody takes it on board. People only benefit within the team if totally on board with the philosophy. If they don't buy into philosophy they don't benefit from other contexts.'

'They need to buy into the philosophy, and they see that over time. If their attitude is wrong, they haven't got the philosophy. If they come in at C4, they have to go back in to the middle and then come out again.'

It was recognised that people were attracted to LSO because of the different contexts, including the learning environment, but they still needed the right attitude and buy in to the philosophy. Participants views therefore reinforced the importance of the philosophy, plus the attitude of individuals to maximise the opportunities LSO offered and that everyone had the chance to benefit:

'[LSO leader] sees everyone being involved and having a role in the student journey and the process of education.'

'There will be those who come in and out of LSO – like a bee on the flower, get their pollen and go.'

Different people therefore had different levels of immersion and 'buy-in' to the philosophy. Participants analysed their individual journeys within LSO:

'I came in at C3, but it took me two years to realise what the philosophy was.'

'I came in at C4, because of the educational setting but until I bought in to the philosophy, I was never going to progress. I had to buy into the philosophy before I could succeed.'

'I came in at C6 and then had to go back to the middle to be able to get to C2 and C3. People come in at different contexts but all have to go to the centre (philosophy) before progressing.'

'It is different for different people. Some people come in with skills but don't develop due to their attitude and not buying into the team philosophy. So, all the contexts are inter-related.'

'I came in at the outset with the right attitude I suppose.'

All participants reinforced that, whatever their starting point, they had to understand and share the core philosophy to maximise progression, even though at the time they may not have realised that was happening. They were then asked if they felt the contexts were transferable elsewhere:

'With the right philosophy present at the start and attitude of the people involved, it could be transferred to another setting.'

'The philosophy had to be present at the start. Now it would be difficult to achieve all what we do without C4.'

Data support the continuing evolution of LSO. The initial contexts, philosophy and attitude, have perpetuated the development of further contexts in LSO. These contexts are now integral to the delivery of education at LSO in the style and level now achieved. As LSO has metamorphosed, new contextual factors have been created and become integral to mechanisms firing. This could be important for transference to another environment and to the hypothesis that IPE has to evolve over a period of time.

The group were then shown the proposed diagrams relating to contexts from the research associate guide and asked to compare to their diagram:

'In our diagram, the contexts overlap, which they do.'

'We all see it from different perspectives, as we all wear different hats, which is the point of IPE. But we all have the same philosophy for education.'

'You will never succeed unless you have the philosophy – that's the key. Understanding that is important. You can come to work and do a job, but not be a part of and enjoy the IPE unless you believe in it.'

'You don't get the benefit from and share IPE without the philosophy. It is enjoying it, taking the advantages from that and sharing it.'

Enjoyment was, therefore, recognised as a common description of those involved with LSO education. This potentially relates back to attitude and may link with the ability for self-directed learning. Participants confirmed that their diagram (Figure 13) best represented the inter-relationships between the contexts. They decided that at LSO the petals should be of similar size and stressed their interdependency but, in other IPE environments elsewhere, may be a different size. They commented that in one diagram shown, IPE was at the centre and that they had not previously been given that as an option. It was discussed that this was potentially an evolutionary process which would be returned to later in the focus group.

9.4.2 Refined theories – Contexts

Data reaffirmed that the core and driving context was the LSO philosophy. Participant attitude was also significant. Some people would join LSO with other skills, or for other contextual reasons but, without the right attitude to buy into the philosophy, they would not progress in education. Whatever the context that encouraged an individual to come to LSO, to maximise the educational opportunities which LSO offers required philosophical buy-in. The main beneficiaries enjoyed the process, and vice versa – this was a cyclical process again based upon attitude and philosophy.

At the inception of LSO education, C1 (philosophy) was the initiating factor, coupled with C2 (attitude). These contexts facilitated the start of education and allowed C6 (skill mix) and C4 (educational setting) to evolve. This was followed by the further development of C3 (organisation) and C5 (time in learning environment), which all together provide the contexts for IPE. All contextual factors are now interrelated and an IPE environment has evolved. IPE developed alongside the contexts. Over time, setting and organisation have assumed more importance; IPE is increasingly dependent upon all contexts; were any removed, the level of IPE would not be maintained. For transference elsewhere, philosophy and appropriate participant attitude are essential, to develop a learning environment mentality. Time is required to cultivate a team with the required skill set. The education setting progressively develops and can be quite individual in terms of what the

specific learning outcomes and subject matter. Organisation is critical at all times; the bigger the environment the more complex the administration.

9.4.3 Mechanisms

Participants were then reminded of the mechanisms which had been discussed and agreed by phase 2 focus groups, and that these were the processes relating to how learning took place at LSO.

Tested Mechanisms:

M1: Empowerment

M2: Unlearning

M3: Experiential learning / Problem Based Learning / Situated Learning

M4: Formal and informal learning

M5: Reflection

M6: Interprofessional Learning

Participants were asked if there was a sequence in the mechanisms; does one lead on from another, do they all progress at the same rate and was it necessary to have M1-M5 in order to have M6? Discussion related back to participant attitude and to M2, unlearning:

'If anyone chooses not to unlearn, they do not benefit from IPL. To benefit from IPL you need to have the other mechanisms.'

'People need to unlearn what they know about the profession too, because we have a different professional model to the majority in dentistry. Some are used to a hierarchical system, especially hospital based nurses. They are never going to be allowed to carry out certain tasks, even though they are within their scope of practice. They have to unlearn that philosophy as well.'

Data confirmed the views that the contextual background of some students made it harder for them to unlearn or, even when willing, to overcome barriers in their own working environment on return. To get M6, IPL, all other mechanisms were required:

'You need all M1-M5 to get interprofessional learning. You could develop your own skills with only elements of M1 to M5 but you would not get IPL.'

'Experiential learning is learning in the LSO environment. You would not have the learning experience you get here, if it was not in this environment. Elsewhere you do not have nurses and orthodontic therapists around. You cannot lose any of those, because experiential learning in LSO is not just clinical, it is what happens everywhere in LSO, both formal and informal.'

Participants agreed that all mechanisms M1 to M5 were required for M6, IPL to fire, although some individuals may benefit in some way from some mechanisms from M1 to M5 but that this would not be due to IPL. The discussion moved to whether the mechanisms fired sequentially:

'Empowerment comes at the top and IPL at the end; the others can come in any order, but vary from student to student. Some people may need the experience of formal and informal learning to be able to unlearn.'

'If not empowered, they do not want to do M2, M3, M4 and M5.'

Variation between individuals is a key point and may partly explain the dynamic nature of LSO. Participants discussed the importance of reflection and demonstrated it in action as the discussions continually referred back to the contexts and their suggested inter-relationship diagram:

'M1 comes first, then you reflect. Students need to reflect on the learning experience. M6 comes at the end and the others in between. Reflection comes after each one. It is a constant process, maybe a spiral.'

'Maybe the stem of the flower could be in the form of a spiral.'

Reflection was demonstrated in action by the discussion, reinforcing it is a dynamic process. Participants continued to link mechanisms to contexts:

'Empowerment is linked to philosophy, because if you take on the philosophy, you are then empowered to want to be part of that philosophy.'

'Unlearning sits comfortably with attitude, because to unlearn you need to respect the qualifications of those around you and appreciate what they are teaching you. That applies to learners and teachers.'

'In order to change attitude you have to reflect on that [above] process. Reflection is continuous and comes after each stage. You could not just jump into formal or informal learning unless empowered.'

'You can empower yourself; it need not be caused by someone else. You may have your own philosophy and want to learn before you come here.'

It was agreed that M1 empowerment was required and may be already firing for some prior to LSO education. Discussion moved to whether the mechanisms fired for everyone and if not, why this was the case:

'All the mechanisms are valid and necessary. They do not take place for everyone – but they [people] are not successful and usually drop out; including past members of staff. Some are not empowered; they do not unlearn. The higher up the traditional professional hierarchy someone is, the more qualified they are, the more difficult it is to unlearn. Then true reflection and informal learning becomes harder too. All of these factors make it more difficult for them to become part of IPL.'

'They are stuck in their ways and have an old philosophy. This may be related to age or where and when they trained. Some students are originally trained outside the UK and their philosophy towards their role and nurses may be different. There is therefore a huge step of unlearning to take to accept that non dentists can teach you.'

'Usually this is overcome with time. More time spent with and listening to people who have been part of that process and have the right attitude, changes opinions. Buying into the team philosophy gives the doubters a light bulb moment. It is the people that teach that is the key.'

Data confirmed that the firing of mechanisms is related to time spent in the LSO environment and that the influence of people with the appropriate attitude and philosophy is the key:

'If we only saw students once each year, they would not benefit as much as if they were here every month. If they are full-time, that makes a difference.'

'When the MSc students first come they are very stand-offish – a, "they know best" attitude but, over their time here the majority have changed. This is due to the philosophy of people they are around towards IPL. You have to have the right philosophy towards IPL.'

'It is the overall learning process within LSO, which is M3.'

'I would not be able to teach what I teach elsewhere, without the experience of teaching it in the LSO environment first.'

It would appear from these comments that the group were supporting situational learning within LSO and that all the mechanisms were necessary for the learning experience to be maximised. Some individuals still had a degree of apprehension relating to teaching more qualified peers:

'Some people have bought into the philosophy, are continually learning but feel that they cannot teach beyond their own level.'

'In that case they have not unlearned [in order to understand] that they can.'

'People learn from each other; some do not see beyond that. They will teach up to a point and then stop. So that person is not right for that role. It is important to have the right people in the right positions doing the right job. LSO is moving towards this. Improved organisation is helping that process.'

These comments relate also to the progressive evolution of LSO IPE and how reflection on processes has shown that individuals must be comfortable

in their roles. This also links to enjoyment, which was discussed relating to contexts and is potentially significant in IPE development outside LSO.

The group were asked to confirm that all mechanisms M1 to M5 are necessary to drive M6 and if there was a sequence:

'M1 + the sum of M2 +M3 +M4 +M5 = M6.'

'People don't unlearn unless they want to. They need to be empowered in order to unlearn.'

'It is influenced by time away from the environment; more time in LSO means getting there quicker. It also depends on the individual; with the right attitude and commitment they engage and fly through. Everyone has the opportunity to be involved but some choose not to.'

Data further underpinned the importance of contextual factors, including the attitude of individuals to maximise the opportunities available at LSO. Time in LSO was related to course progression and exposure to specific aspects of LSO, including clinical patients:

'Some MSc students finish the Certificate stage without unlearning. Maybe this is due to a limited exposure to LSO, or due to past experience and letting

go of what is familiar. Having done the Diploma stage observation sessions, there are few that have not unlearned. When they experience how the LSO team works clinically, the penny drops; they buy into the team philosophy and change. Some choose not to, until they realise it is not helping them.'

This underpins the need for the LSO primary-care environment where students experience situational learning, including seeing the team treating patients. By the Diploma stage, students are further immersed in the LSO clinical environment and see application of their learning relating to clinical cases. They are also applying this learning in their own clinical treatments. Relating to Knowles' theory of adult learning (Knowles *et al.*, 2011), they see the application and value of previous learning processes. Maybe this takes longer for MSc students, where their learning time is more extended, are qualified dentists and higher up the traditional professional hierarchical ladder. For orthodontic therapy students, learning time is more compressed, so their ratio of time within LSO to outside environments is much greater. Also, they are less qualified than MSc students; similarly orthodontic nurses are less qualified and their learning outcomes take less time to achieve.

9.4.4 Refined theories – Mechanisms

Phase 2 of the evaluation had tested and agreed the proposed mechanisms. In this refining phase, discussion explored how these mechanisms fired within LSO, to give further understanding to the processes. The mechanisms were all confirmed as necessary in LSO for IPE; none were changed but how

they inter-related was analysed, which led to greater recognition and comprehension. Theories were refined to include: that M1 (empowerment) was required initially, that this was provided by the LSO contexts but did not fire for everyone and that some individuals were already empowered by their own philosophy and attitude before entering the LSO environment. Once empowered, mechanisms M2 (unlearning), M3 (experiential/problem based/situated learning), M4 (formal and informal learning), and M5 (reflection) were needed to be able to fire M6 (IPL). M5 (reflection) is required as a continuous process throughout. Some people may benefit from LSO without all of the mechanisms firing for them individually but that benefit in terms of outcomes would not be fully derived from IPL.

9.4.5 Outcomes

Participants were reminded of the outcomes agreed by phase 2 focus groups, and that these were some of the results of LSO education.

Tested Outcomes:

- O1: Individual development
- O2: Enhanced depth of learning
- O3: Enhanced clinical competence
- O4: Enhanced communication skills and teamwork
- O5: Development of a conducive community of practice
- O6: IPE environment

The group were asked to discuss the outcomes, if O1 – O4 were needed to drive O5, a conducive community of practice and from this to develop O6, IPE:

'Unless you feel competent, you would not be comfortable to teach.'

'You do need to be constantly improving in areas you are performing.'

'We need O1-O4 to drive O5, a conducive community of practice.'

There was much discussion relating to O3 and whether 'clinical' should be included:

'Being part of the education team, your role may not be clinical but you are still learning.'

'When delivering IPE, you learn more and become more competent yourself, as well as the students. However, we need to take "clinical" out and put "skills" in, because we teach beyond clinical so that is narrowing the field too much.'

'For many students, all they expect is to learn further clinical competence. They do learn enhanced clinical competence.'

‘Organisation and administration is so important to effective IPE, so it is enhanced skills competency in your area of work.’

The group decided that O3 should be refined by removing the word “clinical”, since “enhanced skills competency” covered both clinical and non-clinical skills. Participants were then asked if leadership should be an outcome:

‘Not everyone becomes a leader. Leadership is also about management of your time, skills and taking ownership of your own learning, to get the best out of your learning. Leadership and management comes within depth of learning.’

‘It comes under teamwork as well; to have time to develop you have to work within team parameters. Teamwork is also understanding where you fit and being respectful of the rest of the team with what you do.’

Data confirmed that outcomes O1 to O4 were all necessary to achieve O5. The group were asked if IPE was now the LSO philosophy and, if so, was it always the philosophy without anyone realising it?

‘IPE is the LSO philosophy. [LSO leader’s] original philosophy was to develop his team, by team members teaching team members. This has been proven by [OT colleague] career pathway.’

'The mission statement was originally "continuing personal development for the benefit of the whole team." That was [LSO leader's] philosophy right from the start. It sums up O6 as well.'

This appears to suggest that the current and original LSO philosophy was indeed IPE and further implies that a philosophy which puts the team above individuals is integral for successful IPE. Participants were then asked if there was a difference between LSO people and those from outside?

'It depends upon the philosophy of their own practice and community. LSO is a rarity in dentistry. However more practices are now sending students to us, learning from us and then changing their philosophy.'

'Some practices say they are keen to develop their team on the surface but when team members go back, they are not allowed to change due to the attitude in their own practice. They buy into our philosophy but their practice doesn't have the same philosophy.'

'Other orthodontic practices have a similar philosophy to [LSO leader] for team based treatment delivery. Orthodontic therapist trainers change their philosophy re treatment but not IPE – they use us for that.'

'Student nurses may go back buzzing with ideas but get stonewalled. Trainers are the decision makers – they need their philosophy changed. Some trainers send people for training but do not support them on the course. There is a big difference. Orthodontic therapist trainers have to demonstrate some of the philosophy to get their students through the course but whether they maintain the philosophy afterwards is debatable.'

There is a significant difference between some practice environments that external students come from and LSO. This makes it more difficult for any changes relating to IPE to be implemented by students when they return to their own environment. This finding is supported in the literature (Barr *et al.*, 2000; Barr, 2001; Cooper *et al.*, 2001; Reeves, 2001); it also strengthens the importance of a community of practice which is conducive to IPE being a pre-requisite to development of IPE.

Having established the need for a conducive community of practice and a philosophy initiated by the LSO leader, the group were asked if [LSO leader] went, would IPE continue?

'[LSO leader] has built a really strong skill set team, with the same ideas, vision and philosophy. It would continue, maybe not at the same pace as [LSO leader] does. There is a need for [LSO leader] for

patients, or a specialist with the same philosophy. If the next specialist didn't have the same philosophy, the team would all go.'

'[LSO leader] is the driving force and has contacts with [University of] Warwick. Unless the replacement person had all of that, it would stop in the way it is now. Whether patients, or students, they buy into him.'

'We couldn't teach the MSc course without [LSO leader].'

'If someone came in, without the same philosophy, the team would say this is how we do it, how we like to work and that person would change or the team would leave. The drive would come from the team, but would need a leader. [LSO leader] must surely have a contingency plan in place.'

'With the people we have developed, it will now always be a part of their career so, it would carry on. To deliver IPE to the level we have now reached, it takes [LSO leader]. We would maintain a level but without [LSO lead] it would not be the same.'

The LSO team want to continue IPE and would not accept a situation where it was not continued. However, there was recognition that the overall skill mix would require an individual with the same skill set, philosophy towards IPE

and the team, plus the professional contacts as held by [LSO leader]. This reinforces the importance of the team skill set as a contextual factor. It also highlighted that, for the sustainability of IPE, planning should include continuing development of the clinical and educational skill mix. Further discussion explored if LSO IPE could be transported elsewhere?

'Maybe like a brand – sowing seeds. It could be transported if all the contexts were present'

'We are back to the flower analogy but it works. The IPE analogy comes back to the flower. IPE could now be put into the middle. Maybe [LSO leader] should be in the middle.'

'IPE could maybe be the stem that leads up to the flower. Or IPE could be the sun that makes the flower grow, or the roots.'

Data reinforces the contextual requirements required for LSO IPE and inferred that provided these were met, it could be transportable.

9.4.6 Refined theories – Outcomes

Following data collection and analysis, it was agreed that all outcomes were achieved but not for everyone. Outcome O3 was refined to 'enhanced skills competence' to reflect the importance of the development of the non-clinical

administrative team to the success of IPE. It was confirmed that O1 – O4 (individual development, enhanced depth of learning, enhanced skills competence, and enhanced communication skills and teamwork) were required to develop O5, (a conducive community of practice), which in turn was required for O6, (IPE).

9.5 Refined programme theories – CMO configurations

The refined contexts, mechanisms and outcomes relating to LSO education are as documented in Table 14.

Table 14: Refined contexts, mechanisms and outcomes

Refined contexts	Refined mechanisms	Refined outcomes
C1: Philosophy or ethos within LSO	M1: Empowerment	O1: Individual development
C2: Attitude	M2: Unlearning	O2: Enhanced depth of learning
C3: Organisation within LSO	M3: Experiential learning / Problem Based Learning / Situated Learning	O3: Enhanced skills competence
C4: LSO educational setting	M4: Formal and informal learning	O4: Enhanced communication skills and teamwork
C5: Time in LSO learning environment	M5: Reflection	O5: Development of a conducive community of practice
C6: Skill mix within LSO	M6: Interprofessional Learning	O6: IPE environment

Overall, in phase 3 there was very little refinement of the individual contexts, mechanisms and outcomes but the process itself was still valuable as it led to a deeper understanding of their inter-relationships – the CMO configurations. This is discussed further on page 352. LSO IPE now requires the combined contextual factors to be in place. They all interlink but acceptance of the core philosophy was seen to be the initiating factor for education in LSO, together with individuals with an appropriate attitude to buy into the philosophy. The other contextual factors have evolved from this, have facilitated the development of and are now integral to, IPE in LSO. The core philosophy is still seen as the driving factor and its acceptance and belief is required to maximise the educational opportunities that LSO offers.

The contextual factors enable the learning mechanisms to fire. M1 is required to allow M2, M3, M4 and M5 to fire. Some individuals gain M1 from LSO; others already have M1 within themselves. Wherever the stimulus is achieved, empowerment is necessary. M2 – M5 fire at different times for different people but M5 is required throughout. M1, plus the sum of M2, M3, M4, and M5 allows M6, IPL to fire. Not all mechanisms fire for everyone but this can be related back to missing contexts.

