

**Integration in the early years of medical education:
a qualitative inquiry in one medical school**

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Abbreviations

EBM – Evidence Based Medicine

ECE – Early Clinical Experience

CSLC – Consultation Skills Learning Centre

GMC – General Medical Council

GP – General Practitioner

MMS – Manchester Medical School

OSCE – Objective Structured Clinical Examination

PAL - Peer Assisted Learning

PEP - Personal Excellence Pathway

PPD – Personal and Professional Development

PBL - Problem Based Learning

SP – Simulated Patient

Abstract

Integration is considered to be a key part of medical education by the UK General Medical Council (GMC, 2009, GMC, 2016). Despite this, it is a jargon term without a consistent meaning throughout worldwide medical education. This study used non-participant ethnographic observation of medical students, and semi-structured interviews with both students and staff, with the aim of understanding how students experienced integration at Manchester medical school. The study also aimed to understand facilitators of, and barriers to, the integrated experience. The findings showed how the integrated experience was driven by multi-subject problem-based learning agendas that allowed parallel subject learning to occur via group discussion and via making explicit links to related learning. Experiencing patient contact early in the course, alongside basic science learning, facilitated integration. Integration was also facilitated by the way in which peers supported each other with their learning, and by staff making deliberate attempts to teach in an integrated manner. Barriers to integration included subject compartmentalisation, conflicting information, boundaries between course components, and issues with staff liaison. There was evidence of integration in operation; however, the Manchester medical course fell short of being fully integrated. A new model of integration has been presented to help understand integration in the early years of medical education. This model is informed by the finding presented in this thesis.

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Chapter 1: Introduction

Medical education includes a number of different teaching and learning strategies. There is a good deal of complexity in a medical education curriculum. This results from the diversity of subject matter, the constant questions and challenges in thinking about what should be included, and how to deliver teaching in the most appropriate manner using the most effective strategy. In medical teaching and learning practice, different subjects interconnect and can therefore be integrated in a curriculum. In this introduction, lectures, Problem Based Learning (PBL), informal peer assisted learning (PAL) and Early Clinical Experience (ECE) will be explored amongst other methods. Next, integration as it is currently viewed in medical education will be considered. This chapter will end with the rationale for the research on integrated medical education presented in this thesis.

1.1 Teaching and learning methods in medical education

This section describes a number of different methods of teaching and learning in medical education. Historically, up to approximately the last 20 years, lectures were the main driver (Becker et al., 1961, Sinclair, 1997). Lectures are knowledge based and any resultant learning is passively gained from attentive listening. Ultimately, problem-based learning (PBL) was developed to introduce a problem-solving approach to medical students, in order to equip them for life as a doctor. PBL has not been universally adopted, with some medical schools favouring the more traditional lecture-based approach. The PBL methodology as employed in medical education involves a case, used by a group of students to generate learning outcomes that are discussed in the group after time spent on private study (Barrows, 1980, Spaulding, 1969). Medical education also makes use of lectures, early clinical experience and peer assisted learning alongside other methods. Early clinical experience (ECE) is a method that allows early year medical students to spend time learning clinical skills alongside their basic science learning (Dornan and Bundy, 2004). ECE is advised from the start of medical school by the UK General Medical Council (GMC, 2009, GMC, 2016). In this introduction, current evidence and best practice of ECE are considered.

1.1.a Teaching and Learning Methods

This section describes the teaching and learning methods related to medical education, including lectures, problem based learning, case based learning, peer assisted learning, reflection, and early clinical experience.

1.1.a.i Lectures

First of all, lectures will be discussed. Lectures are still used to support many PBL programmes, adding to the learning process by providing detail on specific elements. A lecture is an educational event delivered by a lecturer where either a single person or a group of people stand at the front of a seated area containing people requiring education on a particular topic. It is common knowledge amongst doctors and medical educators, that medical education made extensive use of this teaching and learning method in the days before PBL. Lectures were used in the two preclinical years of medical education in the UK as the way of delivering knowledge to students up until the 1990s (Sinclair, 1997). Today lectures are still used to some degree in some courses. The classic American ethnography of medical education, 'Boys in White' (Becker et al., 1961) also described lectures as key to knowledge delivery of the basic sciences in the US postgraduate style preclinical year. In lectures, the lecturer talks with or without the aid of accompanying slides. Sometimes lectures can be made available as podcasts and this is valued by students (Pilarski et al., 2008), but with little effect on lecture attendance (Rae and O'Malley, 2017). Attendance issues with lectures have been noted (Bati et al., 2013). Therefore, whilst lectures were previously in a monopoly in medical education, if attendance at lectures were poor then this would decrease their value as an educational event.

Various authors have studied the value of lectures compared with other methods of knowledge delivery. A randomised control study at the University of Iowa Hospitals and Clinics published in 2016 using 36/49 third/forth year medical students has shown that learning about management of gastroschisis (a paediatric surgical condition) by PBL/simulation resulted in better practical test performance than through lecture-style

teaching. However, PBL and lecture-style teaching resulted in the same knowledge-based performance (Zhao and Potter, 2016). It is interesting to note that lectures in this case were therefore the same for knowledge delivery as PBL. Simulation would intuitively be expected to be better for practical skills. More evidence regarding the benefit of newer learning methods over lectures was found amongst US military medics in a study at the Brooke Army Medical Center, Fort Sam, Houston published in 2004, with self-directed learning having little advantage over more traditional lecture-style teaching (De Lorenzo and Abbott, 2004). This was a finding confirmed in other studies despite superior medical student satisfaction with PBL (Antepohl and Herzig, 1999, Khoshnevisasl et al., 2014). On the other hand, a meta-analysis at the West China School of Medicine of Sichuan University published in 2018 demonstrated that a combination of PBL with lectures may be superior to lectures alone in medical education, in terms of knowledge and skills (Jia et al., 2018). There is, thus, contradiction in perceived superiority of learning methods. In a study at University College Roosevelt and Erasmus University Rotterdam published in 2017 of Dutch law courses, students' quality of and self-direction to learning were noted to be superior in PBL as compared to lecture based learning (Wijnen et al., 2017). Additionally, an interview/questionnaire study published in 2012, carried out at the Department of Primary Care and Public Health, Cardiff University, compared two medical school curricula. This study demonstrated that PBL, when compared to lectures resulted in greater self-direction, and furthermore, was superior in terms of reflection and holistic learning (Grant et al., 2012).

It is difficult to say with confidence that PBL is a superior teaching and learning method to lectures, particularly in terms of knowledge; however, it would appear that it is preferred by students to lectures, and that the best educational balance, it seems, may be achieved through a combination of methods.

1.1.a.ii Problem based learning

In PBL a problem is presented and subsequently solved with learning stemming from the time spent on the solution. This learning is then retained as a large chunk of related information. A problem can encompass several topics (Barrows, 1980). PBL started life at McMaster

University in Canada in 1969 (Spaulding, 1969). The concept evolved from a desire to update medical education, with the dual aims of equipping students with the tools to problem solve and to develop behaviours appropriate to the professional environment of a doctor (Spaulding, 1969). As a by-product, PBL resulted in the so-called integration of different basic/social sciences and ultimately basic/clinical sciences and faculty planning (Spaulding, 1969, Neufeld and Barrows, 1974). Evaluation of this nascent teaching and learning method was carried out using PBL in conjunction with simulated patients (SPs) who delivered a case scenario with a group of students (Barrows and Tamblyn, 1976). The students had to diagnose a medical condition using clinical skills and by studying relevant basic science. The study and control groups were assessed (n=10) and it was statistically shown that the former students were better able to formulate problems. The authors thought that the PBL/SP students comparatively studied more effectively, and demonstrated more motivation to search out patient experiences, though these observations were stated as not statistically significant and it is unclear how these observations were justified (Barrows and Tamblyn, 1976). It is interesting to note that integration of basic and clinical science was not an avowed objective in the original genesis of PBL in Canada. Rather, this integration emerged as a by-product of PBL.

Manchester Medical School (MMS), the index case for the present thesis, has used PBL from the early 1990s to the present. PBL allows a body system-based approach to learning. This approach generates integration via learning several subjects related to the system at the same time. Ideally a group of faculty members undertake curriculum planning. The seven steps model for PBL is used at MMS (appendix 11). The seven steps of PBL drive integration from the start. As the students read through the case together, they highlight any content that is unfamiliar. The prior knowledge of some students can help explain unfamiliar ideas to others. Prior knowledge is also called on to integrate learning in the third step. It is activated to explain cues in the case and arrange them into explanations. Step four starts to integrate current learning by arranging the explanations into a description of the phenomenon under study. Sets of learning outcomes are drawn up in step five. These outcomes consist of topics from several subject areas. Finally, after a period of learning, step seven is a group discussion that aims to integrate knowledge acquired in order to explain the case. The tutor also has an important role in integration via facilitation of learning in the PBL group. Under guidance of the tutor, the students think about how the case-related knowledge and their prior knowledge interconnect (Barrows, 1980, Spaulding, 1969, Davis and Harden, 1999).

The Manchester medical course encompasses four core strands, which bring together subject matter both horizontally within the first two years and vertically during the last three years of the five-year course (O'Neill et al., 1999). These are defined by O'Neill et al. (1999, pp. 122-129) as: "Nutrition and Metabolism", "Cardiorespiratory Fitness", "Abilities and Disabilities" and "Life Cycle". MMS centre their horizontally and vertically integrated PBL course curriculum with multidisciplinary modular oversight, using "indexed clinical situations (ICSs)" derived from a survey of clinicians. This survey considered whether/how:

"integration of the course has been achieved through knowing where ICSs appear in the modules and what aspects (items) of these were covered" (O'Neill et al., 1999, p 129).

Course evaluation questionnaires were completed at the end of year 3 and reported in the literature as showing a high level of satisfaction (n=247/275 of 309 students) (O'Neill et al., 2000). Whilst this demonstrates contentment with this mode of learning, it doesn't measure its effectiveness. It can therefore be said that PBL has the potential to provide a framework within which integration can take place.

The idea of integration via PBL will now be considered. PBL has previously been seen as providing an integrated curriculum (Davis and Harden, 1999). The PBL process itself can include embedded integrated learning as part of a curriculum. Viewed globally, an integrated curriculum is one that allows parallel learning of multiple subject areas at the same time in an interlinked fashion. Today, as integrated curricula evolve, medical schools are bringing in patient contact and clinical skills alongside the basic sciences in the early years. PBL has been used in attempts to drive such integration. For example, a study at the University of California medical school by Wilkerson et al. (2009) shows how this institution integrated the pre-clerkship part of their curriculum, through collaboration between faculty and students. The principal learning method was PBL, supported by lectures, laboratory sessions and simulated clinical scenarios. Each week had a formative assessment and there were block ending summative assessments, with both assessments integrated via all subjects being examined (Wilkerson et al., 2009). Another study at the University of California San Francisco by Chen et al. (2007) showed clinical history and examination were integrated with PBL by replacing standard first year PBL cases with simulated clinical situations that generated learning outcomes. However, evaluation using Likert scale questionnaires suggesting this was beneficial

for general learning, and for patient examination more than meaning of examination findings, were not convincing. Focus groups may have helped to clarify how this was beneficial for learning (Chen et al., 2007). In a further example of PBL driving basic and clinical science integration, psychopathology was taught to Year 2 students at the University Of New Mexico School of Medicine (West and West, 1987). A simulated clinical environment was used to inform a PBL style learning situation. One final example is leadership integrated longitudinally at the Zucker School of Medicine at Hofstra/Northwell, Hempstead (Ginzburg et al., 2018). This was within the context of a mixed method PBL and case-based learning medical course, resulting in improved skills. A specific subject was integrated into a general learning programme, rather than full curricular integration. There was a gap in the study due to the methodology used being based on limited pick list style questions, forming a subjective faculty assessment of the students' leadership skills that were seen as effective (Ginzburg et al., 2018).

As a counterpoint, PBL has not always been successful in promoting the integration of all or part of a curriculum. A quasi-experimental study with a control related to partial curriculum integration was carried out among Year 2 students at Isfahan University of Medical Sciences, Iran (Adibi et al., 2007). It was established that students who were taught clinical examination skills along with anatomy, did better than those who were taught anatomy along with PBL. Questionnaire results found these students remembered the anatomy more easily, and recommended that this sort of partial curriculum integration should be applied more generally in the basic sciences (Adibi et al., 2007). PBL then can be used as a driver for integration by parallel learning, which can be in combination with other learning modalities or skills and can also utilise simulated clinical environments.

Research on PBL has not conclusively proved whether there is or isn't an educational benefit to students. However, there is some evidence that PBL is a useful method for promoting learning. PBL assists knowledge retention and teaches the skills for continuing professional education (Frost, 1996). Implementing a PBL course can also improve aspects of learning (Devolder and Degrave, 1989), assessment outcomes (Hoffman et al., 2006), and can be motivational (Boudier and Smits, 2002), though this is not universally agreed, with the motivational aspect of PBL described elsewhere as uncertain (Dolmans and Schmidt, 2006). Evidence from a systematic review shows that PBL promotes a deep level of learning

(Dolmans et al., 2016). However, another systematic review found that it can't be certain a PBL style course does improve learning (Hartling et al., 2010) and via self-reported questionnaires, it was concluded that traditional methods such as lectures were better generally for knowledge-based curriculum content learning than PBL (Bernstein et al., 1995). There is therefore contradictory evidence of whether there is a benefit to using PBL as a method of teaching and learning. Some studies show a beneficial effect of PBL on group learning; but whilst there is evidence that counters this, doubts will remain.

The way that groups interact during a teaching and learning activity is key for its success. PBL has been correlated with improvement in the function of student groups (deGoeij, 1997). However, it has also been demonstrated, in a study of students' perception of experiences at Maastricht University medical school, that there can be room for improvement in PBL group interaction related to learning. This study found that the desirability of student interaction via questioning and reasoning scored higher on questionnaires than how often these actually occurred (Visschers-Pleijers et al., 2005). Learning by interaction in communities of practice was studied in a graduate entry medical course at the University of Birmingham with Year 1 students (Orsmond and Zvauya, 2015). There was a bias in this study as it only used mature students, who may have functioned differently to school leavers. This focus group study showed participants viewed learning as a solo activity despite the PBL environment. PBL groups provided the opportunity for peers to help each other. They would correct each other and find out where information was sourced, sharing resources (Orsmond and Zvauya, 2015). Recent further insight into interaction during PBL was garnered in Saudi Arabia at Imam Abdulrahman Bin Faisal University (Latif et al., 2018). A closed questionnaire study was used to evaluate female students' impressions of using debate and role-play as tools in the PBL process. With regards to role-play, 73% (136) of questionnaire respondents viewed that this aided integration of clinical skills and basic science via critical thinking (Latif et al., 2018). Azer and Azer (2015) carried out a systematic review concluding that despite gaps in knowledge, no conclusions could be drawn as to whether there was a relationship between student interaction and learning in the PBL environment. It is interesting to note that whilst intuitively PBL should promote good group learning, it is far from certain whether there is robust evidence that it does. Learning in isolation was deemed to be reasonable when occurring in a PBL environment. However, there is some evidence that favours PBL in a beneficial way for group interaction.