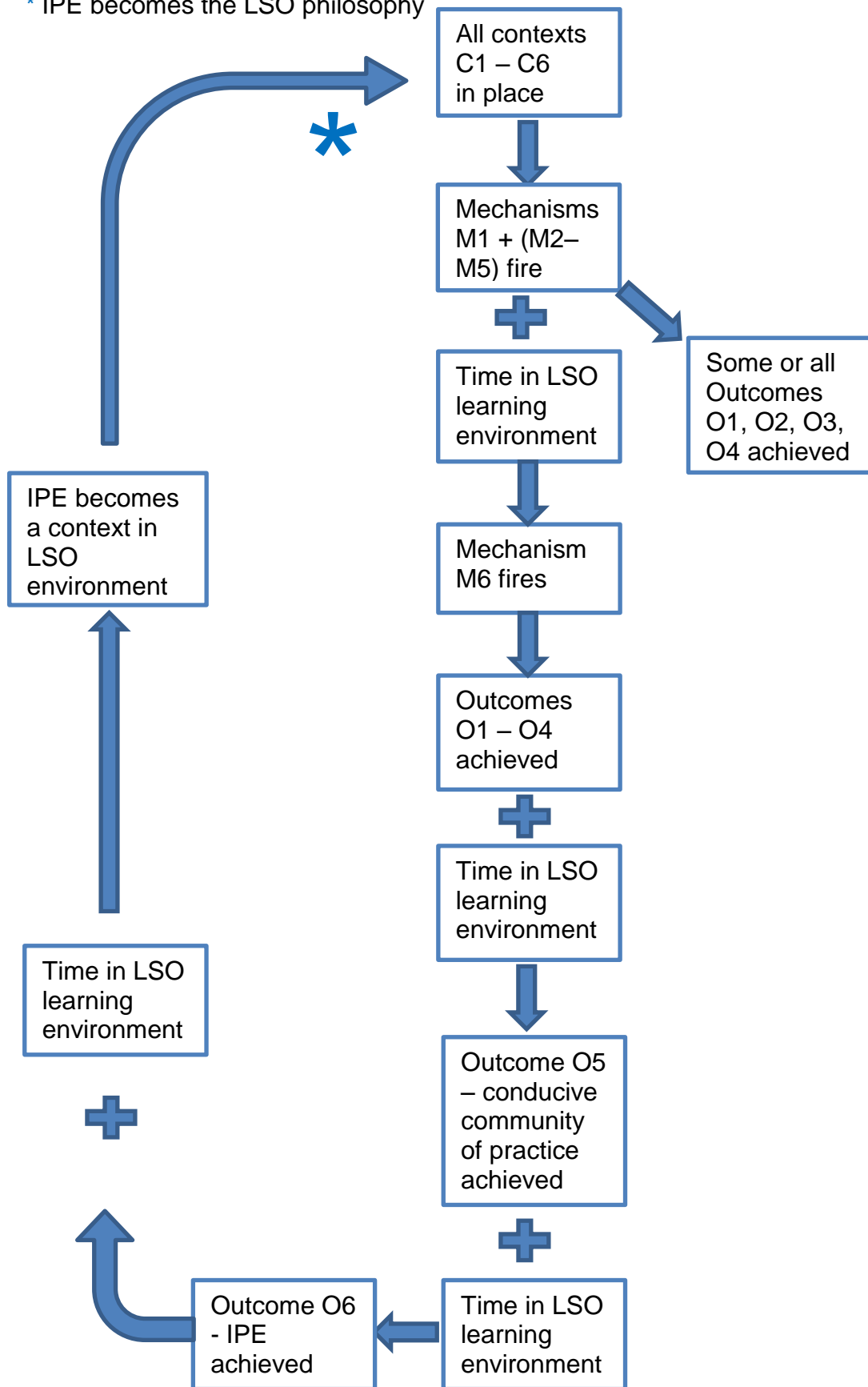
The firing of M6, IPL, leads to outcomes O1 through to O4. Some participants will get some outcomes O1 to O4 from LSO education, where some mechanisms M1 to M5 have fired but without M6 they will not get outcomes O5 and O6. Where M6 has fired, O1 – O4 can be achieved; all are

required to get O5, a conducive community of practice. This is a pre-requisite to O6, IPE.

These processes are time dependent (C5). With further time in the LSO environment, IPE becomes contextualised once sufficient team members have bought in to the philosophy and start to drive it themselves. Contextualisation of IPE is critical to its self-perpetuation within LSO and the continuing reinforcement of the required contexts. It is suggested that IPE has now become the recognised philosophy within LSO. This CMO process, resulting in contextualisation of IPE is diagrammatically portrayed in Figure 14 overleaf, showing the cyclical nature of its development. Contextualisation of IPE occurs at point * in Figure 14, as it has achieved a buy in and acceptance from a critical mass of team members, who are now maintaining the contexts required for its sustainability and further progression. Thus IPE is in itself a dynamic state, which can continue to be self - perpetuating, providing the CMO configurations are maintained.

Figure 14: IPE becomes the LSO philosophy theory

* IPE becomes the LSO philosophy



9.6 Phase 3 refined programme theories

The refined programme theories following phase 3 are documented in Table 15.

Table 15: Phase 3 refined programme theories

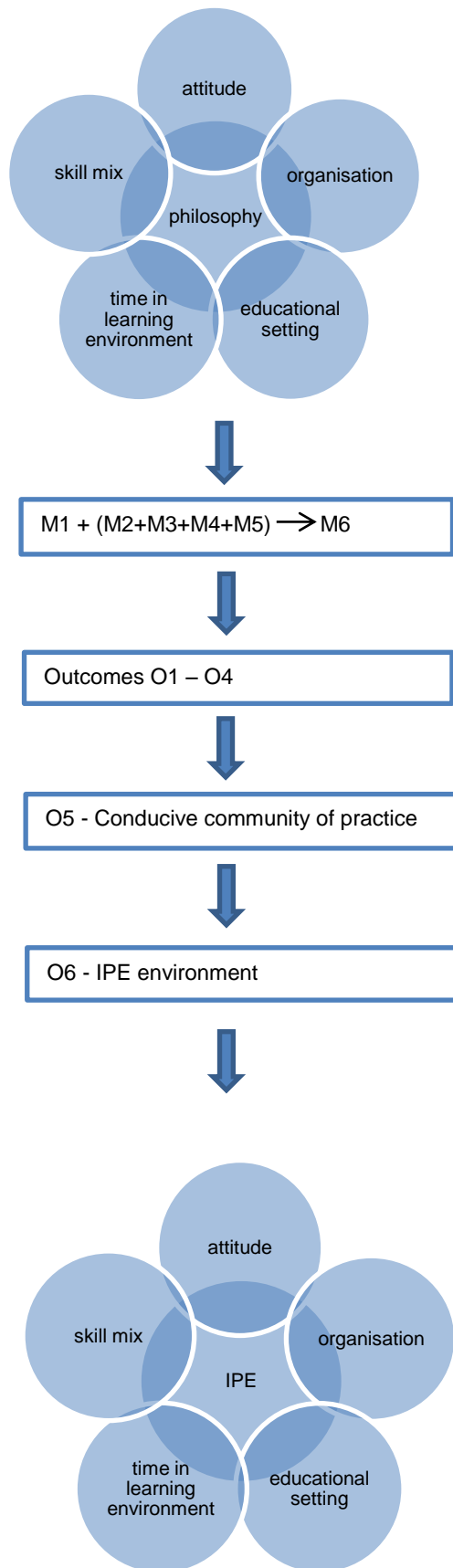
- the original core and driving context was the LSO philosophy, which together with enthusiastic participants, initiated LSO education;
- to maximise the opportunities offered by LSO, individuals need to share the philosophy and desire lifelong learning;
- all contexts interrelate and are now necessary for IPE, which facilitates mechanisms to fire;
- M1 empowerment of individuals is required first;
- then, mechanisms M2 to M5 fire. M5 reflection is required as a continuous process throughout;
- all mechanisms M1 – M5 are required for M6 IPL, which leads to outcomes O1 – O4;
- outcomes O1 – O4 are required to allow O5, a conducive community of practice to evolve, which is time dependent;
- O5 is required to achieve O6 IPE;
- the inter-relationship between contexts, mechanisms and outcomes is dynamic and constantly changing;
- development of a community of practice was required in LSO as a progression in the development of IPE as an outcome, which required all contexts to be maintained, mechanisms to fire and sufficient further time;
- IPE has progressively evolved and over time has become contextual within LSO and integrated within the philosophy;
- IPE was the original philosophy of LSO at the outset.

9.7 Summary

This chapter describes phase 3 of the realist evaluation, the refining of the programme theories tested in phase 2. In realist terms, the LSO contexts have allowed mechanisms to fire, including IPL which has led to outcomes including enhanced individual and team development, which has perpetuated further learning. As this occurs, a conducive community of practice develops, where individuals can find their niche, gain self-respect and respect from colleagues. People develop their own identity, which can be described as a learning trajectory – ‘we define who we are by where we have been and where we are going.’ (Wenger, 2008:105). It is a display of competence. When in a community of practice as a full member, people are in familiar territory, experience competence and are recognized as competent. Dimensions of competence become dimensions of identity (Wenger, 2008). Over time, a community of practice which is conducive to IPE has developed in LSO, which in turn has evolved into an IPE environment.

Further time and maintenance of the contextual factors embeds IPE in the organisation. IPE has now become contextualised within LSO, as it has become the philosophy of a greater number of the team members, and these findings are further represented diagrammatically (Figure 15, overleaf). For IPE to be sustainable in any organisation it must become contextualised. In LSO, IPE is now the philosophy; it may indeed have always been so but without the realisation at the outset by the programme architects.

Figure 15: Refined CMO configurations within LSO



Chapter 10: Discussion

10.1 Introduction

All social programmes involve the interplay of individual and institution; the realist approach starts with an attempt to come to a sociological understanding of the balance of resources and choices available to all participants involved in a programme (Pawson & Tilley, 1997). Historically, much of health professional educational research has taken place in university secondary care environments, by faculty staff as part of their academic portfolios (Glassick, 2000). Such studies may represent 'missed opportunities' to move knowledge in the field forward as the studies do not embrace larger concepts or push the boundaries of conventional approaches to recurrent issues (Eva & Lingard, 2008:752). By contrast, this thesis evaluates LSO education as currently delivered, in a primary care specialist practice, using data collected from stakeholders, many of whom are part of its longitudinal evolution and also draws upon contextual data relating to LSO from before the thesis inception. It analyses an IPE environment where teaching methods take a less traditional approach to orthodontic education. As such, there is potentially much to learn from the LSO journey, especially as many previous IPE evaluations relate to short interventions or occasions in which IPE is a modular slot in a wider programme; not the core philosophy in integrated educational and clinical care provision.

This chapter sets out to discuss the thesis findings, where theory has emerged iteratively from the data provided and refined by participants, initially relating them to the original research questions, but extending the discourse beyond this, including to LSO learning trajectories, reflects upon realism and realist evaluation as a methodology, the limitations of the thesis and, considers the potential implications of the programme theories for LSO, IPE and the wider field of patient care and healthcare professional education.

10.2 Findings

The original research questions in relation to the education programmes taking place at LSO can be found on page 23 and were:

- What works?
- For whom?
- In what circumstances?
- Why?
- How?

These questions are discussed as separate entities but, because of the dynamic interdependency of the CMO configurations, there is overlap in the conversation relating to contexts, mechanisms and outcomes within LSO and certain points are therefore periodically revisited. Emergent themes and linkages from phase 1 of the evaluation led to initial theories in the form of CMO configurations, subsequently tested and refined in phases 2 and 3.

Answers to the research questions are therefore embedded within and extrapolated from refined programme theories, following the evaluation stages documented in Table 6 (page 165).

10.2.1 What works?

In LSO, different levels of orthodontic team members and students teach and learn about, from and with each other. It is therefore IPE, delivered collectively by a team consisting of individuals with a broad skill mix, all with a shared purpose, providing education and CPD for the whole orthodontic team in a conducive atmosphere that works. Data analysis shows it is the complete educational experience that is successful: curricula containing appropriate content for each learner group, teaching integrated with formative and summative assessment, delivered within the LSO environment by a team who can explain the intricacies of what they do and show the results of their expertise, thus establishing credibility with students.

LSO education is sequential, structured and student centred. Delivery consists of a combination of lectures, interspersed with small group, PBL, case based deliberations and assignments, clinical observations, peer group case presentations, evidence based treatment and research of the literature. This allows the initial learning 'about' to take place, seen as the foundation for learning 'with' and 'from' relating to IPE, as discussed on page 95. Pre-clinical academic content is integrated with clinical case-based formative and summative assignments, all of which stimulate self-direction, continuing

reflection and critical thought. Case-based learning integrates with but takes traditional PBL a step further, and could be significant in exploring a theoretical base for LSO IPE. It allows customisation of IPE for LSO students, enabling them to see application of learning.

LSO e-portfolio technology facilitates remote tutor support for students in their own environments, thus increasing their ability to apply their learning in their own clinics and for this to be assessed. Identification of learning outcomes followed by utilisation of a sequence of problems is seen as critical to development of competence in dental education using PBL, where problems or scenarios are tested and refined based on student achievement (Fincham & Shuler, 2001), thus underpinning this structured approach.

In summary, the learning objectives, education content, mode of delivery, infrastructure including information technology, assessment, tutors and administrators, combine in a lifelong learning environment to create opportunities for professional development. This combination, delivered by a team with a broad and appropriate skill mix in the LSO IPE setting, appears to work for most, but not for everyone.

10.2.2 For whom?

IPE in LSO works for those with a positive attitude, who desire lifelong learning, buy-in to the LSO philosophy, have the motivation to learn and improve, are self-directing, happy to learn in a small group setting facilitated

by the LSO team and, are empowered by the environment. This applies to tutors and to students; at LSO people are recognised as both concurrently.

The LSO team, patients and students can all benefit from the education provided. Most team members have developed over time, both as clinicians and educators, along with a growing recognition of the requirements for adult learning. As they educate others, their own skills and depth of subject knowledge are enhanced. This view is supported by Reeves & Freeth (2002), who found that clinical staff benefitted from facilitation experience, which helped their professional development. Elaboration of knowledge occurs by teaching peers, by answering questions about a subject, and by formulating and criticising hypotheses (Kelly *et al.*, 1997). This enhancement of the skill mix, coupled with the maturing expertise of the educator group, appears to continually improve the student educational experience. Tutors serve as expert resources, mentoring student accomplishment and providing expertise to help students advance their state of knowledge (Fincham & Shuler, 2001). In LSO, these resources are the whole team, not just the leaders, which in turn creates opportunities for all team members to develop, whilst supporting students' individual needs.

Students from other practices benefit from LSO education. However, findings show that in certain external practices, the level of trainer support is less than at LSO. Barr *et al* (2000) found that, even when institutional obstacles are overcome, participants left to apply IPL in their respective workplaces, often encounter resistance. Some benefits from LSO IPE may be diluted when

these students return to their respective workplaces, are faced with a different philosophy, or not allowed to use their newly acquired skills. This also impacts negatively on development of IPE. Leaders in these organisations are potentially missing out on the long-term benefits, both individual and collective, which developing their own team brings.

In contrast, the LSO leader has advanced alongside and, maybe because of, the rest of the team. This is particularly significant and reinforces the benefit for LSO of developing an enhanced skill mix team who are empowered to take a more central role in the practice. This type of personal progression is integral to a community of practice as described by Lave and Wenger (1991). The development of an extended duties team has enabled the LSO leader to further refine areas of educational expertise and influence which, in turn, are of benefit to LSO's overall evolution. The leader and LSO have together benefitted from the team philosophy, which is therefore a strong driver for its continuing progression as a context, as it is perceived to be working for mutual benefit.

Younger students appear more immediately flexible in accepting a different style of learning and new concepts, as opposed to the older MSc students. This contradicts the findings of Tunstall-Pedoe *et al.* (2003), who found more mature learners to be more favourably disposed towards IPE than younger learners. The contradiction may be because the MSc students, many of whom are older than most LSO tutors, have also been working in clinical

dentistry for longer. However, once the (younger) tutors have proven their worth and the (older) students recognise their value, this attitude changes. Such a change in learning style to one which involves small group work, and the requirement for student-directed learning is new for most dental students (Fincham & Shuler, 2001) and as such for many postgraduate dentists. This reinforces time spent within the LSO environment as a context. Irrespective of age and experience, philosophy and attitude are seen as the original contexts initiating LSO education, and also needed for individuals entering LSO IPE to maximise the opportunities it offers.

Not everyone however has the attitude of team before self and recognition that the team philosophy leads to collective improvement. Non team players are a negative influence on the group. This is a key factor within tutor and learner groups and supports other research, where dysfunctional groups resulted in the failure of some or all of its members to learn (Hitchcock & Anderson, 1997) and team functioning issues were seen as a barrier (Mickan *et al.*, 2010). Those willing to change attitude appear to benefit from LSO IPE; those that take longer to change appear to benefit less and more slowly.

This thesis did not include patients as participants. However, the findings suggest that patients do benefit from IPE in LSO, because the enhanced skill mix within the team allows each patient more time and the learning environment educates and informs them. Evidence from patient feedback

suggests that patients recognise the knowledge and enthusiasm of the LSO team and suggest both are significant to their clinical care experience.

10.2.3 In what circumstances?

LSO IPE is dependent upon the identified contexts all being in place; it works when participants with an appropriate attitude, who share the philosophy, spend sufficient time in the LSO learning environment, which includes a skill mix of clinical educators, the integrated clinical and educational facilities and good organisation.

The initiating contexts for LSO education were the philosophy, combined with individuals with a positive attitude towards learning. Over time, LSO has developed further contexts required for successful IPE, reacting to external and internal circumstances by constantly re-evaluating, re-analysing and re-programming to maintain them. These include an enhanced skill mix team, facilities as described and an atmosphere of continuous lifelong learning. Good organisation emerged as a key context, without which IPE fails. Organisation in LSO has become more complex with the increasing overlap of clinical care and education but, this integration enhances IPE and provides further opportunities for all the LSO team. Structured planning is a prerequisite for successful IPE interventions (Barr *et al.*, 2000; Cooper *et al.*, 2001; Hammick *et al.*, 2007) and IPCE (Davidson *et al.*, 2008), as is staff development for facilitation of IPL (Hammick *et al.*, 2007).

IPE works in LSO, in realist terms, by providing an environment conducive to the firing of different mechanisms, or processes enabling learning, thus maximising opportunities for adult professional development. IPL may be a product of IPE or happen spontaneously in the workplace, or in education settings (Freeth *et al.*, 2005b) and customisation is important for participants (Hammick *et al.*, 2007), thus recognising its varied aetiology. This thesis suggests that IPL is a mechanism which, providing the contexts are maintained, leads to IPE as an outcome, which, with time and full acceptance by the majority of an organisation, becomes contextualised. LSO has customised a contextual setting for IPL to occur and is now an IPE environment where opportunities for adult learning are provided.

10.2.4 Why?

IPE works in LSO because the majority of people feel benefit from the learning environment and education delivered. The LSO team develop within the IPE infrastructure they are helping to create and evolve. They have ownership of the process, influence their own destiny, are empowered, can drive change, perceive personal improvement, are fulfilled in their roles and recognize that this is being achieved whilst helping others develop. The team have the required depth and range of skills to teach, believe in what they do, continually prove their capabilities and as such are supported and trusted. Most importantly, the majority enjoy their roles, feel valued, and are proud of what they do, which is motivational and self-perpetuating for themselves and others. This in turn empowers students who share the same attitude to

learning and who experience the benefits of LSO IPE in their own professional development. Education is student-centred; interactive, so students have some control over their own learning; well organised, structured and with content relevant to contemporary orthodontic practice. Evidence based, up to date material is delivered by a qualified team, which gives individual support to each student from the most appropriate tutor, in a learning atmosphere that makes them feel safe to actively participate, thus facilitating self-directed learning. LSO IPE works because it is a quality product, which is recognised by learners both within and outside LSO.

The findings show that students benefit from being taught by a range of individuals, especially those who have recently experienced a similar education programme. Continuing coaching and mentoring by interprofessional facilitators helps learners develop (Morey *et al.*, 2002), which further reinforces the importance of DCP educators. The LSO skill mix has enabled education delivery style to change, becoming increasingly interactive, including small group work. Active participation of adult learners should be encouraged (Knowles, 1990); principles of adult learning are key mechanisms for well received IPE (Hammick *et al.*, 2007). Adults need to see the end product of their learning (Knowles, 1990) and the findings indicate that students at LSO become increasingly empowered when they use their learning in the clinical environment.

Programme leaders at LSO have enthusiasm and passion for education and are respected for their actions; empowering individuals encourages new

leaders to emerge within the team, whilst at the same time enthusing students. Personal attitude therefore is critical; enthusiasm, passion, desire and a non-silo mentality are required from programme architects, educators, students and administrators. Previous studies, discussed on page 60, recognised barriers to teamwork and effective healthcare (Barr, 2001), with teacher and learner characteristics being key factors in IPE (Reeves & Freeth, 2002). LSO contexts address these barriers and allow different learning mechanisms to fire for different people at different times.

LSO IPE aims to develop understanding, which facilitates recall and application to different situations. It enhances self-directed learning together with team and interpersonal skills, plus encouraging curiosity and a desire for lifelong learning. The closer the resemblance between where learning occurs and where it is to be applied, the better the performance and the easier recall and application becomes (Kelly *et al.*, 1997). LSO IPE maximises opportunities for students to apply their learning in clinical practice.

10.2.5 How?

LSO IPE works by empowerment, creating opportunity, stimulating people to progress, to deliver beyond their previous limitations, to believe they are capable of more, supporting their ambitions, not stifling innovation, being open and honest and by good teamwork, which motivates and gives a sense of achievement and pride. For some, this requires a period of unlearning of previous beliefs and practices. This is explored in more detail shortly,

however for some it is crucial to situational learning, including experiential, problem based, case based, formal, informal and reflective learning, which then take place. These mechanisms combine to enable IPL, which in turn delivers outcomes including: individual development; enhanced depth of learning, skills competence, communication skills and teamwork; development of a conducive community of practice and, IPE.

In realist terms, LSO contexts provide suitable conditions for mechanisms to fire. These mechanisms are related to various social and learning theories believed to lead to behavioural change due to LSO IPE, which minimises a didactic approach in favour of maximum participant interaction and adapting the LSO tutor role to facilitation. With the development of experiential learning, problem-based learning and work-based learning comes parallel increase in significance and change in the role of adult educators, which is evolving to one of facilitation of self-directed, reflective and critical learning (Jarvis *et al.*, 2002). Healthcare professionals must show continuing professional development, become self-directed learners and know how to put learning into practice (Griffin & Brownhill, 2001). LSO curricula require student participation and subject specific dialogue. Facilitating small group discussion serves as a learning process for tutors, who themselves must be self-directing and have taken the opportunity created at LSO to further develop. The enthusiasm of LSO tutors is motivational to students, who recognise they too have the opportunity to progress; as such motivation and engagement appear to relate to the 'how' LSO education works.