1.1.a.iii Peer assisted learning

In the previous section the idea of peers helping each other via the PBL process was introduced. Peer assisted learning adopts a more formalised approach to the contribution of the student peer group in learning. The concept is that peers act as teachers to other peers, such as in examples of peer assisted learning attempted in undergraduate medicine, including: anatomy (Preece, 2015, Han et al., 2015), pathology (Grover et al., 2017), communication skills (Cushing et al., 2011), clinical examination teaching (Field et al., 2007, Silbert and Lake, 2012), cannulation (Pelloux et al., 2017), elementary surgical skills (Bennett et al., 2018, Saleh et al., 2013), aspects of pharmacology (Trottier, 1999), and simulated accident and emergency cases (Jauregui et al., 2018). In postgraduate medicine peer assisted learning has been applied to courses on surgical techniques (Beard et al., 2012), and evidence based medicine (Habib et al., 2017).

Research has been carried out to evaluate peer assisted learning, giving evidence for its benefits. At the University of Sydney medical school an open and closed response questionnaire study of the peer assisted learning programme was carried out by Menzes et al. (2016). In this particular institution, those in the later years tutored students in the earlier years in a clinical subject of their choice. The programme helped generate a community feeling and was beneficial in terms of the knowledge both transmitted, and reinforced from elsewhere on the course (Menezes et al., 2016). In another study, a systematic review of intra-year group peer assisted learning was conducted (Tai et al., 2016). Improvements in reflective practice, confidence in subject matter knowledge, problem solving, and responsibility for the ongoing development of the peer group, were all noted. Additionally these types of activities resulted in beneficial outcomes that provided a support system for students, with increased levels of rapport (Tai et al., 2016). As these studies have shown, peer assisted learning occurs in a wide variety of settings within medical education and is beneficial not only in bringing students together, but also in amassing skills required for knowledge acquisition.

1.1.a.iv Case based learning

A similar method to PBL used in medical education is the so-called case-based approach and this will now be discussed. The difference with case-based learning is that learning objectives are supplied with a case as opposed to being defined by the learners in PBL. An example of this approach is described in a study by Schapiro et al (2011) at the University of Wisconsin. Here, “integrative cases” which “blend clinical, basic science, and public health approaches in a single experience” were employed (Schapiro et al., 2011, p. S188). This was a pilot effort to integrate public health within their curriculum. A questionnaire with free comment evaluation was used and showed that the cases aided students integrating knowledge (Schapiro et al., 2011). However, this evidence would have been made stronger by coding analysis of the comments. In an integration project with second year students at Monash University Medical School, Australia (Macaulay and Nagley, 2008), basic and clinical sciences were integrated within group style projects that involved a written piece of work and presentation. The authors observed how the cases allowed “explicit links between biomedical science and clinical medicine” (Macaulay and Nagley 2008, p. e25). Evaluation questionnaires were administered, and showed that the majority of students managed to achieve the required integration in their project (Macaulay and Nagley, 2008). As the observations were self-reported their value was limited, as students are not the most objective judges of their own work. The Keck School of Medicine, Los Angeles introduced integrated cases towards the end of their pre-clinical course (Jacobson et al., 2010). This involved relating a symptom to prior learning. Case based learning, then, is a method of teaching and learning whereby a clinical case is used to structure other learning around. As can be seen, this style of teaching and learning is quite similar to PBL in that it allows different subjects to be learnt in parallel and utilise discussion as a learning tool; and in this respect has the potential to drive integration. However, this method doesn’t necessarily allow students to compile their own learning objectives, which tend to be assigned instead.

1.1.a.v Reflection

The personal and professional development of medical students is driven by reflection contained in a portfolio of evidence. Manchester Medical School (MMS) suggests two models for students to use for this reflective learning (Gibbs, 1988, Rolfe et al., 2001). With these models as a basis, students are encouraged to describe a situation, evaluate and analyse what was good and bad, and describe the effect on them and others. The aim of reflection should be to demonstrate that student experiences are learned from, therefore the final step of reflection is to draw up an action plan for similar future situations.

1.1.a.vi Early clinical experience

Whilst there are many elements that contribute to teaching and learning on medical courses such as practical science and reflection, it could be argued that the most important in terms of integration in the early years of medical school is early clinical experience (ECE). ECE is a relatively recent experiential teaching and learning phenomenon in medical education around the world. In the UK, ECE primarily came into being through the General Medical Council requirement that all medical students have patient exposure, and integration between basic and clinical science, from the start of their studies (GMC, 2009, GMC, 2016). ECE is therefore the practice of introducing students to patients from the first year of their medical studies and it is mostly about being in health care environments from this early stage. ECE can also take the form of learning clinical skills, such as history taking and examination, in a simulated environment followed by spending time in GP surgeries and hospitals in order to put these skills into practice with real patients. ECE around the globe can be viewed as a spectrum of teaching and learning practice, key to integration, which will be considered as this section evolves. Within the UK specifically, ECE consists of various levels of placements/sessions, where students in the traditional pre-clinical phase of their medical education (the first two years) undertake learning of consultation and clinical skills in simulated and/or clinical environments. ECE therefore encompasses any situation where a pre-clinical student is exposed to clinical content. These situations can be hands-off or hands-on, for example observed or participatory doctor-patient interactions in a GP surgery or hospital clinic.

The goals of ECE include: integration, providing context by bringing together science and clinical content in order to give more meaning to science topics, and generating enthusiasm by having patient contact (Dornan and Bundy, 2004). ECE has been shown to be motivational for medical students. Evidence for this aspect of ECE comes from an interview study carried out at the Medical School, Queen's Medical Centre, Nottingham (Hampshire, 1998). The aim was to elucidate students' views of a nascent ECE program that involved GP and hospital visits. GP tutors were also interviewed. The general finding was that it was useful to carry out unobserved patient interviews, and that by the time Year 2 was completed, the majority were content with histories, although not so much with examination. It was noted that half of those interviewed gained benefit and motivation in relating the clinical aspects observed to the science content of the course (Hampshire, 1998). ECE is therefore a key innovation in medical education providing early insight into the doctor role that students have ultimately applied for. ECE can therefore be motivational for medical students who can see early on that they are studying to be doctors rather than basic scientists.

ECE has been considered in the context of integrated teaching and learning in the capacity of clinical skills learnt alongside basic science. One interview/focus group study (Yardley et al., 2013b) showed that ECE aided the transition to becoming a doctor. The majority of students viewed ECE as occurring alongside university-based learning experiences rather than integrating with clinical experiences as intended. However there were some students who grasped the concept of integration of science and clinical topics with ECE (Yardley et al., 2013b). Another interview and group discussion study in the same medical school (Yardley et al., 2013a) demonstrated that ECE was not necessarily the solution to providing an integrated experience:

“students did not experience placements as part of integrated learning within the curriculum because they were unable to resolve for themselves the different and often contradictory knowledge presented to them by medical school faculty staff and placement providers” (pp. 116-117).

A feeling of wasting study time was expressed and also a lack of a real-world experience when undertaking SP sessions (particularly in relation to confidentiality and consent). Students were worried about reflecting on aspects that did not go well as they thought there might be consequences to them. The importance of Yardley et al's (2013a, 2013b) work lies in the

background idea of bridging science and ECE and thus integrating student education. However, an understanding of the extent of this integration is needed, in view of the fact that students were viewing their experiences as occurring alongside their course.

At the Mayo Medical School in the USA, in order to retrospectively establish what students gained from ECE, reflective writing was subjected to coding and categorisation (Dyrbye et al., 2007). This work noted students were seeing the way their ECE was integrating with the science content, particularly in the way it gave the basic sciences relevance, consolidated this learning, and helped lend direction to the taught elements of the course. This integration therefore helped motivate the students and gave context to the science, allowing better comprehension and making it easier to remember what they were learning, with reinforcement and application of basic science in the clinical environment. It also showed how the textbook definition of diseases do not always fit with the real world (Dyrbye et al., 2007). Drawbacks were that the reflection was compulsory and in response to leading questions, though there was the option of reflecting more freely. ECE, then, has mixed reports, regarding the degree of integration that can be attached to it. ECE is theoretically integrated in terms of parallel learning of clinical skills and science. In practice however, whilst students can experience integration through ECE, issues can arise such as contradiction and poor tie-in with knowledge delivery. This may compromise such integration.

A variety of approaches to ECE have been implemented in medical courses around the world. For the purposes of this review, ECE can be broadly classified as low, intermediate and high intensity, and this will now be explained. One example of a low intensity form of ECE is provided by The University of Kentucky, which introduced a week-long placement for medical students in a GP practice (Rudy et al., 2000). The students observed the process of consultations and reflected on this. They also carried out a home visit and established the effects of disease on day-to-day living. To give an example of an intermediate intensity form of ECE, in another study from the Eastern Virginia medical school published in 1999, ECE in the pre-clinical years encompassed student visits that involved history-taking with, and examination of paediatric patients. It also gave the opportunity to counsel them, practising communication skills (Kossoff et al., 1999). At the more intensive end of the ECE spectrum, other medical schools have programmed Year 1 and 2 ECE in a similar manner on a trial or

permanent basis (Weeks et al., 2000, O'Brien-Gonzales et al., 2001). O'Brien-Gonzales et al. (2001) introduced data about the importance of clinical science relating contemporaneously to the basic science learning. At the University of California Irvine School of Medicine, Lie et al. (2006, pp. 480, 482) described how the "Patient, Doctor and Society course" combined lectures, seminars and simulated patient interaction with ECE-based observation of a professional in a clinical environment. Student descriptions of these observations were reviewed and coded. They entailed a short narrative of what had been learnt. "Communication, procedures/time-management and cross cultural issues" were commonly mentioned (Lie et al., 2006). However, one should bear in mind that this study could potentially miss student priorities, as there was no direction for the descriptions.

As shown in the preceding paragraph, the type of ECE in the USA varies in intensity from a week-long short experience to an entire ECE course within the context of the medical degree as a whole. However, as the American system of medical education is postgraduate based, it can be difficult to relate to the UK system. Care must therefore be taken when using the term ECE as it may mean different things depending on which medical school and culture is involved. An illustrative example is the Radboud University Nijmegen Medical Centre, published in 2011, where medical students were placed for 4 weeks of ECE in their first year of study (Helmich et al., 2011). They took the role of assistant nurses at either a nursing home or hospital. At this University a coded questionnaire-based study was carried out with use of focus groups to confirm findings. Helmich et al. (2011) identified student "learning goals" following the placement. These goals encompassed: "reflecting on one's own performance, on teamwork and on the professional behaviour of oneself and others, and reflecting on one's own future role as a doctor and future professional development" (Helmich et al. 2011, p. 736). It is therefore clear that students see ECE of this type as useful. This sort of ECE is different from that outlined earlier. Generally, students are sent out on visits to GP practices and hospitals. This is combined with sessions with simulated patients and with tutor-facilitated learning of clinical skills.

ECE is therefore a spectrum of types of integrated experience: from those designed to demonstrate the role of ancillary healthcare professionals, through to those designed to observe clinical practice, and, ultimately, to those that involve direct clinical participation.

1.1.b Summary

Until approximately 20 years ago, lectures drove teaching and learning in medical education via didactic knowledge delivery, and this was the case in Manchester medical school, the index case for this thesis. Today, Manchester is focussed on PBL as a teaching and learning method. In PBL, a problem is presented as a patient case from which learning objectives are set in order to investigate the problem. Didactic lectures, along with various other types of learning such as ECE and reflection may be used in conjunction with PBL to support learning. PBL requires student interaction and can aid integrated learning. Peer assisted learning occurs when students interact within a group-learning situation, and it can have benefits other than knowledge dissemination such as group rapport building. Peer assisted learning is commonly seen in medical education, particularly as PBL is set up for group learning. Some institutions used case-based strategies to achieve integration, although this method is similar to PBL itself. ECE is a key learning modality in medical education and allows real world clinical learning to take place in the early years of medical school with benefits including a drive to integration and giving meaning to basic science learning.

This section has demonstrated that over several decades, there has been a drive towards integration in medical education. Integration is considered as the joining up and parallel delivery of different subject matter teaching such as clinical, basic and social sciences. This term has carried a number of different connotations, ranging from the simple integration of a small facet of a course so that it becomes intertwined with a teaching programme all the way through, to a fully integrated teaching programme. The next section will consider the development of integration in medical education in more depth.

1.2 Perspectives on integration in medical education

The Edinburgh Declaration (1988, p. 481) recommended that medical schools “pursue integration of education in science and education in practice” (Edinburgh-Declaration, 1988). Historically, different subject matter was learnt separately (Carr, 1998). In present times, the nascent concept of integration in medical education has led to systems-based courses, whereby

different subjects are learnt in conjunction with a particular body system, such as cardiovascular or gastrointestinal (Rosse, 1973). The term 'integration' has been elusive to pin down. In this section, the different meanings applied to it over the previous decades will be considered, and finally, the theoretical concepts underpinning integration will be discussed. The literature search strategy for integration in medical education used web of science covering all the databases, and education literature datasets via the University of Manchester Library, using the search terms:

- Integrat* AND medical AND studen*
- Curriculum AND Medic*
- Early AND Experience AND medical AND education
- Problem AND Based AND Learning OR PBL

1.2.a Genesis of the term 'integration' in medical education

The first consideration is the genesis of the term 'integration'. In the past, teaching medical students in the basic sciences involved individual isolation of each discipline (Carr, 1998). Carr conceptualised that curricula should be integrated, though without undertaking/considering research to evidence this view. Integration has been talked about in the terminology of medical education for over half a century. Even in the 1940s, integration was a term used with numerous connotations, when related to medical school curricula (Stubbs, 1947). Generally, medical courses today are delivered in the name of integration by organising the subject matter by the body system to which it relates: so that, for any one body system, the biology, physiology, anatomy, pharmacology, and associated bio-psychosocial science are covered in a parallel and interconnected manner. This approach to medical education using a system-based course is not new (Rosse, 1973). Historical attempts to integrate clinical examination with basic science, pathology and clinical correlates have been made (Rosse, 1970). Utilisation of patients as early clinical experience in first year neuroscience teaching also has historical precedent (Talalla et al., 1974).