Opportunity is a motivator for those who have enthusiasm, desire and the passion to progress. Motivation has been defined as a set of interrelated beliefs or emotions that influence and direct behaviour (Martin, 2007; Martin, 2008). It is the impetus behind what a person actually does; the interior mental state that leads to action. Motivation influences what people choose to do, how well and, for how long, giving behaviour its energy and direction (Martin, 2007; Martin, 2008). Engagement may be defined as a positive and fulfilling learning-related state of mind that is characterised by vigour, dedication and absorption; it is the link between what learners do, between the inner mental states of motivational and prosocial orientation and learning success (Martin, 2007; Martin, 2008). Engagement induces deeper learning with different facilitating contexts at various times (Sorinola *et al.*, 2014).

Motivation and engagement influence student learning and study behaviour, academic performance and success (Sobral, 2004; Wilkinson *et al.*, 2007), and are very important in adult learners (Sorinola *et al.*, 2013). The most potent motivators for adults are internal, such as the desire for increased job satisfaction, self-esteem and quality of life (Knowles *et al.*, 1998; Merriam & Caffarella, 1999; Knowles *et al.*, 2011). Others argue that to construe motivation as a simple internal or external phenomenon is to deny the very complexity of the human mind (Brissette & Howes, 2010). Further views are that motivation is a dynamic concept, so a person can move between different types of motivation depending on the situation (Sorinola *et al.*, 2014) and an independent and dependent variable where the learning environment plays an important role in its enhancement (Kusurkar *et al.*, 2011). Whatever

the definition, the findings suggest that attitude and hence motivation is critical for all involved in LSO IPE, cannot be assumed to be stable and must be continuously nurtured. A key mechanism within LSO is empowerment; it fosters both motivation and engagement, which come from the combined contextual factors.

Individuals with motivation need to perceive they are professionally developing. This key outcome is critical to maintaining the LSO skill mix, which is and has to be a dynamic process. As discussed on page 46, debate continues as to what collaborative practice entails in health care settings, its similarities to and differences from, traditional approaches to multidisciplinary teamwork (Thistlethwaite, 2012). Maybe empowerment leading to ownership is the answer – the LSO team have developed a collective pride in the IPE environment they are a part of, believe in, have helped to create and are developing further. They see it as theirs and, as such, now provide the inner momentum which drives the organisation and IPE forward. The physical facilities are important but, with sufficient financial resources, could be replicated elsewhere, providing the location was similarly accessible to patients. However, developing people takes time. Motivation and engagement must be maintained. This requires a core team-based philosophy which encourages individuals to reach whatever their potential allows. Many in LSO perceive that they are now performing beyond their original aspirations and are setting their own further developmental targets and goals. Time in the LSO learning environment supports this progression

and allows the mechanisms to fire, which develops the outcomes, including IPE; the longer the immersion the deeper the effect.

This engagement at the level of ownership may be significant to the 'with' aspect of defining IPE. 'With' has been proposed as 'active engagement in a respectful manner' (Bainbridge & Wood, 2012:455), but for contextualisation of IPE, there must be ownership by the majority of participants in an organisation. This requires empowerment and opportunity, with no imposed glass ceiling to individual progression.

Another aspect integral to 'how' LSO education works is reflection, which has been frequently discussed in this thesis, because it is recognised as a key mechanism throughout LSO. Regular reflection upon IPE experience helps staff in their facilitation role (Nash & Hoy, 1993; Reeves & Freeth, 2002; Mu *et al.*, 2004), improves organisation (Barber *et al.*, 1997; Reeves & Freeth, 2002; Cooke *et al.*, 2003; Kilminster *et al.*, 2004; Mu *et al.*, 2004; Ponzer *et al.*, 2004) and, as such, is a key component in deeper learning. Taking time to reflect allows opportunity for self-evaluation. Indeed, learning is linked to reflection, which aids critical thinking (Wang & King, 2006; Sweet *et al.*, 2009).

Continuous reflection is vital for both students and tutors. Progression of medical educators on a faculty development programme underpins this view. The key contextual factor influencing initial engagement was participatory

learning, with the interactive mutual learning process, actual practice and learning from each other's experience key to engagement throughout the course (Sorinola *et al.*, 2014). This parallels the LSO learning model, which can be described as participatory. In this same faculty development study, six months later the key contextual factor maintaining learners' engagement with teaching was reflective practice, including the use of reflective portfolios, teaching practice, peer observation and feedback. Later reflection was fostered through experiential practice in their working environment and the single most important factor that kept participants further engaged and learning beyond the course. Reflective practice shaped learners' teaching skills through their own experience and understanding, and was critical in their further development as educators (Sorinola *et al.*, 2014). Achievement of dental students personal development goals was helped by the use of reflective journals (Mullins *et al.*, 2001); the use of LSO reflective e-portfolios for clinical cases is thought to be significant in developing understanding of orthodontic mechanics and treatment, enables students to see the application of taught material and benefit from reflective learning at the same time. When this is added to presentation and discussion within a peer group, the effect is maximised. Thus empowerment and reflection are perceived as key mechanisms which fire on an ongoing basis and, providing the contexts remain in place, are a fundamental part of explaining 'how' LSO IPE works.

Together with empowerment and reflection, unlearning is also proposed as a mechanism; whereby individuals question previous beliefs, including those relating to skills, roles and treatment concepts, plus those without the

appropriate attitude may be persuaded to change and maximise the opportunities LSO offers. Unlearning is found to be important within the process of acquiring new knowledge and behaviours (Becker, 2005); for many LSO students the IPE environment is a new experience, as is self-directed learning. Many students need to accept a new concept of learning and be enthusiastic towards it. A negative attitude prevents learning; however if willing to be open minded and engage with the group, this can be overcome. This may be facilitated by more explanation to students at the outset of what to expect, thus increasing engagement with the adult learner (Knowles *et al.*, 2011).

The importance for adults to apply their learning (Knowles, 1990) has been discussed relating to e-portfolios; they and similar interactive methods relating to clinical case treatments are also used during pre-clinical teaching. Thus, other proposed mechanisms are based upon theories of learning, of which all suggested are proactive in nature. The success of IPE in part depends on interactive learning (Barr *et al.*, 2000), as previously discussed on page 63 and, whatever the setting, IPL has to be interactive (Thistlethwaite, 2012). Essentially learning mechanisms in LSO can be described overall as situational, including experiential, problem based and case based learning. Both formal and informal learning are seen as mechanisms; informal IPL is of significant value (Morison *et al.*, 2003; Freeth *et al.*, 2005a) and is thought to reinforce formal education (Hammick *et al.*, 2007). A key factor at LSO would appear to be that students can see the application of their learning in the clinical environment and experience team

delivered integrated clinical care and education. Seeing and feeling a benefit from a programme is critical to its success and progression. LSO clinical practice allows the application of taught material and the IPE environment maximises opportunities for continuing professional development.

Despite huge discourse, there is still no one agreed model for effective adult education (Minter, 2011). However, problem based learning is thought to enable students to develop self-directed learning skills (Bearn *et al.*, 2002). It is seen to be beneficial in dental education with appropriate teacher training, as are briefing, debriefing and reflection (Sweet *et al.*, 2009), all of which are needed to be self-directing. As such, the suggested mechanisms firing in LSO find support in the literature relating to self-directed learning, lifelong learning, IPE, dental education and the role of the educator team. Adapting LSO IPE through case-based learning may enhance student application of learning to their own environment and have wider significance to IPE becoming more theory-based. Customisation of IPE environments is seen to be beneficial; the same may be true of IPE theory, that different IPE models will be supported by different learning theories. Data analysis indicates that social science theories which empower and motivate may precede learning theories and are integral to LSO IPE.

By providing situated learning and its' supporting contextual requisites, different learning mechanisms fire in LSO. At different stages PBL, case based learning, experiential learning, and reflective learning all are occurring.

Authentic PBL is said to deepen understanding which allows application to other problems, develop self-direction and team skills and promote a desire for lifelong learning (Barrows, 1998), which is a viable description for how learning occurs in LSO. Formal and informal learning create the opportunity for IPL, which appears to enhance understanding with increased time spent amongst the LSO team. This time factor could be explained by the fact that, for some individuals, they have to initially unlearn old habits and accept new ways of learning. For some, the concept of self-directed learning is new, plus the fact that they are now moving to a higher educational level than in their previous studies.

In summary, LSO IPE is an evolutionary process, where certain mechanisms are firing, but need contextual factors to be maintained for their sustainability. The subject matter is appropriate to respective student levels and style of delivery maximises the opportunities for successful outcomes to be achieved. Theory is sought for greater understanding of IPE, practice and care. In this thesis, attitude (context), empowerment, motivation and reflection (mechanisms) have emerged iteratively from the data as important factors and apply to everyone at LSO, built on an underlying core philosophy intent on individual development which benefits the whole team. Continuing development of team members and maintenance of a conducive community of practice are critical to LSO's progression and are now discussed relative to the concept of learning trajectories, both for individuals and LSO.

10.3 Learning trajectories relating to LSO

LSO continues to expand its educational and clinical boundaries, which creates further opportunities for team members. Being treated as equals and not as lesser qualified professionals potentially engenders greater team loyalty, which could relate to the development of a conducive community of practice. Developing a practice requires forming a community whose members engage with each other and choose to participate, resulting in mutual engagement and an ensuing joint enterprise. Sustained engagement in a practice allows an ability to interpret and make use of its repertoire. Individuals can use aspects of the practice history because they have been part of it and it is now part of them (Wenger, 2008). This may be a form of ownership, continually reinforcing empowerment, which occurs in LSO and means that individual and LSO development is inextricably linked.

Descriptions of communities of practice often describe a process in which individuals start as newcomers and develop (Lave & Wenger, 1991). However, such explanations may be an over-simplification, focusing on the entry of newcomers and the transition from inexperienced to experienced and not analysing the organisation of communities of practice (Jewson, 2007), which may be important to LSO. People join LSO with varied experience. This can affect the individual and their progression within the community, which has been highlighted as integral to IPE in LSO. Different social environments, or networks offer different possibilities for so-called learning trajectories, where people develop at different stages and go in different directions. The environment structure will determine what positions

are available within the community of practice at any one time; learning trajectories are as such a function of network configuration (Jewson, 2007). Therefore the constitution within organisations significantly affects individual development and vice versa. LSO maximises opportunity by its continuing evolution, which not only attracts and empowers newcomers, but also continues to change its network configuration to provide motivation and engagement for those who have been within for some time and have enhanced expertise. This is a key factor in sustaining the required contexts, especially the skill mix, which is significant for contextualisation of IPE.

In the context of learning trajectories, it has emerged from the data that the LSO contextual factors required for IPE, were initially driven by the leaders. Individuals motivated to develop professionally are now driving the philosophy forward, which in turn fires learning mechanisms leading to IPL. As the benefits from IPL are felt by a sufficient number of people, an IPE environment has evolved which, initially, is an outcome but, over time, because contexts have been maintained and individuals allowed to constantly develop, has become contextually embedded within LSO. IPE and what it stands for has evolved to become the LSO team philosophy; it is embedded because the majority of its team benefit from it, believe it, live it, show it and teach it. IPE is successful because of the team and it leads to sufficient positive outcomes, such that there is a critical mass of beneficiaries to sustain it as a philosophy in which they believe. This applies to the LSO team and students. IPE is a living, dynamic entity which requires ongoing maintenance and development of its contexts. Continuing motivation is

essential for both tutors and students to achieve this; motivation and engagement have been discussed; are inextricably linked and drive individual and LSO learning trajectories.

Context and environment are seen as important to the success of educational initiatives and their reproducibility, including IPE. Educational faculty development needs to address both individual and organisational needs; understanding the context of an intervention is beneficial when considering replication of successful Interventions in different environments and provide clarification on how and under what conditions an intervention worked (Sorinola *et al.*, 2013). This appears to reinforce the importance of the individual to the organisation, the dynamic nature of such environments as LSO and their future learning trajectories. Within LSO, the majority of people appear to enjoy what they do for most of the time and the reasons behind this, plus when they do not, are of potential significance both within and beyond the boundaries of LSO.

10.4 Implications

LSO appears to be achieving many of the workforce changes in dental education and care recognised as necessary as far back as the Nuffield Report of 1993 (Smith, 1993) and, also more recently (Hobson, 2009; MEE, 2012). Simultaneously it is addressing documented orthodontic manpower shortages (Robinson *et al.*, 2005). The findings from this thesis provide insight for the wider IPE community. IPE has not been 'forced' onto LSO and

its team; it has subliminally been initiated and then progressively developed by those most involved – the stakeholders. The original ideas of the programme architects integrating team delivery of clinical care with education have been put into place, which appears to follow an interprofessionality strategy. This enables professional education and practice interdependency to be evaluated to enhance patient centred care (D'Amour & Oandasan, 2005). As such, LSO appears to provide evidence relating to the IECPCP framework at the micro, meso and macro levels. In so doing, it appears to respond to the concerns of Curran (2004), previously discussed on page 39, relating to the linking of education and patient care. This synergy between the health workforce planning sector and health education systems has also been recognised as important on an international stage (WHO, 2010). If this foundation for IPE were accepted in orthodontics, it could lead to a change in funding for clinical care which is linked to joint educational ventures as part of NHS contracts and be a key performance indicator. IPE is synonymous with enhanced extended duties teams, which in dentistry relies on a greater emphasis on DCP training. As such, the LSO 'model' could also lead to increased opportunities for DCP educators, recognised as one of the original incentives for GDC registration (Hobson, 2004) thus further strengthening the link between education, the dental team and clinical care.

The findings from this thesis appear to support previous work relating to drivers for IPE, that it is often supported by IPE 'champions' (Hammick *et al.*, 2007:27; Brewer *et al.*, 2014:5) and by active professionals (Horbar *et al.*, 2001; Mu *et al.*, 2004) as discussed on page 56. In realist terms, this is a

context, essentially describing an underlying condition of the programme, which is relevant to the operation of the programme mechanisms (Pawson & Tilley, 1997; Pawson & Tilley, 2009). Further implications are that motivation and engagement must be continually stimulated and maintained within any educator group. LSO provides further training in education for its team; in contrast elsewhere, most medical educators do not receive any formal teacher training (McLean *et al.*, 2008). Without engagement, there is no deep learning (Hargreaves, 2006), effective teaching, meaningful outcome, real attainment or progress (Carpenter, 2010). The data suggest that the model of IPE within LSO permits and perpetuates all of these. As such, there may be factors of benefit for other all healthcare professional educational institutions.

Forward momentum within organisations is critical to maintaining this engagement of individuals. Interventions never work indefinitely, in the same way and in all circumstances, or for all people (Pawson & Tilley, 2004). Hammick *et al.* (2007) suggest that IPE is needed to develop the team; this thesis suggests that this is a two-way process, that the team is also needed to develop IPE and that there is a synergy between the two which will mostly either progress or regress, staying at any one level for a relatively short time. Recognising this helps understand the volatility which exists and to an extent guides planning. The implications for IPE in organisations such as LSO is that they must continually plan ahead, motivate and provide opportunities for their skill set to professionally progress, or lose them and be left with less enthused individuals.

A further implication relates to style of education provision. IPE is frequently associated with workplace based learning (Eraut, 2001; Eraut, 2003; Eraut, 2004; Payler *et al.*, 2008). The team delivery of education has facilitated a far less didactic teaching approach, where experiential practice followed by reflection and development of action points has become the driver for individual learning. This self-directed learning is a type of self-regulated learning activity which has been shown to lead to a deeper approach to learning and improved performance (Baumeister & Vohs, 2004). For healthcare professionals, understanding as opposed to remembering of facts is essential, necessitating a deeper level of learning, requiring engagement. Traditional curricula tend to be directed towards memorising facts and gaining technical skills without sufficient concern for understanding or clinical reasoning; they allow insufficient time for reflection, self-directed learning, communication, interpersonal and management skills and fail to emphasise student responsibility for learning (Kaufman & Mann, 1996; Lancaster *et al.*, 1997; Pau *et al.*, 1999). Identifying the contextual factors that positively influence engagement could help medical and dental educators incorporate them into curriculum design, into the development of their institute's teaching culture and learning environment (Sorinola *et al.*, 2014). This is one aspect where patients are important in LSO, for students to see the end product of their learning; to experience being in the play, as opposed to just learning the lines and not actually participating. The findings from this thesis could be of value to educational institutions, where the implication is that curriculum design should require greater elements of interaction, self - direction and reflection in learning from the outset for adult students. If this is combined

with a modular approach to both learning and assessment, weaker students could potentially be identified by performance evaluation at an earlier stage in the learning process and a more tailored support provided.

There are also implications for administration. Simply delegating the planning and organising of IPE to administrators who do not have an in-depth, working knowledge of the processes – in other words are not full members of this cohesive community of practice too, as is often done in many educational institutions, does not maximise IPE outcomes. The importance of experienced faculty members to plan and facilitate courses in establishing and maintaining IPE has been documented (Cooper *et al.*, 2001; Hammick *et al.*, 2007), including timetabling of resources (Tucker *et al.*, 2003; Davidson *et al.*, 2008). Findings from this thesis suggest that the development of non-clinical personnel must parallel that of clinical team members; they need to understand about the courses and subject matter, which means a presence in and around education as it is being delivered. They also need to develop an empathy with students, to be seen and act as educational facilitators. The success of placement shared learning is linked to the encouragement given by teachers (Morison *et al.*, 2003) and the enthusiasm and commitment of managers, administrators, coordinators and facilitators (Davidson *et al.*, 2008). Often in educational organisations, administrators are not integrated into the team and are remote from the delivery site. As such, this change could mean a significant paradigmatic shift for some institutions.

These findings strengthen the use of primary care outreach environments for education of the dental team and go some way to fulfilling the need for studies to evaluate the claimed benefits of this educational format (Eaton *et al.*, 2006). They also have potential implications for the longer term study into IPL in various settings and how this could relate to approaches to patient care (Anderson *et al.*, 2011). There is already a move towards the development of enhanced skills of team members in dentistry (GDC, 2004; GDC, 2011; MEE, 2012; GDC, 2013b), and this thesis gives support to requirements for a further change in emphasis for healthcare professionals education. Certainly there could be a change in the style, delivery and location of teaching, which should include an increased level of training for administrators within the clinical environment. This could help to overcome difficulties of coordination of student placements and stakeholder communication in the clinical environment (Davidson *et al.*, 2008). Primary care environments such as LSO may be the future for IPE research and development, naturally containing the contextual requirements for its' successful implementation and more easily customised for individual interventions.

As discussed, another significant progression at LSO has been the development of new assessment tools. The implications from this are potentially significant for IPE. Students place less emphasis on educational activities which are not assessed (Morison *et al.*, 2003). Methods of assessment need to integrate with programme objectives, otherwise students make 'strategic' learning decisions that address the assessment

methods they encounter (Fincham & Shuler, 2001:418). As such, healthcare professional body registration qualifications which test aspects of team based skills, could reinforce IPE progression. Development of the need for valid assessments of IPL outcomes and the professional registration implications (Nisbet *et al.*, 2011), together with the importance of alignment of assessment with teaching (Biggs & Collis, 1982), have been recognised and in dentistry seen as an area for research and development (Sweet *et al.*, 2009). This could be linked to students spending a certain amount of time in IPE environments and having to demonstrate knowledge of other professionals' scope of practice by a reflective learning portfolio. In this way, reflective learning and IPE are encouraged at the same time. The mode of summative assessment therefore would have an increased formative element, which could encourage alternative modes of teaching and, as such, different ways of learning, enabling increased understanding.

Finally, these findings could be important in terms of the way regulators and decision makers think. The GDC have recognized the value of the dental team (GDC, 2004) but this has not been reflected in terms of learning outcomes, registration, or CPD to encourage a non-silo professional mentality. IPE has been proposed as a way to reduce the stereotyping mentality prevalent and improve collaboration (McMichael & Gilloran, 1984), yet there is little evidence of IPE in dentistry (Wilder *et al.*, 2008). Maybe there could be a requirement for undergraduate education and CPD to include elements relating to the teams in which professionals work, including linked personal and practice development reflective portfolios which are

reviewed annually and needing to show evidence of teamwork, including 360° review. A new GDC registration category for administrators would underpin the need for quality assurance in all areas of patient care.

This thesis has identified core contexts required for IPE, showing that it is a process which has to be gradually developed within institutions and organisations. Data shows that a combination of social science and learning theories potentially relevant to IPE are interacting within LSO. Such workplace customisation as has taken place at LSO can extend beyond professional practice to the individuals unique learning context and is seen as a strength of IPE (Shafer *et al.*, 2002), attitudes to which can be influenced by the setting (Hammick *et al.*, 2007). The contexts identified at LSO could have implications for delivery of integrated education and clinical care, plus the wider development of IPE. Future funding of healthcare professional training could well be directed to environments where teams both deliver clinical care and are trained together. More radically, an institutional teaching model, based and designed from the outset on IPE, could have exciting implications. However, this would have far reaching implications for government, professional and educational organisations and require a significant paradigm shift.

In keeping with the findings, a critical reflection on the chosen paradigm and methodology used for this thesis, relates to and precedes a discussion of the limitations of the evaluation.

10.5 Reflection on realism and experience of realist evaluation

Reflecting on paradigms, realism claims to use contextual thinking to address the issues of for whom and in what circumstances a programme will work (Pawson & Tilley, 2004). Realism is portrayed to go further than other paradigms in recognizing that the world is an open system, which continually gives rise to new and emerging phenomena (Sayer, 2000). Interventions usually take place at the interface of the individual and social, where multiple factors and influences are continuously at work (Cheetham *et al.*, 1992). However, it is the actions of stakeholders that make programmes work; the causal potential of an initiative takes the form of providing reasons and resources to enable programme participants to change, but this is only triggered in conducive circumstances (Pawson & Tilley, 1997). Therefore, realism sits easily with the recognition that, in educational environments, often external influences superimpose on what has been put in place and alter the outcomes. In realist evaluation:

The aim is not to cover a phenomenon under a generalization, but to identify a factor responsible for it, that helped produce, or at least facilitated it (Lawson, 1998:156).