Today, there are different ways of integrating medical education: for example, seminars combining basic science and clinical cases (Thanikachalam et al., 2010). Learning has been described conceptually as a process of organising oneself and this in turn facilitates curriculum integration, implying that integration is a result, rather than a driver, of modern medical learning (Mennin, 2010). There is evidence that learning termed as 'integrated' is valued. At the Faculty of Health Sciences, Linköping University Hospital, Sweden, a student and staff questionnaire was administered to understand what aspects of the medical course were most useful (Brynhildsen et al., 2002). A 6-point scale was used. The main aim was to evaluate views on the integrated elements of the course, both horizontal (intra-year group) and vertical (inter-year group). The questionnaire included additional parameters, in order that there was not a particular emphasis on integration. Those surveyed had an appreciation of the integrated elements; however vertical was seen as less important compared with horizontal integration (Brynhildsen et al., 2002). This study had large/substantial participant numbers and appropriate statistical analysis. Dahle et al. (2002) described how vertical integration was achieved in part at their university using a bi-tutor dynamic, whereby groups have a scientist and a medic for the whole course. Didactic teaching in basic science was tied in with contemporaneous clinical content in later years (Dahle et al., 2002). Medical education has thus been on a journey from learning subjects as separate entities, to learning in an integrated fashion with parallel learning of subjects.

Integration then has been part of the lexicon of medical education for a long time; but what does it actually mean? Writing theoretically, Hays (2013) has suggested the use of caution when talking about integration in terms of medical education, as it is taken to mean a number of different things. He suggests ways in which the term can be applied. The first is the horizontal and vertical integration of a curriculum i.e. basic science learning in a system-based approach and the combination of basic sciences with clinical learning. The second is the integration of assessment with curriculum in such a way that multiple subjects are assessed and scored in parallel potentially using a clinical case as a structure. The third definition is simultaneous education of student and trainee doctors. Benor (1982) described integration as open to multiple interpretations. These can refer to a wide range of activities that can be applied to a whole course of study or a part of it. Simulated and/or real clinical experience are included at an early stage of medical education. Benor described the pre-clinical course as including interrelated clinical behavioural and basic sciences. The clinical course is based

around systems of the body. Basic science learning continues with clinical placements interwoven between what Benor (1982, p. 359) described as “problem oriented case-method” and pedagogical style teaching. The publication itself was theory based with some curriculum description.

The term integration itself has been acknowledged by Brauer and Ferguson (2015, p. 313) “as a buzzword rarely accompanied by productive directions or suggestions for its development, implementation, and evaluation” and “loosely defined in the literature”. It has been used non-specifically when referring to curricula (Brauer and Ferguson, 2015). An interview study (Tresolini and Shugars, 1994) using participants from 17 American and Canadian medical schools, combined with pertinent document review, attempted to define levels of integration. Tresolini and Shugars (1994, p. 234) suggested that integration theoretically mixes basic and clinical science during a whole medical course; but that it can also involve “mind-body integration” which covers the impact on patients of placebo effect and maintaining hope, for example. In addition, students can be instructed in basic clinical topics in an integrated manner rather than through specialty-driven tuition. These factors making up integrated curricula best take place against a background of multi-disciplinary team working (Tresolini and Shugars, 1994). The limitations of this study lay in only interviewing 22 teaching and administrative staff, as the student perspective would have been useful. However, a strength was the methodological subtlety of asking the interviewees to review findings, giving more rigor to the results. Integration in medical education then has evolved from conceptual thinking, to body systems-based organisation of a medical course, and ultimately to delivery of teaching clinical correlations with the basic sciences. The issue with integration remains that it is an imprecise term without consistent definition. For an educational term to have gravitas, it must be clear and unambiguous.

The next consideration is the panoply of ways in which integration has been defined. The term has been used both for joining up single subjects within a medical course and for holistic course organisation, and the following text will give examples of these. By using the word “holistic” it is inferred that within a course or part of a course, multiple subject areas are delivered together in a joined-up fashion. Firstly, holistic examples of integrated education will be discussed. Integration was viewed in the molecular and cellular biology pre-clinical course

of the University of Barcelona medical school in a 1990 publication, as biosciences (physiology, biology and medical physics) learned together rather than in isolation (Carreras, 1990). This was generally reported as positive in reported course evaluations, and as facilitating students' learning. However, with categories rated out of 3 and no option for free comment, there was not much scope for subtlety of opinion with such a small number of rating options. Ultimately staff held a negative view due to less autonomy, less productivity, and more work. The project was abandoned.

Further to defining integration, an example of an integrated course at the University of Colorado School of Medicine, showing how a cardiac scenario could be learnt in parallel as basic science, practical skill and clinical science, was as follows (O'Brien-Gonzales et al., 2001):

“when the cardiac system was being studied in the second year Systems course, a cardiology case was discussed in the Clinical Correlations course; the cardiac system was emphasized in the Principles of Pharmacology and Principles of Pathology courses; and cardiac clinical procedures were being demonstrated in the Clinical Practicum and Clinical Procedure courses. In addition, there was an attempt by preceptors to correlate the cardiac system into their clinical teaching” (p. S50).

A University of Minnesota integrated musculoskeletal course was evaluated by Saleh et al. (2004, pp. 1654-1656). Lectures, “theatre-style multidisciplinary case presentations”, examination tuition, “simulated clinical settings” and “interactive web-based cases” were employed. A short exam was conducted before and after the course, showing significant gains in knowledge. Surveys were carried out showing gain in “confidence in their overall ability to evaluate musculoskeletal problems”. There was a year ending exam, showing improvement on the previous year before the changes. Alterations were made based on these experiences including improving lectures, and an additional physical examination session (Saleh et al., 2004). The prospective nature of this paper increased the value of the evidence it presented compared with the many retrospective course evaluation-based publications.

Integration often revolves around body systems. Integration consistently refers to multiple subject areas learned in a joined-up manner.

1.2.b Subject level integration

It is not only holistic ideals that are used in medical education in the name of integration. Various individual subjects have been described as integrated in some way to provide an integrated teaching and learning experience. Integration doesn't necessarily occur overtly. Even in a traditional style course with individually isolated basic sciences teaching, ethical knowledge can be gained covertly through the participation of model professionals from the medical community (Hafferty and Franks, 1994). Hafferty and Franks thus allude to ethics as an element of the hidden curriculum of medical education. In Year 2 of the London Royal Free Hospital School of Medicine, epidemiology was combined with sociology in an integrated manner by using seminar and lecture as teaching methods, and also completion of some research in this area of study by the students (Elford et al., 1985). In one American study at the University of Chicago, clinical science was integrated with basic science as part of learning pathophysiology and therapeutics. This institution assisted Wuhan University in China in developing a similar course (Mirza et al., 2013).

Further to considering individual subjects, nutrition was integrated into various parts of a first year programme of study at Duke University Medical Centre, including for example consultation skills in nutrition (Johnson et al., 1995). An integrated oncology course set out to teach the various aspects of this subject, integrated together by including lectures, discussion of cases and targeted clinical examination (Luedke et al., 1987). At the University of Limburg, Maastricht, the first year students were introduced to oncology in an integrated manner with basic science/pathology covered and clinical cases considered, and also prognosis and psychosocial factors. Lectures, discussion groups and lab classes were the teaching methods utilised (Bosman, 1985). A further instance of subject level integration can be seen where research was incorporated into a special study module program in the name of integration (Riley et al., 2013). Finally, subject level integration has been seen in a curriculum where observation of post mortem examination was integrated with basic science (Sanchez and Ursell, 2001). In summary, individual subjects that have been described as integrated in medical courses include ethics, epidemiology, nutrition, oncology, and research skills. There are therefore a variety of examples of subject level integration, but with no consistent definition.

Subject level integration has also been implemented longitudinally. In a 2012 publication, such an approach to the teaching of Geriatrics at the Herbert Wertheim College of Medicine, Florida International University, has involved integrating competencies throughout the entire medical course. This included integration of geriatric-based ECE in the pre-clinical years in addition to targeted didactic teaching. In the clinical years, targeted rotations in geriatric related settings allowed the opportunity to cover learning objectives (Martinez and Mora, 2012). Population health was longitudinally integrated into pre-clinical and clinical parts of the course at Brody School of Medicine, East Carolina University, via cases and community visiting respectively (Kerkering and Novick, 2008). At Leiden University Medical Center, an e-learning solution was developed using a cross-disciplinary approach, in order to integrate pharmacology teaching across the medical course (Dubois and Franson, 2009). These authors:

“consider integration as the process of incorporation or implementation of a new piece of learning material into an existing curriculum with regard to practical aspects (find room and time in the course schedule), content (create appropriate connections with existing topics and disciplines) and assessment (assess the students in a formative and summative manner).” (p. 823).

Longitudinal subject level integration has therefore been used with clinical geriatrics, population health, and pharmacology, again with no consistent definition.

Subject level integration has also been described by various authors as integrated within the area of clinical skills: for example where a cadaveric, pre-clinical, surgical demonstration of pancreaticoduodenectomy, was carried out as part of the anatomy class (Are et al., 2009). A more generic clinical skill is cannulation of a vein. A study published in 2011 at the medical school of the University of Massachusetts in the USA, has used interprofessional education by nurses in order to integrate cannulation teaching within the third year of their medical course, via a piloted module (Hale et al., 2011). This style of integration has also been used via assessment. A questionnaire and focus group study at University College London Medical School published in 2016, evaluated student opinion regarding a recently piloted integrated OSCE (Furmedge et al., 2016). According to Furmedge et al. (2016, p. 4) 49.6% and 31.7% of questionnaire respondents (n=1236 of 1280 participants) respectively agreed and strongly agreed with the statement “the exam balanced integration of clinical skills with basic science”.

The use of evidence-based medicine (EBM) was integrated on a subject level into the fourth and fifth years of the medical course at Prince of Songkla University, Thailand. This included literature searching and ensuing critical appraisal, though this was not in the early years of the course (Liabsuetrakul et al., 2009). For this work, an evaluation was carried out for student self-assessment of any EBM skills acquired and attitude to EBM using ratings on a 5-point scale, and thus was therefore unable to provide an understanding of how integration of EBM was experienced. Further examples of clinical skill integration include an opportunity to carry out a piece of work on quality improvement within the ECE program at Dartmouth Medical School (Weeks et al., 2000). The Aristotle University of Thessaloniki Greece carried out a volunteer pilot project that aimed to integrate various subjects in their medical course, incorporating communication skills teaching, schools health promotion activities, basic nursing training, GP placement, and research skills (Panagopoulou et al., 2006).

There is evidence of integrating consultation skills teaching. Patient and SP video consultations were described as integrated in year two of the medical course at the Queen's University of Belfast. Again, this was subject level integration. Plenary sessions were delivered on theory, along with tutor-led group video-feedback sessions (Irwin et al., 1989). At Radboud University Nijmegen Medical Centre, Holland, communication skills were integrated throughout the course, starting in the pre-clinical years and continuing during the clinical years (van Weel-Baumgarten et al., 2013). The communication skills were integrated with other clinical skills and medical subject matter. This course evaluation questionnaire study demonstrated principally that students thought this training would stand them in good stead for clinical rotations and that the integration of communication training within the course was required. The lack of free text was again a problem, in that rather than seeking to understand student views on integration, students were required to give a number out of four depending on the extent to which they agreed. The questions tended towards an assumption that integration was present, rather than trying to understand if it was and what it meant. In summary, clinical skills that have been described as being integrated, though not in a consistent manner, are surgical technique, cannulation, consultation/communication skills, evidence-based medicine, and quality improvement. In these examples, whilst the avowed aim was to integrate, it could be argued that they simply added skills to their courses of study.

Integration in my view would be learning multiple subjects and skills in parallel as opposed to adding skills into a course.

Simulation has also been used in conjunction with the term integration. The term simulation encompasses simulated versions of real-life situations. In the Faculty of Medicine at the University of Manitoba, Canada, computer-based simulation was used to supplement basic science learning (Blanchaer, 1985). This was done by undertaking problem solving type clinical exercises, which give an added dimension of the science behind the symptoms. A simulation was used to integrate teaching of heart attack/failure in the first year of study at Harvard Medical School. History and examination were used to reach differential diagnoses and acute management was practised (Gordon et al., 2006). Ginzburg et al (2017) have carried out a simulation study in the first two years at the Hofstra Northwell School of Medicine, USA. When eight integrated courses taking place during this programme time finished, a simulation exercise was conducted. Two different simulations aimed to give students the experience of assessing and subsequently managing a mannequin patient, with a condition related to the material in the course they had just finished. A basic scientist and a doctor debriefed them afterwards for 40-50 minutes in an integrated, structured and specified manner, in order to bring out links between the basic and clinical sciences. Restricted three-point Likert questionnaires, and ultimately one open question, were given to students to evaluate the experience. The vast majority of respondents thought the debrief helped understand how basic sciences impacted on the clinical world and vice versa.

In summary, simulation that has been integrated in medical education thus includes computer clinical problem solving and practice clinical scenarios, sometimes using a dummy patient. The difficulty of attempting a coherent definition of integration is laid bare in the preceding paragraphs. The term has been applied in simulated experiences, and from one to several subject areas, in each case with no consistency in itself.

1.2.c Multi-disciplinary learning and integration

Multi-disciplinary learning has been noted as relevant to integration. This is because it allows parallel learning of subjects. At Aalborg University Denmark, Vergel et al (2017) carried out pre-clinical curriculum document analysis, observations and interviews to build an understanding and perspective on integration. They aimed to find out what and how students were learning/integrating. The authors described a perception of complexity in integration at all levels of the curriculum with activities/experiences and subjects all integrated. Multidisciplinary discussions helped demonstrate integration of knowledge, however lectures were not viewed as necessary or in line with expectations. The observational part of the study was flawed, as the researcher didn't speak the language that students used in discussions during the learning activities, and had to resort to interviews after the observations in order to understand what the discussions were about. This cast doubt on ability to answer the research questions. With a small sample of stakeholders (only ten participants in the research, staff and students), the authors may not have achieved data saturation and it is difficult to establish whether sufficient depths of data were obtained. In a pilot semi-structured interview and focus group study carried out at the University of California, San Francisco (Jain et al., 2003), staff members were found to perceived course integration in terms of organisational factors such as multi-disciplinary inception, whereas students perceived it more in terms of course content such as patient cases or pathologies. This finding is illuminating as it raises the possibility of different agendas between staff and students. Intuitively one would think that it is not surprising that curriculum planners would consider integration in terms of the global organisation of a course. Equally, one might think that students would consider integration in terms of the content they were experiencing. It is difficult to fully appraise these latter findings, as the conference poster abstract does not allow scope for the methods and results to be fully apparent.