This process enables the realist inquirer to investigate the causal mechanisms and the conditions under which certain outcomes will or will not be realised. Interesting events are the result of complex transactions at many different levels and cannot be explained simply in terms of a causal link

between events at the surface (Kazi, 2003). As such, evaluation of LSO education was not simply looking at what is visible, but exploring in great depth the reasons behind the seemingly obvious. Realist evaluation has allowed probing beneath the surface of events at LSO; obtaining data from the key stakeholders, which then could be analysed to initiate hypotheses of causal processes. These hypotheses were then unpicked and discussed with and by stakeholders, in a series of analytic processes designed to provide the maximum clarity, understanding and subsequent explanation. A recognition of the influence of social interactions on the success or otherwise of LSO education has been enhanced by use of this methodology.

Realist evaluation is now considered as one of the theory-driven inquiry schools (Marchal *et al.*, 2012). It is both intellectually demanding and stimulating at one and the same time, enabling a deeper understanding of the underlying processes which underpin LSO education. Flexibility in data collection methods allowed exploration of respondents' opinions, clarification of interesting and relevant issues, eliciting of complete information and exploration of sensitive topics (Barriball & While, 1994). Use of the same research associate for semi-structured interviews and focus groups maximised standardisation between groups. Although there are various strategies for combining different degrees of interview standardization and moderator involvement (Morgan & March, 1992), most projects tend to set both of them at comparable levels. The rich data collected confirmed the appropriateness of the choice of data collection methods and also the importance of the research associate to the success of the methodology.

In realist evaluation, phase 2 is said to test the programme theories and phase 3 to refine them. However, this study found that minimal refining of the theories took place in phase 3; the majority occurring during phase 2. This could be specific to this particular study, or be due to the use of two focus groups at the phase 2 stage; in other words linked to the methods employed. The majority of refinement in realist evaluation may however occur in the second phase. Another view could be that phase 3 showing relatively little refinement reinforces the methodology, where phases 1 and 2 reach a consensus. Maybe herein lies the real strength of realist evaluation - that the process itself gives enlightenment relating to the programme being evaluated, and that this is as important for deep understanding as the findings which result. Whatever the reason, the data collection methods provided insight from different perspectives, thematic analysis of which allowed programme theories to be identified, tested and refined. Therefore, realist evaluation allowed the iterative development of theories to reflect the knowledge gained from the data about the impact of the programme on individuals, the team and answer the research questions (Sorinola *et al.*, 2014) and, in so doing, an increased understanding of the processes involved in LSO IPE.

10.6 Limitations of the thesis

This thesis is an educational evaluation of LSO; as such it could be construed as a narrow field and therefore constrains utility of findings in the wider healthcare field. Similarly, limitations relating to any insider evaluation,

as addressed in Chapter 4, are potentially relevant, as the researcher was known to all the participants (Patton, 2002). The use of a research associate for data collection aimed to minimise this influence.

A further limitation may be that this evaluation does not access views from individuals who have either left LSO, or students who did not complete the courses; however, the numbers of both were low. As such, data from participants may presumably be from those more positive about and successful in the LSO environment, which may affect the perspective of the results when consideration is given to transporting the LSO model elsewhere. In reality, very few educational interventions are universally accepted and rational analysis would suggest that the programme theories have potential value beyond the LSO environment, as the objectives included establishing a greater understanding of LSO education. The above limitations are therefore suggested to have had a limited overall impact on evaluation outcomes.

In terms of data collection, critique exists of qualitative research where interviews which involve a great deal of interpretation on the part of the interviewee are the sole method employed to gather data, which is then further interpreted by the researcher (Silverman, 2006). Self-reported data can rarely be independently verified and may contain bias. However, in this study, focus groups were used to test and subsequently refine the theories drawn from the semi-structured interviews. As such, participants were a significant part of the process of data interpretation and were therefore

integral to development of the programme theories. Being able to inductively derive constructs from the participants' data has been said to give credence to what was important to them as adult learners (Sorinola *et al.*, 2014). In minimising researcher influence by anonymising participants, it was not possible to segregate data from the separate participant groups. Although this limitation was necessary to enable stakeholders to participate freely, it would have been interesting to compare and contrast views from the different stakeholder groups, which may be of value in future studies.

Finally, patients were not included in the participant groups. Data relating to patient opinion has been gathered indirectly from other participants. Including patients as participants was considered and rejected for this thesis, but could be considered for future evaluations. Also, there was no cost-benefit analysis of this intervention; prospective funders may require such data prior to implementation of findings which could also form part of future evaluations.

10.7 Challenges

The challenges following this study include putting new knowledge into practice and:

- further development of the LSO team
- changing thoughts and behaviour in dental and orthodontic education
- progressing IPE in general, and
- developing interprofessionalism.

These need not be unrelated goals. For LSO to continue to evolve, contexts must be maintained, which relies upon ongoing empowerment of the team. LSO must create new educational opportunities by further developing its course portfolio, plus additional assessment tools that include evaluation of IPE, which are accepted by appropriate professional regulatory bodies. In this way, opportunities for assessors are created and IPE is strengthened, as it would then become a part of learning objectives for all education providers.

Involvement with assessment enhances professional development. Formative and summative assessments associated with LSO courses have been developed by individuals within the team. In so doing, a separate arm of LSO has achieved awarding body status for dental nurse qualifications and obtained recognition from the GDC. This progression is enabling further evolution of LSO education, plus creating new opportunities for individuals as assessors and examiners. For IPE to become further embedded in healthcare professional training, it must become part of summative assessment. LSO becoming an awarding body could enhance this process, as it can place IPE within its assessments and learning outcomes. As more institutions prepare students for these alternate assessments, IPE becomes more rooted in dental professional education.

Developing registrable qualifications leads to a greater degree of autonomy for LSO over subject matter and teaching style. Currently in dental professional registration qualifications, there is little assessment of team

based skills or knowledge which potentially limits IPE development. New learning outcomes and assessments including teamwork and IPE may enhance their development and improve patient care. LSO is developing Situational Judgment Tests (SJTs), which could be appropriate for assessment of IPE and teamwork. Becoming an awarding body could also signal a subtle change in LSO's identity, as it becomes not only a provider of education, but also a source of qualifications for other institutions and, in so doing, offers continuing professional development opportunities for the team.

This thesis has demonstrated how delivery of clinical care and education in a quality assured primary care centre can be a symbiotic process, plus describes the development of clinician educators. The enhanced skills team delivers clinical care, whilst maintaining lifelong learning. This model could enhance interprofessionalism and the integration of education and clinical care may prove to be an appropriate strategy for the future and an opportunity for change for both the NHS and Health Education England.

10.8 Future research

This study raises further questions and opportunities for future research. Education and patient care has limited financial resources. The LSO model could be a cost effective alternative for healthcare and education, providing an opportunity for change for the NHS and Health Education England and, as such, enable resources for further evaluation of IPE. Any such IPE evaluation could use the refined outcomes tool, the New World Kirkpatrick

Model (Kirkpatrick, 2014), which supersedes previous models. Future research could therefore include:

1. Evaluation of different assessments in dentistry and orthodontics which include IPE and teamwork
2. A cost-benefit pilot study of interprofessionalism in orthodontics
3. Evaluation of individuals after a time period following LSO education, both within and outside LSO
4. Further evaluation of LSO progression after a longer time period, to determine whether IPE has continued to develop and whether this study itself has led to change within LSO and in the wider IPE field
5. External evaluation of the LSO IPE model for health professionals education.

10.9 Summary

The aim of this qualitative research thesis was to explore and understand the LSO education process. This involved an investigative procedure to gradually make sense of a social phenomenon by contrasting, comparing, replicating, cataloguing and classifying the component parts. The researcher aimed to see the processes from the participants view and through ongoing interaction with the data, analysed their perspectives and meanings.

IPE takes time to become established. It needs to develop gradually within an organization or institution and be fuelled by the continuing development of individuals, plus attract new people, who can sustain its progressive growth and account for any loss of personnel through personal circumstances. Individuals must be allowed to express themselves, to improve professionally and for this to benefit the whole team. Subject matter has to be of an appropriate standard for the learner groups. As IPE develops, it requires increasing organization as more people become involved. Administrators have to evolve within the IPE team, learn and understand the educational processes and some of the subject matter. They have to feel responsible and be valued as part of the IPE team.

There has to be an appropriate skill mix of people who are prepared to share success and failure, benefits and responsibilities, support individual students as required and, to enjoy the success of others as much as their own. If this is present, an IPE environment can develop. Where IPE already exists, it has at some point been generated, based upon someone's idea, or belief. This will have created opportunity and empowered people who, in turn, have taken the initiative and maximised the chance offered. This then attracts others and if the contexts are maintained for long enough IPE becomes established and sustainable.

IPE is people dependent. Organisations must value their skilled individuals, provide continuing professional stimulation to maintain empowerment and

opportunity. Transparent preparation for the future affects performance here and now. Leaders must maintain their own enthusiasm, actively encourage new leaders to emerge and allow them to influence the future direction of the institution. This requires a willingness to relinquish areas of control and a change to traditional hierarchies of decision making. Without this, the skill mix will eventually be lost. Providing contexts are maintained, IPE works and offers a structure for integrated clinical care and education, thus creating the opportunity for new, cohesive models of delivery.

Recommendations for IPE include broadening evaluation from outcomes-focused work to more realist approaches; extending evaluation focus to long term measurement and involving all stakeholders in IPE evaluation design (Thistlethwaite *et al.*, 2014), which adds weight for the methodology of this evaluation and implications deduced from the findings. Continuing education has undergone a fundamental shift in focus from knowledge dissemination to improving clinical practice (Olson, 2012), resulting in use of a broader range of theories, increased attention to educational strategies beyond didactic traditional approaches and emphasis on IPE and learning (Kitto *et al.*, 2014). IPE has been affected by conceptual challenges (Reeves *et al.*, 2011), including a tendency to theorise IPE as an all-encompassing term. This can be problematic as it overlooks some of the important differences, such as the setting in which IPE is delivered (Reeves, 2009). The key messages for IPE from this thesis are documented in Table 16. LSO merges IPE and workplace learning and a deeper understanding of its processes suggests that IPE is a philosophy and overarching educational theory in its own right.

Table 16: Recommendations for IPE

Key messages for institutions or organisations:

- **PHILOSOPHY:**
 - individual development for the benefit of the whole team
 - leaders who initiate and follow this philosophy, encouraging new leaders to emerge
 - enthusiastic stakeholders committed to lifelong learning

- **ADMINISTRATION:**
 - develop and maintain an appropriate skill mix at and above levels being taught
 - skill mix allows interactive teaching and promote different modes of learning
 - timetabling and assessments allowing continuing reflection
 - promote from within the team and engage recruits at a lower professional level
 - administrators fully integrated within the IPE team and facilitate education
 - appropriate training for tutors and administrators
 - long term planning includes provision for an overall leader of appropriate expertise
 - regular team meetings to enhance communication and motivation

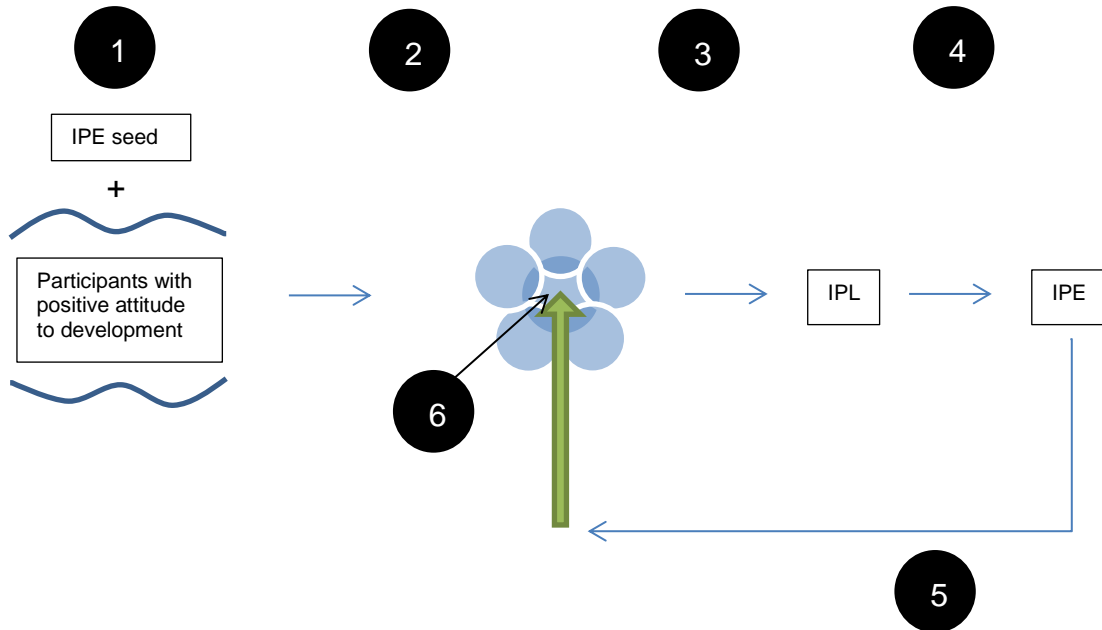
- **ASSESSMENT AND PROGRESSION:**
 - new summative assessments for healthcare professionals registrable qualifications which have learning outcomes relating to IPE
 - clinical reflective portfolios used for assessment and an increased reflective element in personal development portfolios for healthcare professionals
 - development of a career pathway and qualifications for non-clinical healthcare professionals

Chapter 11: Conclusions

11.1 Conclusions

This thesis describes a real practice setting evaluation of IPE. The purpose of this primary research was to understand LSO processes, in the expectation that greater understanding could inform beneficial change and contribute to knowledge of IPE and healthcare professional education. Educating the orthodontic team together and learning about, from and with each other, in a primary care environment, emerges in this research as successful for the majority of stakeholders. Findings identify contextual factors required for successful IPE in LSO, mechanisms of causation, and outcomes, plus give insight into the evolution of LSO into an IPE environment. Original contexts at LSO were the leader's philosophy, based upon developing a high quality extended duties team and, sufficient motivated individuals to accept the concept and drive it forward. These key contexts of philosophy and attitude are fundamental for initiating IPE in any environment. The stages in IPE evolution in LSO are diagrammatically represented in Figure 16 overleaf. IPE cannot be simply transplanted in any organisation as a fully developed entity and expected to flourish; it risks being overcome by negativity and traditionalist views on education existing within many institutions. It has to evolve over time in a conducive environment.

Figure 16: Stages in IPE evolution within LSO



Stage description:

- 1 The start of LSO education as IPE seed is sown within individuals with the desire to further develop professionally. As some mechanisms fire, certain outcomes are achieved, and
- 2 individuals develop for the benefit of the team, leading to further contextual developments in LSO
- 3 contexts allow further mechanisms to fire in LSO, leading to IPL as a mechanism, which leads to
- 4 further outcomes achieved, including a conducive community of practice, in turn leading to IPE as an outcome
- 5 further time in the LSO IPE environment leads to
- 6 IPE becoming the philosophy as a critical mass of participants themselves further develop IPE by increasing involvement and influence thus self-perpetuating required contexts

To initiate IPE, in Context-Mechanism-Outcome configuration terms: an underlying team philosophy and individuals with a positive attitude (C) stimulate empowerment (M), which is the primary mechanism required to enable learning in any IPE environment, leading to individual professional development which benefits the team (O). Individuals must feel benefit from IPE in order to be enthusiastic and motivated to help others.

These outcomes develop an enhanced skill mix and a culture of continuing learning, changing the delivery of patient care and education. The learning environment maintains empowerment, which is fundamental for lifelong learning and sustaining IPE. Empowerment leads to other learning mechanisms firing. These may vary, depending upon particular contexts but continuing reflection is required in adult education for self-directed learning, maximised development and, to sustain momentum for IPE.

Time is required to develop a conducive community of practice, which is an essential pre-requisite for evolving an IPE environment. Providing contexts are maintained, IPE continually evolves. This is a dynamic process; if any contextual factors are lost, IPE is not sustainable and the model regresses. Therefore, IPE needs to be contextual to be viable, which relies upon the whole team perceiving benefit. Once a critical mass of individuals are motivated, IPE becomes contextual. This is enhanced by developing individuals from within and not imposing a 'glass ceiling' on their progression, thus benefitting the whole organisation.

To continue this progression new leaders need to emerge. Developing from within helps sustain IPE, as team members realise they have opportunities to advance within the organisation. This is a major factor for team morale, which is significant for IPE. Required contexts must be maintained, both facilities and personnel. Developing people creates opportunity for growth and sustaining momentum is vital. Contexts fluctuate but, enthusiasm must be maintained. Daily team meetings facilitate this and their importance is one of the many benefits of a greater understanding of LSO education that realist evaluation has delivered. Realist evaluation provides insight into theorisation of IPE. Contexts, mechanisms and outcomes unpick IPE, thus providing a deeper knowledge of underlying processes. This requirement for continuing critical thought and explanation results in a desire for greater understanding, which, in LSO, could be as important as the programme theories themselves.

IPE seeks theoretical underpinning; most explanations classify IPE as a separate intervention attached to courses. The evidence provided here implies however that it must be the underpinning philosophy of the organisation, the overarching educational theory, requiring certain contexts that facilitate other social science and learning theories. IPE must be driven by leaders who have IPE as their philosophy, who live it, demonstrate it by their actions, empower and create opportunity for others, enabling IPE to grow. IPE is a living, vibrant entity revolving around people, their attitudes, perceptions and emotions as individuals but also their integration as a conducive community of practice, which requires continuous forward momentum. For IPE progression, individuals must be continually

empowered, enthused and motivated to maintain their full engagement. A sustainable IPE environment will be a professionally stimulating environment, which this study suggests describes LSO in the eyes of its stakeholders.

LSO is 'one' model of IPE, which is potentially transportable. It is not necessarily 'the' model. Indeed, this thesis suggests that there should not be one single model of IPE but that the essential contexts identified, when present, could allow further models of IPE to evolve, evaluation of which will add to the body of evidence and ultimately enhance integrated healthcare professionals education and patient care. IPE must be the institutional philosophy. It always was at LSO, but until this evaluation, not identified as such. The core philosophy and the LSO mission statement has been identified by participants. A mission statement for IPE could indeed be that originally used by LSO, namely: 'individual development for the benefit of the whole team.'

References

- Alfano, M. C. (2012) Connecting Dental Education to Other Health Professions. *Journal of Dental Education*, 76 (1): 46-50.
- Allan, H., Bryan, K., Clawson, L. & Smith, P. (2005) Developing an interprofessional learning culture in primary care. *Journal of Interprofessional Care*, 19 (5): 452-464.
- Anderson, J., Ateah, C., Wener, P., Snow, W., Metge, C., MacDonald, L., Fricke, M., Ludwig, S. & Davis, P. (2011) Differences in Pre-licensure Interprofessional Learning: Classroom Versus Practice Settings. *Journal of Research in Interprofessional Practice and Education*, 2.1: 3-24.
- Archer, M. (1995) *Realist Social Theory: The Morphogenic Approach*. Cambridge: Cambridge University Press.
- Astbury, B. & Leeuw, F. L. (2010) Unpacking Black Boxes: Mechanisms and Theory Building in Evaluation. *American Journal of Evaluation*, 31 (3): 363-381.
- Austin, E. K. (1981) *Guidelines for the Development of Continuing Education Offerings for Nurses*. New York: Appleton-Century-Crofts.
- Ausubel, D. (1978) *Educational psychology - a cognitive view*. New York: Holt, Rinehart and Winston.
- Babbie, E. (2007) *The practice of social research*. 11th edn. California: Wadsworth Publishing Company.
- Bailey, K. D. (1987) *Methods of Social Research*. 3rd edn. New York: The Free Press, National Academies.
- Bainbridge, L. & Wood, V. I. (2012) The power of prepositions: Learning with, from and about others in the context of interprofessional education. *Journal of Interprofessional Education*, 26: 452-458.
- Bandura, A. (1977) *Social Learning Theory*. Englewood Cliffs, New Jersey: Prentice Hall.
- Banfield, G. (2004) What's Really Wrong with Ethnography? *International Education Journal*, 4 (2): 53-63.
- Barab, S. & Squire, K. (2004) Design-based research: Putting a stake in the ground. *Journal of the Learning Sciences*, 13 (1): 1-14.

Barber, G., Borders, K., Holland, B. & Roberts, K. (1997) Life Span Forum: an interdisciplinary training experience. *Gerontology & Geriatrics Education*, 18 (1): 47-59.

Barbour, R. S. (1998) Mixing qualitative methods: Quality assurance or qualitative quagmire? *Qualitative Health Research*, 8 (3): 352-361.

Barbour, R. S. (2005) Making Sense of Focus Groups. *Medical Education*, 39 (7): 742-750.

Barnett, R. (1990) *The Idea of Higher Education*. Milton Keynes: Open University Press.

Barr, H. (2001) *Interprofessional education: today, yesterday and tomorrow - a review*. London: Centre for the Advancement of Interprofessional Education.

Barr, H. (2013) Toward a theoretical framework for interprofessional education. *Journal of Interprofessional Care*, 27 (1): 4-9.

Barr, H., Freeth, D., Hammick, M., Koppel, I. & Reeves, S. (2000) *Evaluations of Interprofessional Education: A United Kingdom Review for Health and Social Care*. London: Centre for the Advancement of Interprofessional Education.

Barr, H., Freeth, D., Hammick, M., Koppel, I. & Reeves, S. (2006) The evidence base and recommendations for interprofessional education in health and social care. *Journal of Interprofessional Care*, 20 (1): 75-78.

Barr, H., Hammick, M., Koppel, I. & Reeves, S. (1999) Evaluating interprofessional education: two systematic reviews for health and social care. *British Education Research Journal*, 25 (4): 533-544.

Barr, H., Koppel, I., Reeves, S., Hammick, M. & Freeth, D. (2005) *Effective interprofessional education: argument, assumption and evidence*. London: Blackwell.

Barriball, K. L. & While, A. (1994) Collecting data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing*, 19: 328-335.

Barrington, D., Rodger, M., Gray, L., Jones, B., Langridge, M. & Marriott, R. (1998) Student evaluation of an interactive multi-disciplinary clinical learning model. *Medical Teacher*, 20: 530-535.

Barrows, H. S. (1986) A Taxonomy of Problem-Based Learning Methods. *Medical Education*, 20: 481-486.

Barrows, H. S. (1998) The essentials of problem-based learning. *Journal of Dental Education*, 62: 630-633.

- Barrows, H. S. & Tamblyn, R. M. (1980) *Problem Based Learning: An Approach to Medical Based Learning*. New York: Springer.
- Bauman, Z. (1987) *Legislators and Interpreters: On Modernity, Post-modernity and Intellectuals*. Cambridge: Polity Press.
- Baumeister, R. F. & Vohs, K. D. (2004) *Handbook of self-regulation: Research, theory, and applications*. 2nd edn. New York: Guilford.
- Baxter Magolda, M. B. & King, P. M. (2004) *Learning partnerships: theory and models of practice to educate for self-authorship*. Sterling, Virginia: Stylus.
- Bazeley, P. (2009) Analysing Qualitative Data: More Than 'Identifying Themes'. *The Malaysian Journal of Qualitative Research*, 2 (2): 6-17.
- Bearn, D. R. & Chadwick, S. M. (2010) Problem-based learning in postgraduate dental education: a qualitative evaluation of students' experience of an orthodontic problem-based postgraduate programme. *European Journal of Dental Education*, 14 (1): 26-34.
- Bearn, D. R., Chadwick, S. M., Jack, A. C. & Sackville, A. (2002) Orthodontic undergraduate education: assessment in a modern curriculum. *European Journal of Dental Education*, 6 (4): 162-168.
- Beck, U. (1992) *Risk Society: Towards a New Modernity*. London: Sage Publications.
- Becker, K. (2005) Individual and Organisational Unlearning: Directions for Future Research. *International Journal of Organisational Behaviour*, 9 (7): 659-670.
- Bellanti, N. D., Wiggs, J. S., Kenney, E. B., Laswell, H. R., Saxe, S. R., Spohn, E. E. & Cooper, T. M. (1973) Individualization of clinical dental curriculum. *Journal of Dental Education*, 37: 33-36.
- Biggs, J. B. (1993) From theory to practice: a cognitive systems approach. *Higher Education Research Development*, 12: 73-85.
- Biggs, J. B. (1999) *Teaching for Quality Learning at University: What the student does*. Buckingham: Society for Research into Higher Education & Open University Press.
- Biggs, J. B. & Collis, K. F. (1982) *Evaluating the quality of learning - the SOLO taxonomy (Structure of Observed Learning Outcome)*. London: Academic Press.
- Biggs, J. B. & Tang, C. (2007) *Teaching for Quality Learning at University*. Maidenhead: Society for Research into Higher Education and Open University Press.

Blaxter, L., Hughes, C. & Tight, M. (2006) *How to Research*. 3rd edn. Buckingham: Open University Press.

Bond, M. (1997) A learning team in the making. *Journal of Interprofessional Care*, 11: 89–98.

Borg, W. R. & Gall, M. D. (1989) *Educational research: an introduction*. New York: Longman.

BOS (1992) The joint response of the British Orthodontic Societies to the Nuffield Inquiry into Personnel Auxiliary to Dentistry. *British Journal of Orthodontics*, 19 (4): 334-342.

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

Bouton, M. E. (1994) Conditioning, Remembering, and Forgetting. *Journal of Experimental Psychology: Animal Behaviour Processes*, 20 (3): 219-231.

Bouton, M. E. (2000) A Learning Theory Perspective on Lapse, Relapse, and the Maintenance of Behaviour Change. *Health Psychology*, 19 (1): 57-63.

Boyatzis, R. E. (1998) *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks: Sage.

Boyd, E. M. & Fales, A. W. (1983) Reflective learning: key to learning from experience. *Journal of Humanistic Psychology*, 23 (2): 99-117.

Boyle, M. & McEvoy, J. (1998) Putting abortion in its social context: Northern Irish women's experiences of abortion in England. *Health: An International Journal for the Social Study of Health, Illness and Medicine*, 2: 283-304.

Brah, A. & Hoy, J. (1989) Experiential learning: a new orthodoxy? In: Weil, S. & McGill, I. eds. *Making Sense of Experiential Learning*. Buckingham: Society for Research into Higher Education and the Open University Press: 73.

Brewer, M., Jones, S., Smith, M., Trede, F. & Flavell, H. (2014) *Creating a collaborative practice environment which encourages sustainable interprofessional leadership, education and practice*. Sydney, NSW: Curtin and Charles Sturt Universities: LE12-2164.

Brink, P. J. (1989) Issues in reliability and validity. In: Morse, J. M. eds. *Qualitative Nursing Research: A Contemporary Dialogue*. Rockville, Maryland: Aspen: 164-186.

Brissette, A. & Howes, D. (2010) Motivation in medical education: A systematic review. *Webmed Central Medical Education*, 1 (12): 1-9.

- Britten, N. (1995) Qualitative interviews in medical research. *British Medical Journal*, 311: 251-253.
- Brown, J. S., Collins, A. & Dugid, P. (1989) Situated cognition and the culture of learning. *Educational Researcher*, 18: 32-42.
- Bruffee, K. A. (1995) *Collaborative learning: higher education, interdependence, and the authority of knowledge*. Baltimore and London: The John Hopkins University Press.
- Bullock, A. (2010) Dental education as a social science: some implications for research. *European Journal of Dental Education*, 14 (2): 65-68.
- Bunniss, S. & Kelly, D. R. (2010) Research paradigms in medical education research. *Medical Education*, 44: 358–366.
- Burnard, P. (1991) A method of analysing interview transcripts in qualitative research. *Nurse Education Today*, 11 (6): 461-466.
- Burns, R. (1995) *The adult learner at work*. Sydney: Business and Professional Publishing.
- CAIPE [online] Available from: www.caipe.org.uk (Accessed 12th January 2011).
- Carpenter, B. (2010) *A vision for the 21st century special school*. London: Specialist Schools and Academies Trust.
- Carpenter, J. & Hewstone, M. (1996) Shared learning for doctors and social workers: Evaluation of a programme. *British Journal of Social Work*, 26 (2): 239-257.
- Carr, W. & Kemmis, S. (1986) *Becoming Critical: Education, Knowledge and Action Research*. London: Farmer Press.
- CASP (2013) [online] Available from: <http://www.casp-uk.net/> (Accessed 6th June 2013).
- Charles, G., Bainbridge, L. & Gilbert, J. (2004) *Interprofessional education and practice in the health and human services: The University of British Columbia Model*. Vancouver, British Columbia: UBC.
- Chaves, J. F., Chaves, J. A. & Lantz, M. S. (1998) The PBL-Evaluator: a Web-based tool for assessment in tutorials. *Journal of Dental Education*, 62: 671-674.
- Cheetham, J., Fuller, R., McIvor, G. & Petch, A. (1992) *Evaluating Social Work Effectiveness*. Buckingham: Open University Press.

Cheyne, H., Abhyankar, P. & McCourt, C. (2013) Empowering Change: Realist Evaluation of a Scottish Government Programme to Support Normal Birth. *Midwifery*, 10: 1110-1121.

CIHC (2009) *Program Evaluation for Interprofessional Initiatives: Evaluation Instruments/Methods of the 20 IECPCP Projects*. Vancouver, Canada: Canadian Interprofessional Health Collaborative.

CIHC (2010) *A National Interprofessional Competency Framework*. Vancouver, Canada: Canadian Interprofessional Health Collaborative.

Clough, P. & Nutbrown, C. (2007) *A Student's Guide to Methodology*. 2nd edn. London: Sage.

Cohen, L., Manion, L. & Morrison, K. (2007) *Research Methods in Education*. 6th edn. London: Routledge Falmer.

Colyer, H., Helme, M. & Jones, I. (2005) The theory–practice relationship in interprofessional education (Occasional Paper No. 7). Available from: <http://www.health.heacademy.ac.uk/publications/occasionalpaper/occ7.pdf> (Accessed 16th May 2015).

Connelly, J. B. (2007) Evaluating complex public health interventions: theory, methods and scope of realist enquiry. *Journal of Evaluation in Clinical Practice*, 13: 935-941.

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

Cooper, H., Carlisle, C., Gibbs, T. & Watkins, C. (2001) Developing an evidence base for interdisciplinary learning: a systematic review. *Journal of Advanced Nursing*, 35 (2): 228-237.

COPDEND. (2013) *A Reference Guide for Postgraduate Dental Specialty Training in the UK: The Dental Gold Guide*. Oxford: Committee of Postgraduate Dental Deans and Directors.

Cowan, J. (1998) *On becoming an innovative university teacher*. Buckingham: Open University Press.

Cox, D. W. (1984) Experiential Learning - Experience as the Source of Learning and Development - Kolb, D. A. *Journal of College Student Development*, 25 (5): 481-482.

Craddock, D., O'Halloran, C., Borthwick, A. & McPherson, K. (2006) Interprofessional education in health and social care: fashion or informed practice? *Learning in Health and Social Care*, 5 (4): 220-242.

- Craddock, D., O'Halloran, C., McPherson, K., Hean, S. & Hammick, M. (2013) A top-down approach impedes the use of theory? Interprofessional educational leaders' approaches to curriculum development and the use of learning theory. *Journal of Interprofessional Care*, 27: 65-72.
- Cramer, K. D. & Wasiak, H. (2006) *Change the way you see everything: Through asset-based thinking*. Philadelphia, PA: Running Press Book Publishers.
- Creswell, J. W. & Miller, D. L. (2000) Determining validity in qualitative inquiry. *Theory into Practice*, 39 (3): 124-131.
- Crutcher, R., Then, K., Edwards, A., Taylor, K. & Norton, P. (2004) Multi-professional Education in Diabetes. *Medical Teacher*, 26 (5): 435-443.
- Cure, R. J. & Ireland, R. S. (2008) The development of an outreach training programme in orthodontics. *British Dental Journal*, 204 (11): 631-634.
- Curran, V. (2004) *Interprofessional Education for Collaborative Patient-Centred Practice*. Vancouver, Canada: Health Canada.
- D'Amour, D. & Oandasan, I. (2005) Interprofessionality as the field of interprofessional practice and interprofessional education: an emerging concept. *Journal of Interprofessional Care*, 19 (Supplement 1): 8-20.
- Davidson, M., Smith, R. A., Dodd, K. J., Smith, J. S. & O'Loughlan, M. J. (2008) Interprofessional pre-qualification clinical education: a systematic review. *Australian Health Review*, 32 (1): 111-120.
- Davies, D. & Dodd, J. (2002) Qualitative research and the question of rigor. *Qualitative Health Research*, 12 (2): 279-289.
- Davies, P. (1999) What is evidence-based education? *British Journal of Educational Studies*, 47 (2): 108-121.
- Dearne, K. (2008) Not easy being green, but audits help. *Australian IT*: 1st July 2008: At: <http://www.theaustralian.com.au/technology/not-easy-being-green-but-audits-help/story-e6frganx-1111116779996?nk=c72640c010944652522936443449be5e> (Accessed 5th June 2013).
- Deci, E. L. & Ryan, R. M. (1985) *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum.
- Delahaye, B. (2005) *Human Resource Development: principles and practice*. 2nd edn. Brisbane: Wiley.
- Denning, J. D. & Verschelden, C. (1993) Using the focus group in assessing training needs: empowering child welfare workers. *Child Welfare*, 72: 569-579.

- Denzin, N. K. (1989) *The Research Act: A Theoretical Introduction to Sociological Methods*. 3rd edn. Englewood Cliffs, New Jersey: Prentice Hall.
- DeWalt, K. M., DeWalt, B. R. & Wayland, C. B. (1998) Participant observation. In: Bernard, H. R. eds. *Handbook of methods in cultural anthropology*. Walnut Creek, CA: AltaMira Press: 259-299.
- Dewey, J. (1916) *Democracy and Education: An Introduction to the Philosophy of Education*. New York: Macmillan.
- Dewey, J. (1933) *How we think: A restatement of the relation of reflective thinking to the educative process*. New York, NY: D. C. Health and Co.
- Dienst, E. R. & Byl, N. (1981) Evaluation of an educational program in health care teams. *Journal of Community Health*, 6 (4): 282-298.
- Dobbert, M. (1982) *Ethnographic Research*. New York: Praeger.
- DoH. (1990) *Caring for People: Community Care in the Next Decade*. London: HMSO.
- DoH. (1995) *Child Protection: Messages from Research*. London: HMSO.
- DoH. (1997) *The New NHS: Modern and Dependable*. London: HMSO.
- DoH. (2000) *A Health Service of all the Talents: Developing the NHS Workforce*. London: HMSO.
- DoH. (2002a) *NHS dentistry: options for change*. London: HMSO.
- DoH. (2002b) *Next steps in joint training for health professionals*. London: HMSO.
- DoH. (2002c) *Life long learning framework for the NHS* London: HMSO.
- DoH. (2004) *Implementing a Scheme for Dentists with Special Interests (DwSIs)*. London: HMSO.
- DoH. (2005) *Primary Care Dental Services: Implementation of Local Commissioning*. London: HMSO.
- DoH. (2006) *Guidelines for the appointment of Dentists with Special Interests (DwSIs) in Orthodontics*. London: HMSO.
- DoH. (2013) *Delivering high quality, effective, compassionate care: Developing the right people with the right skills and the right values. A mandate from the Government to Health Education England: April 2013 to March 2015*. London: The Stationery Office.

Douglas, E. (2002) *Qualitative Analysis: Practice and Innovations*. London: Routledge.

Dreyfus, H. & Dreyfus, S. (1986) *Mind over machine: the power of human intuition and expertise in the era of the computer*. Oxford: Basil Blackwell.

Duguid, S. & Pawson, R. (1998) Education, change and transformation: The prison experience. *Evaluation Review*, 22 (4): 470-495.

Dunn, L. (2002) Theories of Learning. Oxford Centre for Staff and Learning Development. Available from: http://www.brookes.ac.uk/services/ocsd/2_learnth/theories.html/ (Accessed 5th May 2013).

Eaton, K. A., de Vries, J., Widstrom, E., Gait, T. C., Bedi, R., Meyers, I., Feldman, C. A. & Hobson, R. (2006) 'Schools without walls?' Developments and challenges in dental outreach teaching - report of a recent symposium. *European Journal of Dental Education* 10 (4): 186-191.

Edwards, R., Miller, N., Small, N. & Tait, A. (2002) *Supporting Lifelong Learning Volume 3: Making Policy Work*. London: Routledge Falmer/Open University.

Elkind, A. (2002) Outreach teaching: is this the future for dental education? *British Dental Journal*, 193 (2): 111-112.

Elkind, A., Blinkhorn, A., Blinkhorn, F., Duxbury, J., Hull, P. & Brunton, P. (2005) Developing dental education in primary care: the student perspective. *British Dental Journal*, 198 (4): 233-237.

Elkind, A., Watts, C., Qualtrough, A., Blinkhorn, A., Potter, C., Duxbury, J., Blinkhorn, F., Taylor, I. & Turner, R. (2007) The use of outreach clinics for teaching undergraduate restorative dentistry. *British Dental Journal*, 203 (3): 127-132.

Emerson, R. M., Fretz, R. I. & Shaw, L. L. (2001) Participant Observation and Fieldnotes. In: Atkinson, P., Coffey, A., Delamont, S., Lofland, J. & Lofland, L. eds. *Handbook of Ethnography*. Thousand Oaks, CA: Sage Publications: 356-357.

Eraut, M. (1994) *Developing Professional Knowledge and Competence*. London: The Farmer Press.

Eraut, M. (2001) Do continuing professional development models promote one-dimensional learning? *Medical Education*, 35 (1): 8-11.

Eraut, M. (2003) *Learning in the first three years of postgraduate employment-The LiNEA Project*. IN: EARLI Conference: Padua, Italy.

Eraut, M. (2004) A wider perspective on assessment. *Medical Education*, 38 (8): 803-804.

Eva, K. W. & Lingard, L. (2008) What's next? A guiding question for educators engaged in educational research. *Medical Education*, 42 (8): 752-754.

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.

Fairbrother, P. & Mathers, N. J. (2004) Lecturer practitioners in six professions: combining cultures. *Journal of Clinical Nursing*, 13 (5): 539-546.

Falchikov, N. (2001) *Learning together: peer tutoring in higher education*. London: RoutledgeFalmer.

Falchikov, N. (2005) *Improving assessment through student involvement: practical solutions for aiding learning in higher and further education*. London: Routledge.

Field, M. J. (1995) *Dental Education at the Crossroads: Challenges and Change*. Washington, DC: The National Academies Press.

Fincham, A. G. & Shuler, C. F. (2001) The changing face of dental education: the impact of PBL. *Journal of Dental Education*, 65 (5): 406-421.

Finkle, S. L. & Torp, L. L. (1995) *Introductory Documents*. Aurora, IL: Illinois Math and Science Academy.

Francis, R. (2013) *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry*. London: The Stationery Office.

Freeth, D., Hammick, M., Koppel, I., Reeves, S. & Barr, H. (2002) *A Critical Review of Evaluations of Interprofessional Education, Occasional Paper no. 2*. London: LTSN – Centre for Health Sciences and Practice.

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

Freeth, D., Meyer, J., S., R. & Spilsbury, K. (1999) Linking interprofessional education to user benefit: of drops in the ocean and stalactites. *Advancing Clinical Practice*, 3: 127–135.

Freeth, D., Reeves, S., Koppel, I., Hammick, M. & Barr, H. (2005b) *Evaluating Interprofessional Education: A Self-Help Guide*. London: The Higher Education Academy.

Frost, N. (2001) Professionalism, change and the politics of lifelong learning. *Studies in Continuing Education*, 23 (1): 5-17.

Gaengler, P., De Vries, J., Akota, L., Balciuniene, I., Berthold, P. & Gajewska, M. (2002) Student selection and the influence of their clinical and academic environment on learning. *European Journal of Dental Education*, 6 (Supplement 3): 8-26.

Gagne, R. M. (1965) *The conditions of learning and theory of instruction* (1st ed.) New York, N.Y.: Holt, Rinehart & Winston.

Gallacher, J., Munday, P. & Gelbier, S. (2012) The New Cross School for dental auxiliaries (therapists from 1979) (1960-1983). *Dental Historian*, 55: 83-91.

Gallagher, S. A. & Stepien, W. J. (1996) Content acquisition in problem-based learning: depth versus breadth in American studies. *Journal for the Education of the Gifted*, 19: 257-275.

GDC. (2004) *Developing the dental team: curricula frameworks for registrable qualifications for professionals complimentary to dentistry*. London: General Dental Council.

GDC. (2010) *Curriculum and Specialist Training Programme in Orthodontics*. London: General Dental Council.

GDC. (2011) *Preparing for practice - Dental team learning outcomes for registration*. London: General Dental Council.

GDC. (2012) *Standards for Education - Standards and requirements for providers of education and training programmes*. London: General Dental Council.

GDC. (2013a) *Scope of Practice*. London: General Dental Council.

GDC. (2013b) *Standards for the Dental Team*. London: General Dental Council.

Gelbier, S. (2005) 125 years of developments in dentistry, 1880-2005. Part 5: Dental education, training and qualifications. *British Dental Journal*, 199 (10): 685-689.

Gelman, S., White, A., Carlson, L. & Norman, L. (2000) Making organisational change to achieve improvement and interprofessional learning: perspectives from health professions educators. *Journal of Interprofessional Care*, 14: 131-146.

George, J. & Cowan, J. (1999) *A handbook of techniques for formative evaluation*. London: Kogan Page.

Gharechahi, M., Zarei, M. & Javidi, M. (2014) Evaluation of Students' Opinion about Seminars Conducted with Problem Based Learning Method in the Endodontics Department of Mashhad Dental School. *Future of Medical Education Journal*, 4 (1): 22-26.

Gill, D. & Griffin, A. E. (2009) Reframing medical education research: let's make the publishable meaningful and the meaningful publishable. *Medical Education*, 43 (10): 933-935.

Gillan, C., Lovrics, E., Halpern, E., Wiljer, D. & Harnett, N. (2011) The evaluation of learner outcomes in interprofessional continuing education: A literature review and an analysis of survey instruments. *Medical Teacher*, 33 (9): E461-E470.

Gillman, B. (2000) *The research interview*. London: Continuum.

Gilmore, N. D. (1973) Learning model for clinical dentistry. *Journal of Dental Education*, 37: 35-38.

Glaser, B. G. & Strauss, A. L. (1967) *The Discovery of Grounded Theory*. New York: Aldine.

Glassick, C. E. (2000) Reconsidering scholarship. *Journal of Public Health Management and Practice*, 6: 4-9.

Golafshani, N. (2003) Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8 (4): 597-607.

Gorard, S. & Rees, G. (2002) *Creating a Learning Society? Learning Careers and Policies for Lifelong Learning*. Bristol: Policy Press.