More evidence for integration as multi-disciplinary learning is presented in a semi-structured interview study at the School of Medicine, University of California San Francisco (Muller et al., 2008). Seven faculty and six students were interviewed, as well as a student group of fifteen interviewed together (Muller et al., 2008). The themes identified were as follows (pp. 778-784). "Interdisciplinary teaching" was the main definition of integration by these interviewees. Experience in the clinical environment was thought to help with the scientific learning ("it all

comes together”). The integration of the course was not complete. The didactic element of the course was particularly felt as not integrated. Staff reported that “interdisciplinary faculty collaboration” was a defining part of integration. “Co-ordinated curricular components” were also seen as defining integration although there was evidence of isolation in some areas of teaching by staff who:

“did not know the curriculum beyond their own lectures, did not communicate with one another, made no effort to discover what content had already been covered or what students would be learning in the future and failed to link their subject matter with the rest of the curriculum”. (p. 782).

An issue was seen in the “Sequencing and framing of curricular content” in that advanced levels of knowledge in the curriculum sometimes preceded a grounding in the basics. Limited numbers of study participants may lead to bias in these observations of Muller et al. (2008) in an otherwise useful piece of work. However, the purposive sampling of faculty who were stakeholders in the change process was both a source of bias and a strength, in that faculty likely had a vision and a set of values about integration. They also would have had knowledge and experience of it. Additionally, generalisation to the UK is difficult using data from an American course even in the early years, due to postgraduate versus undergraduate systems of study.

As shown in the above examples, multi-disciplinary learning added complexity to group discussions and was deemed important to the idea of integration in medical education. It should be noted that in different studies, the perception of integration was by staff or students, but not necessarily in step with each other’s opinions.

1.2.d Summary

Historically, subjects in medical education have been taught in isolation. Over time, a more integrated approach has been developed and is in evidence today. There have been a number of different attempts at achieving this; but ultimately integration still remains a buzzword, a non-specific term that is applied in medical education with no consistency, yet with some tangible outcomes and clear benefits for learning. Integration is a key buzzword, given the drive for medical courses to become integrated. Therefore understanding the meaning of the

term is essential in order to progress delivery of 21st century medical teaching and curriculum planning.

1.3 Rationale for the thesis

This section will describe the rationale for this thesis. It will cover the Manchester context, and go on to explain the knowledge gap regarding integration in medical education and the manner in which this gap will be filled by the present thesis. The research questions will be stated and finally the epistemological position taken with regards to analysis of the data will be presented.

1.3.a Rationale and theory

Firstly, the context of the research using the University of Manchester medical school as an index case will be set out. The Manchester medical course itself is an integrated mixed methods course that utilises, as learning modalities, the following components: PBL, lectures, early clinical experience, and microbiology, physiology/pharmacology and anatomy practicals. These are assessed through multiple choice tests and integrated practical assessments. This institution will be used as an exemplar in order to investigate the research questions.

Next the academic justification for the research that forms this thesis will be explained. I have said integration has been described as a buzzword (Brauer and Ferguson, 2015). However it is also a key part of the lexicon of modern medical education in the UK, with the General Medical Council requiring that students have early clinical experience (GMC, 2009, GMC, 2016). This requirement implies integration of ECE with traditional early basic science learning. The situation with regards to integration being an ambiguous term with numerous connotations can either be accepted, as asserted by Hays (2013) and Benor (1982); or, as is the aim of this thesis, we can seek to understand what integrated medical education actually is and

what it looks like on the ground. By investigating what integration is and what it looks like, it can start to gain universally understood meaning and application.

An ethnographic study, supported by semi-structured qualitative interviews, is employed in this thesis. Previous use of this combination of data collection tools in medical education will be described. The direct observational methodology of ethnography is well suited to understanding how something is happening on the proverbial shop floor. Interviews are an ideal partner to the observational work as they allow detailed views of stakeholders to be elucidated in a way that observational work cannot uncover. Understanding integration in the future will be to the benefit of training more capable doctors. Understanding integration is the first step on the road to applying it.

1.3.a.i Ethnography and Semi-Structured Interviews in Medical Education

Ethnography has been used in medical education research generally as an observational methodology that helps understand what is actually happening in a particular environment. Ethnographic methodology has yet to be utilised fully, for understanding the term “integration” in medical education. The main ethnographic studies carried out in the field of medical education date back over several decades. One such study, at Cornell University medical school in the USA, took a mixed method approach (diary, interview, observation) (Fox, 1957). More details of the study design are provided in section 2.1.b. The author noted a lack of certainty experienced by the students in relation to both intra-individual, and profession-wide, knowledge deficit, which came from the absence of didactic teaching and academic grading at the institution. This lack of certainty was also seen when pre-clinical students were exposed to patients and did not possess either the knowledge or clinical skills to make accurate diagnoses. The deficit in knowledge/clinical skills was however countered in terms of assisting them in making diagnoses, with the techniques and knowledge of the era being far short of today. Students gradually became less uncertain and started to see inter-subject relationships and connections, which are outcomes of modern integrated learning. The issues with this work related to the difficulty in telling which data came from what collection tool, and the lack of a detailed description of how the methods were applied.

Becker et al. (1961) carried out a seminal ethnographic study at Kansas University medical school in the USA a few decades ago. The authors undertook total participant observation, supplemented by interviews (see section 2.1.b for more details). In the pre-clinical part of the course, it was reported that students found the amount of information hard to learn and adopted strategies in order to target their learning, making it more manageable. There was evidence of integration even at this time in terms of cadaveric dissection, with body areas being supplemented with didactic teaching, and parallel physiology/biochemistry teaching. The study followed students for the whole course and would have benefitted from more balance between the student and staff perspective. It was more sociological style research as opposed to educationalist and the gap was that the work did not formally include the curriculum. This is a major limitation in terms of comparison with the present study; however observations of the learning process were useful (Becker et al., 1961). An ethnographic study of teaching at the bedside of patients during the clinical course at Edinburgh Medical School was conducted as participant observation with interviews over 2 years, as described in section 2.1.b (Atkinson, 1981). The processes around how the clinical students were taught whilst on their ward placements by physicians and surgeons were described. Pre-clinical knowledge was called upon by teachers, in relation to the clinical setting in which students found themselves. The work had little to say about integration in the early years, as it was focused on clinical education, and given that medical education has changed dramatically in the intervening years.