Gordon, R. L. (1975) *Interviewing: Strategy, Techniques and Tactics*. Illinois: Dorsey Press.

Green, C. (2013) Relative distancing: A grounded theory of how learners negotiate the interprofessional. *Journal of Interprofessional Care*, 27: 34-42.

Greenfield, S. (1999) Soul, brain and mind. In: Crabbe, M. J. C. eds. *From Soul to Self*. London: Routledge: 108-125.

Griffin, C. & Brownhill, B. (2001) The learning society. In: Jarvis, P. eds. *The Age of Learning: Education and the Knowledge Society*. London: Kogan Page: 63.

Grimwade, K. (2003) Orthodontic speciality training in the UK. *Journal of Orthodontics*, 30 (1): 93.

Haig, A. & Dozier, M. (2003a) BEME guide no. 3: systematic searching for evidence in medical education-Part 2: constructing searches. *Medical Teacher*, 25 (5): 463-484.

- Haig, A. & Dozier, M. (2003b) BEME Guide no 3: systematic searching for evidence in medical education-Part 1: Sources of information. *Medical Teacher*, 25 (4): 352-363.
- Hall, P. & Weaver, L. (2001) Interdisciplinary education and teamwork: a long and winding road. *Medical Education*, 35 (9): 867-875.
- Hammick, M., Barr, H., Freeth, D., Koppel, I. & Reeves, S. (2002) Systematic reviews of evaluations of interprofessional education: results and work in progress. *Journal of Interprofessional Care*, 16 (1): 80-84.
- Hammick, M., Freeth, D., Koppel, I., Reeves, S. & Barr, H. (2007) A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical Teacher*, 29 (8): 735-751.
- Harden, R. M. (1998) Effective multiprofessional education: a three-dimensional perspective. 20: 402-408.
- Hargreaves, D. (2006) *Personalising learning 6: The final gateway: School design and organisation*. London: Specialist Schools Trust.
- Hasler, J. & Klinger, M. (1976) Common ground in general practice and health-visitor training – an experimental course. *Journal of the Royal College of General Practitioners*, 26: 266-276.
- Headrick, L. A., Wilcock, P. M. & Batalden, P. B. (1998) Interprofessional working and continuing medical education. *British Medical Journal*, 316 (7133): 771-774.
- Healy, M. & Perry, C. (2000) Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research*, 3 (3): 118-126.
- Hean, S., Craddock, D. & Hammick, M. (2012) Theoretical insights into interprofessional education: AMEE Guide No. 62. *Medical Teacher*, 34 (2): E78-E101.
- Hean, S., Craddock, D. & O'Halloran, C. (2009) Learning theories and interprofessional education: a user's guide. *Learning in Health & Social Care*, 8 (4): 250-262.
- Hean, S., O'Halloran, C., Craddock, D., Hammick, M. & Pitt, R. (2013) Testing theory in interprofessional education: Social capital as a case study. *Journal of Interprofessional Care*, 27: 10-17.
- Hedberg, B. (1981) How Organisations Learn and Unlearn. In: Nystrom, P. & Starbuck, W. H. eds. *Handbook of Organizational Design*. London: Cambridge University Press: 3.

- Henwood, K. L. & Pidgeon, N. F. (1992) Qualitative Research and Psychological Theorising. *British Journal of Psychology*, 83: 97-111.
- Hindle, D., Braithwaite, J., Travaglia, J. & Iedema, R. (2006) *Patient safety: A comparative analysis of eight inquiries in six countries*. Sydney: Centre for Clinical Governance Research, University of NSW.
- Hitchcock, M. A. & Anderson, A. S. (1997) Dealing with dysfunctional tutorial groups. *Teaching and Learning in Medicine*, 9: 19-24.
- Hobson, R. S. (2009) Challenges to future dental education. *British Dental Journal*, 206 (3): 125-126.
- Holland, K. (2002) Inter-professional education and practice: the role of the teacher/facilitator. *Nurse Education Practitioner*, 2 (4): 221-222.
- Honderich, T. (2005) *Oxford Companion to Philosophy*. Oxford: Oxford University Press.
- Horbar, J. D., Rogowski, J., Plsek, P. E., Delmore, P., Edwards, W. H., Hocker, J., Kantak, A. D., Lewallen, P., Lewis, W., Lewit, E., McCarroll, C. J., Mjuscce, D., Payne, N. R., Shiono, P., Soll, R. F., Leahy, K. & Carpenter, J. H. (2001) Collaborative quality improvement for neonatal intensive care. NIC/Q Project Investigators of the Vermont Oxford Network. *Pediatrics*, 107 (1): 14-22.
- Houle, C. O. (1980) *Continuing Learning in the Professions*. San Francisco: Jossey Bass.
- Huberman, A. M. & Miles, M. B. (1998) Data management and analysis methods. In: Denzin, N. K. & Lincoln, Y. S. eds. *Collecting and interpreting qualitative materials*. Thousand Oaks, California: Sage: 179-210.
- Hughes, C. (2006) *Qualitative and Quantitative Approaches to Social Research*. [online] Available from: www2.warwick.ac.uk/.../teachingresearchprocess/quantitativequalitative (Accessed 30th March 2014).
- Hughes, D. & Dumont, K. (1993) Using focus groups to facilitate culturally anchored research. *American Journal of Community Psychology*, 21: 775-806.
- Hung, D. (2002) Situated cognition and problem-based learning: implications for learning and instruction with technology. *Journal of Interactive Learning Research*, 13 (4): 393-415.
- Hutchinson, L. (1999) Evaluating and researching the effectiveness of educational interventions. *British Medical Journal*, 318 (7193): 1267-1269.

Hutchinson, S. & Skodol-Wilson, H. (1992) Validity threats in scheduled semi-structured research interviews. *Nursing Research*, 41 (2): 117-119.

IPEC (2011) *Core Competencies for Interprofessional Collaborative Practice*. Washington, D.C.: IPEC.

Jarvis, P. (1992) Learning practical knowledge. In: Baskett, H. K. M. & Marsick, V. J. eds. *Professions' Ways of Knowing: New Findings on How to Improve Professional Education*. San Francisco: Jossey Bass: 89-94.

Jarvis, P. (1995) *Adult and Continuing Education, Theory and Practice*. 2nd edn. London: Routledge.

Jarvis, P. (1999) *The Practitioner Researcher: From Practice to Theory*. San Francisco: Jossey-Bass.

Jarvis, P. (2001) *The Age of Learning: Education and the Knowledge Society*. London: Kogan Page.

Jarvis, P., Hoford, J. & Griffin, G. (2002) *The theory and practice of learning*. 2nd edn. London: Kogan Page.

Jenkins, A., Breen, R., Lindsay, R. & Brew, A. (2003) *Reshaping teaching in higher education-Linking teaching with research*. London: Kogan Page.

Jewson, N. (2007) Cultivating network analysis: Rethinking the concept of 'community' within 'communities of practice'. In: Hughes, J., Jewson, N. & Unwin, L. eds. *Communities of Practice: Critical Perspectives*. Abingdon, Oxon: Routledge: 68-82.

Johnson, B. R. (1997) Examining the validity structure of qualitative research. *Education*, 118 (3): 282-292.

Johnson, D. W. & Johnson, R. T. (1999) *Learning together and alone*. 5th edn. Boston: Allyn and Bacon.

Kaufman, D. M. & Mann, K. V. (1996) Comparing students' attitudes in problem-based and conventional curricula. *Academic Medicine*, 71: 1096-1099.

Kay, E. J. (2007) Dental education-where it needs to be. Dentistry for the community. *British Dental Journal*, 202 (1): 1.

Kazi, M. (2003) Realist Evaluation for Practice. *British Journal of Social Work*, 33: 803-818.

Kelly, M., Shanley, D. B., McCartan, B., Toner, M. & McCreary, C. (1997) Curricular adaptations towards problem-based learning in dental education. *European Journal of Dental Education*, 1 (3): 108-113.

Kevern, J. & Webb, C. (2001) Focus Groups as a Tool for Critical Social Research in Nurse Education. *Nurse Education Today*, 21: 323-333.

Kilminster, S., Hale, C., Lascelles, M., Morris, P., Roberts, T., Stark, P., Sowter, J. & Thistlethwaite, J. (2004) Learning for real life: patient-focused interprofessional workshops offer added value. *Medical Education*, 38 (7): 717-726.

King, P. M. & Kitchener, K. S. (1994) *Developing reflective judgement*. San Francisco: Jossey-Bass.

Kirkpatrick (2014) *The New World Kirkpatrick Model*. [online] Available from: [http://www.kirkpatrickpartners.com/OurPhilosophy/TheNewWorldKirkpatrick Model](http://www.kirkpatrickpartners.com/OurPhilosophy/TheNewWorldKirkpatrickModel) (Accessed 5th October 2014).

Kitchener, K. S. & King, P. M. (1990) The reflective judgement model; transforming assumptions about knowing. In: Mezirow, J. eds. *Fostering critical reflection in adulthood: a guide to transformative and emancipatory learning*. San Francisco: Jossey-Bass: 159-176.

Kitto, S., Goldman, J., Schmitt, M. H. & Olson, C. A. (2014) Examining the intersections between continuing education, interprofessional education and workplace learning. *Journal of Interprofessional Care*, 28 (3): 183–185.

Kitzinger, J. (1994) The methodology of focus groups: The importance of interaction between research participants *Sociology of Health and Illness*, 16: 103-121.

Kitzinger, J. (1995) Qualitative Research: Introducing focus groups. *British Medical Journal*, 311 (7000): 299-302.

Klein, J. I. (1989) Parenthetic Learning in Organisations: Toward the Unlearning of the Unlearning Model. *The Journal of Management Studies*, 26 (3): 291.

Knowles, M. S. (1975) *Self-directed learning: a Guide for Learners and Teachers*. Chicago: Follett.

Knowles, M. S. (1980) *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. New York: Cambridge.

Knowles, M. S. (1990) *The Adult Learner: a Neglected Species, 4th edition* Houston: Gulf Publishing Company, Book Division.

Knowles, M. S., Holton, E. & Swanson, R. A. (1998) *The adult learner: The definitive classic in adult education and human resource development*. 5th edn. Houston: Gulf Publishing Company.

Knowles, M. S., Holton III, E. F. & Swanson, R. A. (2011) *The adult learner: the definitive classic in adult education and human resource development*. 7th edn. Abingdon, Oxon: Routledge.

Kolb, D. A. (1984) *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ: Prentice-Hall Inc.

Kusurkar, R. A., Ten Cate, T. J., Van Asperen, M. & Croiset, G. (2011) Motivation as an independent and a dependent variable in medical education: A review of the literature *Medical Teacher*, 33: e242–e262.

Laird, D. (1985) *Approaches to training and development*. Reading, Massachusetts: Addison-Wesley.

Lancaster, C. J., Bradley, E., Smith, I. K., Chessman, A., Stroup-Benham, C. A. & Camp, M. G. (1997) The effect of PBL on students' perceptions of learning environment. *Academic Medicine*, 72 (10 Supplement 1): 10-12.

LaSala, K. B., Hopper, S. K., Rissmeyer, D. J. & Shipe, D. P. (1997) Rural health care and interdisciplinary education. *Nursing Health Care Perspective*, 18: 292-298.

Lave, J. (1988) *Cognition in Practice: Mind, mathematics and culture in everyday life*. Cambridge, UK: Cambridge University Press.

Lave, J. (1991) Situating Learning in Communities of Practice. In: Resnick, L., Levine, J. & Teasley, S. eds. *Perspectives on Socially Shared Cognition*. Washington, DC: APA: 63-82.

Lave, J. & Wenger, E. (1991) *Situated Learning: Legitimate Peripheral Participation* Cambridge, UK: Cambridge University Press.

Lave, J. & Wenger, E. (1998) *Communities of Practice: Learning, Meaning and Identity*. Cambridge, UK: Cambridge University Press.

Lavine, R. A. (2012) Guided Discovery Learning. In: Seel, N. M. eds. *Encyclopedia of the Sciences of Learning*. New York: Springer: 1402-1403.

Lawson, T. (1998) Economic science without experimentation/abstraction. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. & Norrie, A. eds. *Critical Realism: Essential Readings*. London Routledge: 144-185.

Lawton, F. E. (1976) What can be done to correct deficiencies in the undergraduate course? *International Dental Journal*, 26 (1): 67-72.

Leathard, A. (1994) Inter-professional developments in Britain: an overview. In: Leathard, A. eds. *Going Inter-professional: Working Together for Health and Welfare*. London: Routledge: 3-37.

Lee, A. (2005) Knowing our business: The role of education in the university Available from: www.acde.edu.au/ (Accessed 25th July 2012).

LePine, J. A., Colquitt, J. A. & Erez, A. (2000) Adaptability to changing task contexts: Effects of general cognitive ability, conscientiousness and openness to experience. *Personnel Psychology*, 53 (3): 563.

Lesser, L. E. & Storck, J. (2001) Communities of Practice and organizational performance. *IBM Systems Journal*, 40 (4): 831-841.

Lincoln, Y. S. & Guba, E. G. (1985) *Naturalistic Inquiry*. London: Sage Publications.

Lowe, J. (2014) The role of the lead pathologist and attending pathologists in the multidisciplinary team. G087 13. Available from: www.rcpath.org (Accessed 30th October 2014).

Lynch, C. D., O'Sullivan, V. R. & McGillycuddy, C. T. (2006) Pierre Fauchard: the 'Father of Modern Dentistry'. *British Dental Journal*, 201: 779-781.

Lyndon, H. (1989) I Did it My Way! An Introduction to "Old Way/New Way" Methodology. *Australasian Journal of Special Education*, 13 (1): 32-37.

Mann, P. H. (1985) *Methods of Social Investigation*. Oxford: Basil Blackwell.

Marchal, B., van Belle, S., van Olmen, J., Hoere´e, T. & Kegels, G. (2012) Is realist evaluation keeping its promise? A review of published empirical studies in the field of health systems research. *Evaluation*, 18 (2): 192–212.

Martin, A. J. (2007) Examining a multidimensional model of student motivation and engagement using a construct validation approach. *British Journal of Educational Psychology*, 77 (2): 413–440.

Martin, A. J. (2008) Enhancing student motivation and engagement: The effects of a multidimensional intervention. *Contemporary Educational Psychology*, 33 (2): 239–269.

May, K. A. (1989) Interview techniques in qualitative research: concerns and challenges. In: Morse, J. M. eds. *Qualitative Nursing Research: A Contemporary Dialogue*. Rockville, Maryland: Aspen: 171-182.

May, K. (1991) Interviewing techniques: Concerns and challenges. In: Morse, J. M. eds. *Qualitative Nursing Research*. Newbury Park, CA: Sage: 188-201.

Mayberry, W. E., Requa-Clark, B. & H., F. P. (1993) *An introduction to problem-based learning*. Kansas: University of Missouri-Kansas City.

Mays, N. & Pope, C. (1995a) Observational methods in health care settings. *British Medical Journal*, 311: 182-184.

- Mays, N. & Pope, C. (1995b) Qualitative Research: Rigour and qualitative research. *British Medical Journal*, 311: 109-112.
- McDermott, R. & Archibald, D. (2010) Harnessing your staff's informal networks. *Harvard Business Review*, 88 (2): 82-89.
- McDonald, J. P., Adamidis, J. P., Eaton, K. A., Seeholzer, H. & Sieminska-Piekarczyk, B. (2000) A survey of postgraduate (specialist) orthodontic education in 23 European countries. *Journal of Orthodontics*, 27 (1): 92-98.
- McKie, A. E., Crowe, A., McCombes, W. & Freeman, R. (2010) Dental nurses as trainers and assessors: vocational dental trainer attitudes. *European Journal of Dental Education*, 14 (4): 235-246.
- McLafferty, I. (2004) Focus Group Interviews as a Data Collecting Strategy. *Journal of Advanced Nursing*, 48 (2): 187-194.
- McLean, M., Cilliers, F. & Van Wyk, J. (2008) Faculty development: Yesterday, today and tomorrow. *Medical Teacher*, 30: 555–584.
- McMichael, P. & Gilloran, A. (1984) *Exchanging views: courses in collaboration*. Edinburgh: Moray House College of Education.
- MEE (2012) *A Review of Skill Mix in Dentistry*. London: Medical Education England.
- Ments, M. V. (1990) *Active talk: the effective use of discussion in learning*. London: Kogan Page.
- Merriam, S. B. & Caffarella, R. S. (1999) *Learning in adulthood: a comprehensive guide*. San Francisco: Jossey-Bass Wiley imprint.
- Messick, S. (1992) The interplay of evidence and consequences in the validation of performance assessments. *Educational Researcher*, 23 (2): 13-23.
- Meyer, J. (2000) Using qualitative methods in health related action research. *British Medical Journal*, 320: 178–181.
- Mezirow, J. (1981) A Critical Theory of Adult Learning and Education. *Adult Education*, 32 (1): 3-24.
- Mezirow, J. (2003) Transformative learning as discourse. *Journal of Transformative Education*, 1: 59-63.
- Mezirow, J. (2004) Forum comment on Sharan Merriam's 'The role of cognitive development in Mezirow's transformational learning theory'. *Adult Education Quarterly*, 55: 69–70.

Mickan, S., Hoffman, S. J. & Nasmith, L. (2010) Collaborative practice in a global health context: Common themes from developed and developing countries. *Journal of Interprofessional Care*, 24 (5): 492-502.

Miller, N. & Boud, D. (1996) Animating learning from experience. In: Boud, D. & Miller, N. eds. *Working with Experience*. London: Routledge: 8-10.

Minter, R. L. (2011) The Learning Theory Jungle. *Journal of College Teaching and Learning*, 8 (6): 7-15.

Mishler, E. G. (2000) Validation in inquiry-guided research: The role of exemplars in narrative studies. In: Brizuela, B. M., Stewart, J. P., Carrillo, R. G. & Berger, J. G. eds. *Acts of inquiry in qualitative research*. Cambridge, MA: Harvard Educational Review: 119-146.

Mitchell, L. (2007) *An Introduction to Orthodontics*. 3rd edn. Oxford: Oxford University Press.

Mocker, D. W. & Spear, G. E. (1982) *Lifelong Learning: Formal, Nonformal, Informal, and Self-Directed*. Columbus, Ohio: Educational Resources Information Centre.

Moher, D., Liberati, A., Tetzlaff, J. & Altman, D. G. (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA statement. *British Medical Journal* 339 (b2535): Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2714657/> (Accessed 23rd June 2013).

Morey, J. C., Simon, R., Jay, G. D., Wears, R. L., Salisbury, M., Dukes, K. A. & Berns, S. D. (2002) Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams project. *Health Service Research*, 37 (6): 1553-1581.

Morgan, D. & Krueger, R. (1993) *Advancing the State of the Art*. Newbury Park, California: Sage.

Morgan, D. L. (1997) Focus Groups as Qualitative Research. In: Morgan, D. L. eds. *Planning and Research Design for Focus Groups*. Thousand Oaks, California: Sage: 32-46.

Morgan, D. L. & March, S. J. (1992) The impact of life events on networks of personal relationships: A comparison of widowhood and caring for a spouse with Alzheimer's disease. *Journal of Social and Personal Relationships*, 9: 563-584.

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. *European Journal of Dental Education*, 12 (1): 23-28.

Morrison, R. S. & Letrell, P. (1999) Using Focus Group Methodology in Nursing. *Journal of Continuing Education in Nursing*, 30 (2): 62-65.

Morse, J. M. (1989) Strategies for sampling. In: Morse, J. M. eds. *Qualitative Nursing Research: A Contemporary Dialogue*. Rockville, Maryland: Aspen: 127-145.

Moser, C. A. & Kalton, G. (1986) *Survey Methods in Social Investigation*. Aldershot, Hampshire: Gower.

Mossey, P. (2003) The continuum of dental education and its environment. *British Dental Journal*, Education Supplement 3.

Mossey, P. (2004) The changing face of dental education. *British Dental Journal*, 197 (Education Supplement): 3-4.

Motley, W. E. (1986) *History of the American Dental Hygienists' Association, 1923-1982*. IN: American Dental Hygienists' Association Conference: Chicago, Ill.

MRC. (2000) *A Framework for the Development and Evaluation of Randomised Controlled Trials for Complex Interventions to Improve Health*. London: Medical Research Council.

Mu, K., Chao, C., Jensen, G. & Royeen, C. (2004) Effects of interprofessional rural training on students' perceptions of interprofessional health care services. *Journal of Allied Health*, 33 (2): 125-131.

Mullins, G., Wetherell, J., Townsend, G., Winning, T. & Greenwood, F. (2001) *Problem-based learning in dentistry: the Adelaide experience*. Adelaide: University of Adelaide.

Murphy, F. A. (2000) Collaborating with practitioners in teaching and research: a model for developing the role of the nurse lecturer in practice areas. *Journal of Advanced Nursing*, 31 (3): 704-714.

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.

Nay-Brock, R. M. (1984) A comparison of the questionnaire and interviewing techniques in the collection of sociological data. *Australian Journal of Advanced Nursing*, 2 (1): 14-23.

NEBDN [online] Available from: www.nebdn.org (Accessed 23rd November 2013).

Newstrom, J. W. (1983) The Management of Unlearning: Exploding the "Clean Slate" Fallacy. *Training and Development Journal*, 37 (8): 36.

Newton, N. (2010) The use of semi-structured interviews in qualitative research: strengths and weaknesses. *Exploring Qualitative Methods* 1-11. Available from: http://www.academia.edu/1561689/The_use_of_semi-structured_interviews_in_qualitative_research_strengths_and_weaknesses (Accessed 03rd July 2013).

Nisbet, G., Lee, A., Kumar, K., Thistlethwaite, J. & Dunston, R. (2011) *Interprofessional Health Education - A Literature Review*. Sydney, Australia: Australian Learning and Teaching Council.

Norman, G. R. & Schmidt, H. G. (1992) The Psychological Basis of Problem-Based Learning - A Review of the Evidence. *Academic Medicine*, 67 (9): 557-565.

Nvivo Online Multimedia (2012) NVivo qualitative data analysis software. Available at: http://www.qsrinternational.com/products_nvivo.aspx (Accessed 21st September 2012).

O'Neill, P. N. (1998) Assessment of students in a problem-based learning curriculum. *Journal of Dental Education*, 62: 640-643.

Oandasan, I. & Reeves, S. (2005) Key elements for interprofessional education. Part 1: the learner, the educator and the learning context. *Journal of Interprofessional Care*, 19 (Suppl 1): 21-38.

Olson, C. A. (2012) Twenty predictions for the future of CPD: Implications of the shift from the update model to improving clinical practice. *Journal of Continuing Education in the Health Professions*, 32: 151-152.

Olson, E. E. & Eoyang, G. H. (2001) *Facilitating organisational change: lessons from complexity science*. San Francisco: Jossey-Bass/Pfeiffer.

Opie, C. (2004) *Doing educational research*. London: Sage.

Oppenheim, A. N. (1992) *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter.

Orlando, F. J. & Gies, W. J. (1992) *His Contribution to the Advancement of Dentistry*. New York: The William J. Gies Foundation for the Advancement of Dentistry.

Oxford English Dictionary (2011) [online] Available from: <http://dictionary.oed.com/> (Accessed 25th June 2011).

Oxman, A. D., Cook, D. J. & Guyatt, G. H. (1994) Users' guides to the medical literature VI. How to use an overview. *Journal Of The American Medical Association*, 272 (17): 1367-1371.

Parkin, P. (2009) *Managing Change in Healthcare*. London: Sage.

Patton, M. Q. (1978) *Utilization-focussed evaluation*. Beverley Hills CA: Sage.

Patton, M. Q. (1990) *Qualitative Evaluation and Research Methods*. 2nd edn. Newbury Park, California: Sage.

Patton, M. Q. (2002) *Qualitative evaluation and research methods*. 3rd edn. Thousand Oaks, CA: Sage Publications, Inc.

Pau, A. K., Collinson, S. & Croucher, R. (1999) Dental students' evaluation of 2 community-oriented PBL modules. *European Journal of Dental Education*, 3: 159-166.

Pawson, R. (2002) Evidence-based policy: the promise of 'realist synthesis' *Evaluation*, 8 (3): 340-358.

Pawson, R. (2006) *Evidence-Based Policy. A Realist Perspective*. London: Sage Publications.

Pawson, R., Greenhalgh, T., Harvey, G. & Walshe, K. (2004) *Realist synthesis: an introduction*. Manchester: University of Manchester.

Pawson, R., Greenhalgh, T., Harvey, G. & Walshe, K. (2005) Realist review- a new method of systematic review designed for complex policy interventions. *Journal of health services research & policy*, 10 (Suppl 1): 21-34.

Pawson, R. & Manzano-Santaella, A. (2012) A realist diagnostic workshop. *Evaluation*, 18 (2): 176-191.

Pawson, R. & Tilley, N. (1997) *Realistic Evaluation*. London: Sage Publications Ltd.

Pawson, R. & Tilley, N. (2004) Realist Evaluation. 1-36. Available from: http://www.communitymatters.com.au/RE_chapter.pdf (Accessed 23rd March 2014).

Pawson, R. & Tilley, N. (2009) Realist evaluation. In: Uwe, H., Polutta, A. & Ziegler, H. eds. *Evidence-based Practice: Modernising the Knowledge Base of Social Work?* Opladen and Farmington Hills, MI: Barbara Budrich: 151-180.

Payler, J., Meyer, E. & Humphris, D. (2008) Pedagogy for interprofessional education - what do we know and how can we evaluate it? *Learning in Health and Social Care*, 7 (2): 64-78.

Perry, W. G. (1999) Forms of ethical and intellectual development in the College Years: a scheme. San Francisco: Jossey-Bass Wiley imprint.

Peters, R. (1967) *The Concept of Education*. London: Routledge and Kegan Paul.

Pietroni, P. C. (1994) Interprofessional teamwork: its history and developments in hospitals, general practice and community care (UK). In: Leathard, A. eds. *Going Interprofessional: Working together for health and welfare*. London: Routledge.

Plasschaert, A. J., Lindh, C., McLoughlin, J., Manogue, M., Murtooma, H., Nattestad, A. & Sanz, M. (2006) Curriculum structure and the European credit transfer system for European dental schools: part I. *European Journal of Dental Education*, 10 (3): 123-130.

Polit, D. F., Beck, C. T. & Hungler, B. P. (2001) *Essentials of nursing research: Methods, appraisal, and utilization*. Philadelphia, PA: Lippincott, Williams & Wilkins.

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, T. (2000) Orthodontic therapists - the current situation. *Journal of Orthodontics*, 27 (2): 207-209.

Ponzer, S., Hysin, U., Kusoffsky, A., Lauffs, M., Lonka, K., Mattiasson, A. C. & Nordström, G. (2004) Interprofessional training in the context of clinical practice: goals and students' perceptions on clinical education wards. *Medical Education*, 38 (7): 727-736.

Pope, C. & Mays, N. (2006) *Qualitative Research in Healthcare*. Cambridge: Blackwell.

Powney, J. (1988) Structured eavesdropping. Research Intelligence. *Journal of the British Educational Research Foundation*, 28: 10-20.

Preskill, H. & Catsambas, T. T. (2006) *Reframing evaluation through appreciative inquiry*. Thousand Oaks, California: Sage.

Progoff, I. (1992) *At a journal workshop*. New York: Putnam.

Prosser, M. & Trigwell, K. (1998) *Understanding learning and teaching: the experience in higher education*. Buckingham: Open University Press.

Punch, M. (1986) *The Politics and Ethics of Fieldwork*. Newbury Park, California: Sage.

Radford, D. R., Hellyer, P., Jones, K. A. & Meakin, N. (2014) Experienced General Dental Practitioners as Clinical Teachers: A Qualitative Study of their Experience over the First Three Years as Novice Clinical Teachers in an Outreach Setting. *Journal of Interdisciplinary Medicine and Dental Science*, 2 (6): 1-7.

Rafter, M. E., Pesun, I. J., Herren, M., Linfante, J. C., Mina, M., Wu, C. D. & Casada, J. P. (2006) A Preliminary Survey of Interprofessional Education. *Journal of Dental Education*, 70 (4): 417-427.

Ramsden, P. (2003) *Learning to Teach in Higher Education*. 2nd edn. London: RoutledgeFalmer.

Reason, P. & Bradbury, H. (2006) *Handbook of Action Research*. London: Sage.

Rees, C. & Monrouxe, L. (2010) Theory in medical education research: how do we get there? *Medical Education*, 44 (4): 334-339.

Reese, H. W. & Overton, W. E. (1970) Models of Development and Theories of Development. In: Gottlet, L. R. & Baltes, P. B. eds. *Life-span development psychology*. New York: Academic Press: 115-145.

Reeves, S. (2000) Community-based interprofessional education for medical, nursing and dental students. *Health Social Care Community*, 8 (4): 269-276.

Reeves, S. (2001) A systematic review of the effects of interprofessional education on staff involved in the care of adults with mental health problems. *Journal of Psychiatric & Mental Health Nursing*, 8 (6): 533-542.

Reeves, S. (2009) An overview of continuing interprofessional education. *Journal of Continuing Education in the Health Professions*, 29: 142-146.

Reeves, S., Albert, M., Kuper, A. & Hodges, B. D. (2008a) Why use theories in qualitative research? *British Medical Journal*, 337: 631-634.

Reeves, S. & Freeth, D. (2002) The London training ward: an innovative interprofessional learning initiative. *Journal of Interprofessional Care*, 16 (1): 41-52.

Reeves, S., Goldman, J., Gilbert, J., Tepper, J., Silver, I., Suter, E. & Zwarenstein, M. (2011) A scoping review to improve conceptual clarity of interprofessional interventions. *Journal of Interprofessional Care*, 25 (3): 167-174.

Reeves, S. & Hean, S. (2013) Why we need theory to help us better understand the nature of interprofessional education, practice and care. *Journal of Interprofessional Care*, 27: 1-3.

Reeves, S., Perrier, L., Goldman, J., Freeth, D. & Zwarenstein, M. (2013) *Interprofessional education: effects on professional practice and healthcare outcomes (update) (Cochrane Review)*. Cochrane Collaboration: CD002213: 1-47.

Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Hammick, M. & Koppel, I. (2008b) *Interprofessional education: effects on professional practice and health care outcomes*. Cochrane Collaboration: 1469-493X: 1-21.

Remington, T. L., Foulk, M. A. & Williams, B. C. (2006) Evaluation of evidence for interprofessional education. *American Journal of Pharmaceutical Education*, 70 (3): Article 66.

Richie, J. & Spencer, L. (1994) Qualitative data analysis for applied policy research. In: Bryman, A. & Burgess, R. eds. *Analysing Qualitative Data* London: Routledge: 173-194.

Ritchie, J. & Lewis, J. (2003) *Qualitative research practice: a guide for social science students and researchers*. London: Sage.

Robinson, P. G., Patrick, A. & Newton, T. (2012) *Modelling the Dental Workforce Supply in England*. Sheffield: University of Sheffield.

Robinson, P. G., Willmot, D. R., Parkin, N. A. & Hall, A. C. (2005) *Report of The Orthodontic Workforce Survey of the United Kingdom*. Sheffield: University of Sheffield.

Rock, W. P., O'Brien, K. D. & Stephens, C. D. (2002) Orthodontic teaching practice and undergraduate knowledge in British dental schools. *British Dental Journal*, 192 (6): 347-351.

Rogers, C. R. (1969) *Freedom to Learn*. Columbus, Ohio: Merrill.

Rohlin, M., Petersson, K. & Svensater, G. (1998) The Malmö model: a problem-based learning curriculum in undergraduate dental education *European Journal of Dental Education*, 2: 103-114.

Rolfe, G. (1997) Beyond expertise: theory, practice and the reflexive practitioner. *Journal of Clinical Nursing*, 6: 93-97.

Rossi, P. & Freeman, H. (1993) *Evaluation: a systematic approach*. 5th edn. Newbury Park, CA.: Sage.

Rothwell, P. S. (1999) The MFGDP examination. *British Dental Journal*, 187 (7): 354-356.

Rugg, G. (2009) *Research Methods in the Social Sciences*. [online] Available from:

http://www.ulster.ac.uk/staffdev/Research_Training/controller.php?function=view_unit_details&id=239 (Accessed 2nd January 2010).

Russell, K. M. & Hymans, D. (1999) Interprofessional education for undergraduate students. *Public Health Nursing*, 16: 254-262.

Ryan, G. & Bernard, R. (2000) Data management and analysis methods In: Denzin, N. & Lincoln, Y. eds. *Handbook of Qualitative Research*. Thousand Oaks, CA: Sage: 769-802.

Sackett, D. L., Rosenberg, W. M. C., Gray, J. A. M., Haynes, R. B. & Richardson, W. S. (1996) Evidence based medicine: what it is and what it isn't. *British Medical Journal*, 312 (7023): 71-72.

Savery, J. R. & Duffy, T. M. (1995) Problem-based learning: Rationale and description. *Medicine Education*, 17: 11-16.

Sayer, A. (2000) *Realism and Social Science*. London: Sage.

Schmidt, H. G. (1993) Foundations of problem-based learning - Some explanatory notes. *Medical Education*, 27 (5): 422-432.

Schofield, M. (1995) *The future health care workforce: The steering group report*. Manchester: Health Services Management Unit, University of Manchester.

Schön, D. A. (1983) *The Reflective Practitioner: How Professionals Think in Action*. London: Maurice Temple Smith.

Schön, D. A. (1987) *Educating the reflective practitioner: toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass.

Scriven, M. (1994) The fine line between evaluation and explanation. *Evaluation Practice*, 15 (1): 75-77.

Seeholzer, H., Adamidis, J., Eaton, K., McDonald, J. & Sieminska-Piekarczyk, B. (2000) A survey of the delegation of orthodontic tasks and the training of chairside support staff in 22 European countries. *Journal of Orthodontics*, 27 (3): 279-282.

Shadish, W. R., Cook, T. D. & Campbell, D. T. (2002) *Experimental and Quasi-experimental designs for generalised causal inferences*. Boston: Houghton Mifflin Company.

Shafer, M. A., Tebb, K. P., Pantell, R. H., Wibbelsman, C. J., Neuhaus, J. M., Tipton, A. C., Kunin, S. B., Ko, T. H., Schweppe, D. M. & Bergman, D. A. (2002) Effect of a clinical practice improvement intervention on Chlamydia screening among adolescent girls. *JAMA*, 288 (22): 2846-2852.

Shapiro, N. S. & Levine, J. H. (1999) *Creating learning communities: a practical guide to winning support, organizing for change, and implementing programs*. San Francisco: Jossey-Bass.

Shea, J. A., Arnold, L. & Mann, K. V. (2004) A RIME perspective on the quality and relevance of current and future medical education research. *Academic Medicine*, 79 (10): 931-938.

Sieber, V., Briggs, A., Mather-Hillon, J., Madhvani, N. & Zakaria, R. (2008) *Student managed eLearning; ePortfolios, identity and personalised learning in healthcare education*. Newcastle: The Higher Education Academy.

Silverman, D. (2006) *Interpreting qualitative data*. 3rd edn. London: Sage Publications.

Smith, J. (2003) *Qualitative psychology: A practical guide to research methods*. London: Sage Publications.

Smith, L. (1992) Ethical issues in interviewing. *Journal of Advanced Nursing*, 17 (1): 98-103.

Smith, M., Ash, P., Gilmour, A. S. M., Austin, T. & Robinson, P. G. (2011) Outreach training: the special interest group's report. *European Journal of Dental Education*, 15 (2): 85-89.

Smith, N. J. (1993) Education and Training of Personnel Auxiliary to Dentistry. *British Dental Journal*, 175 (6): 193-195.

Sobral, D. T. (2004) What kind of motivation drives medical students learning quests? *Medical Education*, 38: 950–957.

Sorinola, O., Thistlethwaite, J. & Davies, D. (2013) Motivation to engage in personal development of the educator. *Education for Primary Care*, 24 (4): 226–229.

Sorinola, O. O., Thistlethwaite, J., Davies, D. & Piele, E. (2014) Faculty development for educators: a realist evaluation. *Advances in Health Sciences Education: Theory and Practice* 19 (3): 1-17. Available from: www.link.springer.com (Accessed 21st August 2014).

Spradley, J. P. (1980) *Participant Observation* Orlando, Florida: Harcourt College Publishers.

- Srinivasan, M., Wilkes, M., Stevenson, F., Nguyen, T. & Slavin, S. (1982) Comparing problem-based learning with case-based learning: effects of a major curricular shift at two institutions. *Academic Medicine*, 1: 74-82.
- Starbuck, W. H. (1996) Unlearning ineffective or obsolete technologies. *International Journal of Technology Management*, 11 (7,8): 725.
- Stenhouse, L. (1985) *Research as a basis for teaching*. London: Heinemann Educational Books.
- Stone, J. (2009) *Interprofessional Collaborative Practice (IPCP) - definitions and terminology: attempting to speak the same language*. Canberra: ACT Health.
- Sweet, J. (2009) Beyond reflection dogma. In: Frost, N. eds. *Beyond reflective practice*. London: Routledge, an imprint of Taylor & Francis Books Ltd.
- Sweet, J., Pugsley, L. & Wilson, J. (2008a) Stakeholder perceptions of chairside teaching and learning in one UK dental school. *British Dental Journal*, 205 (9): 499-503.
- Sweet, J., Wilson, J. & Pugsley, L. (2008b) Chairside teaching and the perceptions of dental teachers in the UK. *British Dental Journal*, 205 (10): 565-569.
- Sweet, J., Wilson, J. & Pugsley, L. (2009) Educational innovations for dentistry. *British Dental Journal*, 206 (1): 29-34.
- Tajfel, H. (1981) *Human groups and social categories*. Cambridge: Cambridge University Press.
- Tajfel, H. & Turner, J. C. (1986) The social identity theory of intergroup behaviour. In: Worschel, S. & Austin, W. eds. *Psychology of intergroup relations*. Chicago, IL: Nelson-Hall: 7-24.
- Thistlethwaite, J. (2012) Interprofessional education: a review of context, learning and the research agenda. *Medical Education*, 46 (1): 58-70.
- Thistlethwaite, J., Jackson, A. & Moran, M. (2013) Interprofessional collaborative practice: A deconstruction. *Journal of Interprofessional Care*, 27: 50-56.
- Thistlethwaite, J., Kumar, K., Moran, M., Saunders, R. & Carr, S. (2014) An exploratory review of pre-qualification interprofessional education evaluations. *Journal of Interprofessional Care*, [Early online]: 1-6. Available from: <http://informahealthcare.com/jic> (Accessed 5th December 2014).

- Thistlethwaite, J. & Moran, M. (2010) Learning outcomes for interprofessional education (IPE): Literature review and synthesis. *Journal of Interprofessional Care*, 24 (5): 503-513.
- Tope, R. (1996) *Integrated interdisciplinary learning between health and social care professions: A feasibility study*. Aldershot: Avebury.
- Tracy, S. J. (2010) Qualitative Quality: Eight “Big-Tent” Criteria for Excellent Qualitative Research. *Qualitative Inquiry*, 16 (10): 837–851.
- Treece, E. W. & Treece, J. W. (1986) *Elements of Research in Nursing*. 4th edn. St Louis: C.V. Mosby.
- Tucker, K., Wakefield, A., Boggis, C., Lawson, M., Roberts, T. & Gooch, J. (2003) Learning together: clinical skills teaching for medical and nursing students. *Medical Education*, 37 (7): 630-637.
- Tunstall-Pedoe, S., Rink, E. & Hilton, S. (2003) Student attitudes to undergraduate interprofessional education. *Journal of Interprofessional Care*, 17 (2): 161-172.
- Verma, S., Broers, T., Paterson, M., Schroder, C., Medves, J. M. & Morrison, C. (2009) Core competencies: The next generation comparison of a common framework for multiple professions. *Journal of Allied Health*, 38 (1): 47-53.
- Vygotsky, L. S. (1978a) *Mind and Society: The development of higher psychological processes*. 4 edn. Cambridge, MA: Harvard University Press.
- Vygotsky, L. S. (1978b) *Interaction between Learning and Development*. Cambridge, MA: Harvard University Press.
- Wang, V. C. X. (2012) Understanding and Promoting Learning Theories. *International Forum of Teaching and Studies*, 8 (2): 5-11.
- Wang, V. C. X. & Cranton, P. (2012) Promoting and implementing self-directed learning (SLD): An effective adult education model. *International Journal of Adult Vocational Education and Technology*, 3 (3): 16-26.
- Wang, V. C. X. & King, K. P. (2006) Understanding Mezirow’s theory of reflectivity from Confucian perspectives: A model and perspective. *Radical Pedagogy*, 8 (1): 1-17.
- Wang, V. C. X. & King, K. P. (2007) Confucius and Mezirow—Understanding Mezirow’s theory of reflectivity from Confucian perspectives: A model and perspective. In: King, K. P. & Wang, V. C. X. eds. *Comparative adult education around the globe*. Hangzhou, China: Zhejiang University Press: 253-275.

- Watts, M. & Ebbutt, D. (1987) More than the sum of the parts: research methods in group interviewing. *British Educational Research Journal*, 13: 25-34.
- Weaver, K. & Olson, J. K. (2006) Understanding paradigms used for nursing research. *Journal of Advanced Nursing* 53 (4): 459–469.
- Webb, C. & Kevern, J. (2001) Focus groups as a research method: a critique of some aspects of their use in nursing research. *Journal of Advanced Nursing*, 33: 798 – 805.
- Wenger, E. (2008) Identity in Practice. In: Hall, K., Murphy, P. & Soler, J. eds. *Pedagogy and Practice: Culture and Identities*. London: Sage: 105-114.
- Wenger, E. (2010) Communities of practice and social learning systems: the career of a concept. In: Blackmore, C. eds. *Social Learning Systems and Communities of Practice*. London: Springer: 179-198.
- Wenger, E., McDermott, R. A. & Snyder, W. M. (2002) *Cultivating communities of practice: a guide to managing knowledge*. Boston, Mass: Harvard Business School Press.
- Westhorp, G., Prins, E., Kusters, C. S. L., Hultink, M., Guijt, I. & Brouwers, J. H. A. M. (2011) *Realist Evaluation: an overview*. IN: Realist Evaluation Conference: Wageningen University.
- WHO. (1988) *Learning together to work together for health. Report of a WHO study group on multiprofessional education of health personnel: the team approach*. Geneva: World Health Organization
- WHO. (2006) *The Health Report 2006-Working Together for Health*. Geneva, Switzerland: World Health Organisation.
- WHO. (2010) *Framework for action on interprofessional education and collaborative practice*. Geneva: World Health Organisation.
- Wilder, R. S., O'Donnell, J. A., Barry, J. M., Galli, D. M., Hakim, F. F., Holyfield, L. J. & Robbins, M. R. (2008) Is Dentistry at Risk? A Case for Interprofessional Education. *Journal of Dental Education*, 72 (11): 1231-1237.
- Wilkinson, T. J., Wells, J. E. & Bushnell, J. A. (2007) Medical student characteristics associated with time in study: Is spending more time always a good thing? *Medical Teacher*, 29: 106–110.
- Williams, A. C., Bower, E. J. & Newton, J. T. (2004) Research in primary dental care Part 3: designing your study. *British Dental Journal*, 196: 669–674.

Wilson, N. H. F., Jones, M. L., Pine, C., Saunders, W. P. & Seymour, R. A. (2008) Looking forward: educating tomorrow's dental team. *European Journal of Dental Education* 12 (3): 176-199.

Windeknecht, K. & Delahaye, B. (2004) *A Model of Individual and Organisational Unlearning*. IN: Australia & New Zealand Academy of Management Conference: Dunedin, New Zealand.

Wong, G., Greenhalgh, T., Westhorp, G. & Pawson, R. (2012) Realist methods in medical education research: what are they and what can they contribute? *Medical Education*, 46 (1): 89-96.

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., Goldman, J. & Reeves, S. (2009) *Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes*. Cochrane Collaboration: 1469-493X: 1-31.

Appendices

Appendix 1: Search strategies

- 1 INTER-PROFESSION* or INTERPROFESSION*
- 2 INTER-DISCIPLIN* or INTERDISCIPLIN*
- 3 INTER-OCCUPATION* or INTEROCCUPATION*
- 4 INTER-INSTITUTION* or INTERINSTITUTION*
- 5 INTER-AGEN* or INTERAGEN*
- 6 INTER-SECTOR* or INTERSECTOR*.
- 7 INTER-DEPARTMENT* or INTERDEPARTMENT*
- 8 INTER-ORGANISATION* or INTERORGANISATION*
- 9 INTERPROFESSIONAL RELATIONS
- 10 TEAM*
- 11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
- 12 MULTI-PROFESSION* or MULTIPROFESSION*
- 13 MULTI-DISCIPLIN* or MULTIDISCIPLIN*
- 14 MULTI-INSTITUTION* or MULTIINSTITUTION*
- 15 MULTI-OCCUPATION* or MULTIOCCUPATION*
- 16 MULTI-AGEN* or MULTIAGEN*
- 17 MULTI-SECTOR* or MULTISECTOR*
- 18 MULTI-ORGANISATION* or MULTIORGANISATION*
- 19 PROFESSIONAL-PATIENT RELATION*
- 20 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19
- 21 11 or 20
- 22 EDUCATION* or TRAIN* or LEARN* or TEACH* or COURSE*
- 23 QUALITY ASSURANCE or TQM or CQI or GUIDELINE DEVELOPMENT
- 24 22 or 23
- 25 20 and 24
- 26 STUDENT PERFORMANCE APPRAISAL
- 27 COURSE EVALUATION
- 28 PROGRAM* EVALUATION
- 29 EVALUATION RESEARCH
- 30 EVALUATION METHODS
- 31 HEALTH CARE OUTCOME*
- 32 SOCIAL CARE OUTCOME*
- 33 EDUCATION* OUTCOME*
- 34 LEARNING OUTCOME*
- 35 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34
- 36 25 and 35
- 37 QUALITY IMPROVEMENT PROGRAM* or QUALITY OF CARE RESEARCH
- 38 QUALITY OF HEALTH CARE or QUALITY ASSESSMENT*
- 39 QUALITY ASSURANCE or QUALITY CIRCLE*
- 40 QUALITY IMPROVEMENT or QUALITY MANAGEMENT
- 41 MEDICAL AUDIT* or NURSING AUDIT*
- 41 PEER REVIEW or QUALITY ASSURANCE
- 43 HEALTH CARE GUIDELINE* or BENCHMARKING GUIDELINE*

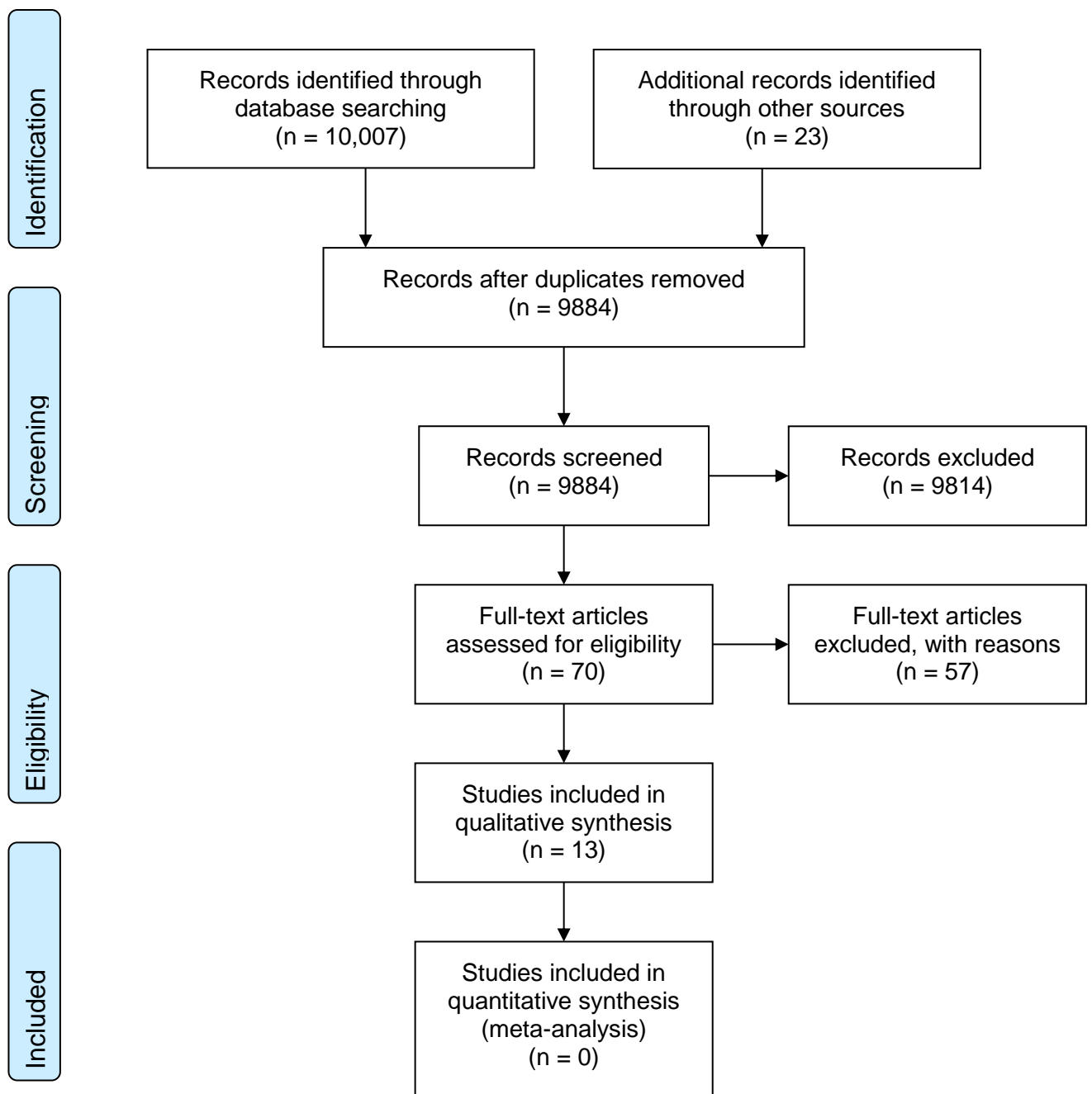
44 PRACTICE GUIDELINE* or TOTAL QUALITY MANAGEMENT
45 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44
46 36 and 45

Key words for interprofessional education literature searches

interprofessional	education	course development
multiprofessional	training	guideline development
interdisciplinary	learning	continued professional development
interagency	teaching	service development

Appendix 2: Literature searching and selection of papers for review: PRISMA flow diagram

From: Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. *British Medical Journal*, 339:b2535, doi: [10.1136/bmj.b2535](https://doi.org/10.1136/bmj.b2535)



Appendix 3: Reviewed papers

Evaluations of interprofessional education: A United Kingdom Review for Health and Social Care (Barr *et al.*, 2000).

Developing an evidence base for interdisciplinary learning: a systematic review (Cooper *et al.*, 2001).

A systematic review of the effects of IPE on staff involved in the care of adults with mental health problems (Reeves, 2001).

A Critical Review of Evaluations of Interprofessional Education (Freeth *et al.*, 2002).

The Evidence Base & Recommendations for Interprofessional Education in Health and Social Care (Barr *et al.*, 2005).

Evaluation of Evidence for Interprofessional Education (Remington *et al.*, 2006).

A best evidence systematic review of interprofessional education: BEME Guide no. 9 (Hammick *et al.*, 2007).

Interprofessional pre-qualification clinical education: a systematic review (Davidson *et al.*, 2008).

Interprofessional education: effects on professional practice and health care outcomes (Cochrane Review) (Reeves *et al.*, 2008b).

Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes (Cochrane Review) (Zwarenstein *et al.*, 2009).

Learning outcomes for interprofessional education (IPE): Literature review and synthesis (Thistlethwaite & Moran, 2010).

Interprofessional Health Education – A Literature Review. Overview of international and Australian developments in interprofessional health education (IPE) (Nisbet *et al.*, 2011).

Interprofessional education: effects on professional practice and healthcare outcomes (update) (Cochrane Review) (Reeves *et al.*, 2013).

Appendix 4: Data abstraction sheet used for selected papers (modified from CASP systematic review abstraction sheet)

Review paper	
Question re review	Answer
<p>Type of review</p> <p>Did the review ask a focused question?</p> <p>Did the review include the right type of study?</p> <p>Did the reviewers try to identify all relevant studies?</p> <p>Did the reviewers assess the quality of the included studies?</p> <p>If the results of the studies have been combined, was it reasonable to do so?</p> <p>How are the results presented?</p> <p>How precise are these results?</p> <p>Can the results be applied to the local population?</p> <p>Were all important outcomes considered?</p> <p>Should policy or practice change as a result of the evidence contained in this review?</p> <p>What methodologies were used in the studies?</p> <p>How was the data collected?</p> <p>What was the IPE intervention?</p> <p>Length and type of studies?</p> <p>Was there any mention of dentistry?</p> <p>Number of studies included</p> <p>Quality of evidence in included studies</p>	
Researcher conclusions:	

Appendix 5: Burnard's method of qualitative data analysis

- Aims to produce a detailed, systematic record of themes and issues addressed in the interviews under an exhaustive category system
- Analysis a staged process:
 - 1. Notes and memos made of topics discussed
 - 2. Transcripts read and notes made of themes within – **immersion in data**
 - 3. Transcripts read again and headings made to describe all aspects of the content; these headings (categories) account for all interview data – **open coding stage**
 - 4. Survey categories and group under higher-order headings
 - 5. New list of categories and sub-headings worked through; repetitious or similar headings removed to produce a final list
 - 6. Two colleagues invited to independently generate category lists; the lists are then discussed and adjusted – enhances validity of categorising method and **guards against researcher bias**
 - 7. Transcripts re-read alongside final list of categories and sub-headings to establish the degree to which the categories cover all aspects of the interviews; adjustments made as necessary
 - 8. Transcripts worked through with list of categories and sub-headings and **coded** accordingly
 - 9. Coded sections of transcripts are taken out and grouped together, maintaining the context of the coded sections

- 10. Cut out sections are grouped under appropriate headings and sub-headings
 - 11. Selected respondents asked to check if responses fit into categories and adjusted accordingly – checks **validity** of categorising process
 - 12. All sections filed together for direct reference when writing up findings; reference back to original transcript as necessary
 - 13. Writing up of each section
 - 14. Decision as to how to link findings to literature; during write up or after write up
- **Validity** can be checked by asking randomly selected respondents to read through the transcripts of their interviews and confirm what they see as the main points
 - This list of headings can be compared with the researchers lists and discussed with respondents and minor adjustments made if necessary

Appendix 6: BSREC approval letter

5th February 2013

Warwick Medical School

PRIVATE

Richard Cure
Warwick Dentistry
Warwick Medical School
University of Warwick
Coventry CV4 7AL

Dear Richard,

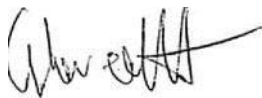
Study Title and BSREC Reference: *An Evaluation of Education in an Orthodontic Training Centre, REGO-2012-028*

Thank you for submitting your revisions to the above-named project to the University of Warwick Biomedical and Scientific Research Ethics Sub-Committee for Chair's Approval.

I am pleased to confirm that I am satisfied that you have met all of the conditions and your application meets the required standard, which means that full approval is granted and your study may commence.

I take this opportunity to wish you success with the study and to remind you any substantial amendments require approval from the committee before they can be made. Please keep a copy of the signed version of this letter with your study documentation.

Yours sincerely,



David Davies
Chair
Biomedical and Scientific
Research Ethics Sub-Committee

Enquiries: Amy Ismay
B032 Medical School
Building Warwick
Medical School,
Coventry, CV4 7AL.
Tel: 02476-151875
Email:
A.C.Ismay@warwick.ac.uk

Appendix 7: Participant information leaflet



PARTICIPANT INFORMATION LEAFLET TEMPLATE & GUIDANCE

Study Title: An evaluation of Education in an Orthodontic Training Centre

Investigator(s): Richard Cure

Introduction

You are invited to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take the time to read the following information carefully. Talk to others about the study if you wish.

(Part 1 tells you the purpose of the study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study)

Please 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.

PART 1

What is the study about?

An Evaluation of Education in an Orthodontic Training Centre wants to find out what different groups think about the education delivered at LSO and what factors affect learning at LSO. The study aims to further knowledge in the field of orthodontic education. You are being contacted because you are involved or have been involved in education at LSO.

Do I have to take part?

It is entirely up to you to decide. I will describe the study and go through this information sheet, which I will give you to keep. If you choose to participate, I will ask you to sign a consent form to confirm that you have agreed to take part. You will be free to withdraw at any time, without giving a reason and this will not affect you or your circumstances in any way. Any data collected before your withdrawal will remain as part of the study.

What will happen to me if I take part?

If you are willing to take part you will be interviewed by the research associate, Professor Robert Ireland, at LSO, to discuss education at LSO

and you will be asked to participate in a focus group discussion on education at LSO. You may subsequently attend a second focus group discussion. It is anticipated that the interview would be for one hour and the focus group discussion(s) approximately one and a half hours.

The interview and focus group discussion(s) will be audio recorded to keep an accurate record of what is discussed. The recordings will be kept in a secure location. You will have the opportunity to listen to the recording and to read the transcript of it, to ensure the transcript is a clear reflection of what you have said.

This information will be used to form hypotheses about education at LSO.

What are the possible disadvantages, side effects, risks, and/or discomforts of taking part in this study?

Apart from giving up some of your time, it is not anticipated that there are any disadvantages to taking part, except for the potential that the educationalists may receive some negative feedback from the participants about some aspects of the education provided.

There is no anticipated risk in terms of pain, discomfort or distress. Participants will be involved in the research during their normal working time. Timetabling will ensure no adverse effects to the participants or the running of the practice. All responses will be anonymised.

The relationship between the researcher and the participants could be perceived by some as a potential risk. The researcher may be either your employer, supervisor or co-educator. The employer-employee relationship in many organisations would be not only perceived as a risk, but due to the philosophy of the organisation, would be a risk. Part of the research is to investigate the philosophy of LSO as to whether this is a factor in learning. Whatever your position, your role is not under threat as the methods used for data collection are a core part of the practice structure. Using a research associate for data collection anonymises your opinions.

What are the possible benefits of taking part in this study?

Participation may not benefit you personally. The information collected will hopefully help improve education people receive at LSO in the future and the overall LSO environment. It may also help education in the wider dental field.

Expenses and payments

No expenses or payments will be made to participants in this study

What will happen when the study ends?

Participant data related to the study will be coded and confidentially maintained by the University of Warwick for a period of 10 years.

Will my taking part be kept confidential?

Yes. The study will follow strict ethical and legal practice and all information

about you will be handled in confidence. Further details are included in Part 2.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm that you might suffer will be addressed. Detailed information is given in Part 2.

This concludes Part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

PART 2

Who is organising and funding the study?

The study is part of a Doctoral thesis at the University of Warwick. It is not being funded by any external body.

What will happen if I don't want to carry on being part of the study?

Participation in this study is entirely voluntary. Refusal to participate will not affect you in any way. If you decide to take part in the study, you will need to sign a consent form, which states that you have given your consent to participate.

If you agree to participate, you may nevertheless withdraw from the study at any time without affecting you in any way.

You have the right to withdraw from the study completely and decline any further contact by study staff after you withdraw. However, should you withdraw from the study, previous information collected from you will not be removed from the study, as this data will have been analysed and may have influenced subsequent data collection within the study.

If you are a student participant, withdrawal from the study will not affect your place on the course or grades achieved in any way.

What if there is a problem?

This study is covered by the University of Warwick's insurance and indemnity cover. If you have an issue, please contact Nicola Owen (details below).

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. Please

address your complaint to the person below, who is a Senior University of Warwick official entirely independent of this study:

Nicola Owen

Deputy Registrar

Deputy Registrar's Office

University of Warwick

Coventry, UK, CV4 8UW.

T: +00 44 (0) 2476 522 713 E: Nicola.Owen@warwick.ac.uk

Will my taking part be kept confidential?

No identifiable personal information will be used in writing up this research. Data will be de-identified and only the research associate will know your personal opinions.

What will happen to the results of the study?

The results will be used to help identify better ways for healthcare professionals to provide orthodontic education in a primary care setting. The findings of the study will be written as a PhD thesis from The University of Warwick, presented at conferences and published in medical and dental education journals, in order to be useful to as many people as possible. Findings included in the publication will be completely de-identified (no names will be used). If you would like to receive a copy of the findings I will arrange this.

Who has reviewed the study?

This study has been reviewed and given favourable opinion by the University of Warwick Biomedical and Scientific Research Ethics Committee (BSREC): Approval No: REGO-2012-028. Date: 05/02/2013.

What if I want more information about the study?

If you have any questions about any aspect of the study or your participation in it not answered by this participant information leaflet, please contact:

Richard Cure at Richard.cure@warwick.ac.uk

Thank you for taking the time to read this participant information leaflet.

Appendix 8: Participant consent form



CONSENT FORM

(Biomedical and Scientific Research Ethics Committee) Study Number:

Participant Identification Number for this study:

Title of Project: An Evaluation of Education in an Orthodontic Training Centre

Name of Researcher(s): Richard Cure. Supervisor: Jane Kidd

Please initial all boxes

1. I confirm that I have read and understand the information sheet dated **02/04/2013** (version **1**) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. I understand I will be contacted by my work/student email.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my education or legal rights being affected. Any data already collected will remain as part of the study.
3. I agree to take part in an individual interview.
4. I agree to take part in a focus group

Name of Participant

Date

Signature

Name of Person
taking consent

Date

Signature

Appendix 9: Interview guide for research associate

The participants have had an explanation of the study. Please briefly review that the participants understand the purpose and processes of the study and are happy that the interview is to be audio-recorded.

The interview questions are designed to allow participants to express their own views about LSO education. This guide is to help you with some of the various factors which may be raised and to give a background to the further information which may be useful for you to find from the participants, so that “themes” can be developed from the data. The questions are in black type. [Guidance notes applicable to the questions in blue type.](#)

Participant questions:

What do you think about education in LSO?

[Professional skill mix](#)
[Facilities – surgeries, lecture room, clinical skills lab, orthodontic lab](#)
[Learning in the working environment](#)
[Learning tasks by doing them](#)
[Organisation - administration](#)
[Individuals – who?](#)
[Leadership – ethos – does one individual drive the LSO process?](#)
[Mentoring](#)
[Teamwork – mix of orthodontists; therapists; orthodontic nurses](#)
[Ability of individual rather than status](#)
[Attitude/willingness to participate](#)
[Shared interest in the process](#)

What helps education in LSO?

Why do these factors help?

How do these factors help?

Describe how this affects you?

[Individuals may be affected differently by the same factors – important to know if this is the case](#)

What do you feel hinders education in LSO?

[Similar to the above – need to establish what if any are key factors.](#)

[Some participants may view the same factor differently](#)

Why do these factors hinder?

How do these factors hinder?

Describe how this affects you?

Who does LSO education work for?

[Need to establish whether LSO education is beneficial for all, or some and the context behind the answers.](#)

[Is it specific to:](#)

Individuals involved?
Professional skill mix?
Timing
Attitude/willingness to participate

Why do you think LSO education works for them?
How does LSO education work for them?
Describe how this affects you?

Who does LSO education not work for?

Similar to above

Why does LSO education does not work for them?
How does LSO education not work for them?
Describe how this affects you?

Has LSO education changed?

Establish if participants perceive if LSO education has developed over their time of involvement and if so:

How has LSO education changed?

What are the participant views on the development- positive and negative

Why has LSO education changed?

What do participants feel has driven the change; conversely what has prevented change, including was change not necessary and if not, why not?

What are the key factors in LSO education?

What is vital to the process, ie. without these factors LSO education would not work or be less value? Explore further why the participants feel these factors are key factors.

Who do we learn from in LSO education?

Do we learn from LSO group situations?

Is learning affected by the relationships between those involved in the LSO group?

What is important about the individuals within the LSO group?

To explore if participants perceive greater value from simply being in a group, or is there added value from interprofessional education – the learning with, from and about each other as opposed to learning by doing, situated learning. How much immersion in the environment is needed?

What would improve education at LSO?

How would the participants change LSO education

Why would this help?

What is the need for the change?

How would this help?

Would it help everyone?

Describe how this would help you?

The individual participant perception