An ethnography was carried to observe University College London's medical course (Sinclair, 1997). It included the first year of practice, and focussed on the social and academic aspects of the pre-clinical years and two of three clinical years. More details on the design of this study are provided in section 2.1.b. The ethnographer had originally qualified as a doctor. The author used Goffman's (1959) metaphor of the stage to explain the findings. Goffman first identified the concept of front and back stage (Goffman, 1959). Front stage is the formal behaviour of an individual in front of others in a particular setting. Back stage is the behaviour displayed when the same individual is off-display and as such is more relaxed. In Sinclair's (1997) study, the alcohol-driven social behaviour in the context of students starting out on the course, rugby clubs and dramatic society were highlighted. Activities were postulated to have an official and unofficial front stage and back stage. Official front stage activities included lectures, dissection classes and assessments whereas unofficial front stage activities included

rugby, theatrical and rag week student teams. Official back stage activities included library work and students working together to learn, whereas unofficial back stage activities included drinking in the student pub. There was also the world of the general public off the medical school stage. The pre-clinical course was lecture-based and the author described the students learning the individual basic sciences. Different disciplines delivered curriculum content in isolation from each other. An attempt had been made to integrate the teaching of embryology and anatomy by starting an association between them in the form of a joint course in human development and structure. There remained boundaries between the two subjects and the student body were able to see this clearly. Any integration between subjects learnt in the pre-clinical years was mainly done by the students. Their physical bodies would sometimes be used to help them make interconnections between subject matter they were taught. The pre-clinical course, however, was planned to change to an integrated systems-based curriculum. Sinclair, having been through his own medical school experience, leaves his observations open to a pre-formed opinion/agenda in terms of the subject matter of the observations, and he declares this.

A piece of ethnographic research in conjunction with semi-structured interviews (section 2.1.b), was carried out at the Children's Hospital of Philadelphia in the USA, focusing on teaching during paediatric ward rounds (Balmer et al., 2010). This study showed that time was a limiting factor for the amount of teaching that can take place, with doctors needing to get on with their day's work. It was observed to be difficult teaching in front of family members. The situations arising as teaching opportunities were not definable and included observation of senior doctors' soft skills. The study observation was carried out between 3 to 10 days a month, over an 8-month period. It may have been better to observe more often over a shorter time frame. The study had no relation to early years medical education, unlike the present thesis. In order to study how fourth year UK medical students learn consultation skills whilst on ward rounds, an ethnographic study was carried out by Quilligan (2015) at a pseudonymous hospital. Quilligan used a combination of observation and audio-recordings of consultations, with interviews (section 2.1.b). The students had little opportunity to participate in ward round consultations, and any learning was garnered by observation of, for example, breaking bad news following a prior discussion with the clinician, or a negotiation with a patient regarding treatment. Going on ward rounds was not always regarded by the students as a valuable activity (Quilligan, 2015).

In a similar manner to ward round observation, ethnographic research with informal interviews was carried out on an acute medical ward at Danderyd Hospital, Karolinska Institutet in Sweden and published in 2016 (section 2.1.b). The purpose of the study was to observe the ward community and how medical and nursing students engaged with it. The limitation was that the numbers of nursing students was too low to be secure in the findings. Observations included keeping calm in situations that were stressful and complicated, and high staff turnover giving issues in differential makeup of work communities. Also, differences were observed between staff being stationed on the ward and those who had other work locations, giving rise to borders between work communities. Having to participate in previously unknown activities led to a requirement for students to interact in an adaptive manner within a work community (Hagg-Martinell et al., 2016). These authors related their findings to a community of practice as per the learning theory of Lave and Wenger (Lave and Wenger, 1991). The social learning practice of copying more experienced professionals was a consistent finding amongst the studies described above and this was combined with knowledge delivery. During sessions on morbidity and mortality in the Toronto Sunnybrook Health Sciences Centre, Kuper et al (2010) studied teaching and learning by ethnography and semi-structured interviews (section 2.1.b). The social type of learning that senior doctors thought was important over and above knowledge delivery, though valued by juniors, was not their own expectation of these sessions. This was because the juniors were more interested in content knowledge acquisition (Kuper et al., 2010).

Audio-visual and social media technologies have been used for ethnography in some medical education studies. Video ethnography has been used in the UK at Ninewells Hospital, Dundee by Urquhart et al. (2018), in a study of feedback for medical students. The researcher was present in the environment but did not participate other than to video the students whenever feedback occurred. The participants weren't told that feedback was the focus of the research. This feedback was mostly from tutors but also from fellow students and patients. All years of the programme were included. Verbal feedback formed the majority, with a number of different foci for feedback, prioritising knowledge and also including clinical examination and consultation skills. The videoing allowed non-verbal feedback to be observed in a way that audiotaping wouldn't have (Urquhart et al., 2018). The gap in the study was not to use interviews to follow up observations. An American digital ethnographic study supplemented

by semi-structured interviews was carried out at the George Washington University medical school by Chretien et al. (2015). The study explored medical student use of Twitter. The authors spent 8 months observing tweets of 293 students and made field notes from these observations. 10 interviews were carried out. The study found that Twitter was used as an information source facilitating collaboration between peers and senior professionals. It also allowed students to gain a perspective on the patient's point of view. Medical students on Twitter had a community that gave support and help to each other including sharing information, helping with assessment studying, and giving felicitations on progress (Chretien et al., 2015). Such technological approaches therefore demonstrate the importance of feedback and peer-assisted learning on clinical learning.

These ethnographic/interview studies in medical education to some extent give insight into the difficulty with managing the volume of learning but also into nascent attempts at integration such as interconnection between anatomy and other subjects. They also gave insight into how students learn medicine in the clinical environment.

1.3.a.ii Theories underpinning the thesis

In this thesis, an epistemological position is taken in order to provide a theoretical base for analysing the research data. This is in addition to considering the relationship of the data with the current state of knowledge regarding integration in medical education. There are two models that relate to integration in medical education. The first is the integration ladder (Harden, 2000), relevant to the current thesis. The second is the spiral curriculum (Harden, 1999), providing some context for the present study. The theoretical context will now be discussed.

A number of educational theories speak to integrated medical education, and two in particular are useful/relevant for the purposes of this thesis. The first of these is the Lave and Wenger theory of Legitimate Peripheral Participation (Lave and Wenger, 1991). The second is the Transformative Learning theory (Mezirow, (1991). These will both be considered in relation to medical education. The goal of medical education is to produce consciously competent doctors who are able to understand and apply their clinical knowledge backed up by the basic

sciences. This requires that subject matter be learned together in as fully integrated a manner as is feasible. The research presented herein is particularly concerned with the UK medical education system. A significant proportion of the literature on integration is from work done in American Universities. It should be borne in mind that their medical courses differ from UK equivalents in that an undergraduate degree must be conferred before entry to medical school. There is also literature on integration from UK medical courses. Integration from the UK point of view is therefore implicitly different, given that there is no requirement for prior undergraduate study and therefore no undergraduate level education in the basic sciences.

1.3.a.ii.1 Integration ladder

The first theoretical position is a model that considers levels of integration hierarchically, called 'the integration ladder'. This model, proposed by Harden (2000), is a key theoretical framework when considering the findings to be presented in this thesis. The model comprises 11 elements, each moving closer to the ideal of a fully integrated course (the 11th element). The initial four rungs are subject-driven learning, the next six are gradually increasing subject integration, and the ultimate rung on the ladder empowers the student with responsibility to integrate. The 11 elements of the Harden (2000, pp. 551-556) integration ladder are as follows:

1. "Isolation" of each component subject from the others in terms of content, timetabling and assessment. Any overlap is merely accidental.
2. "Awareness" of other subject content preventing overlap but otherwise still isolated.
3. "Harmonisation", whereby there is either formal or informal open communication between subjects, and an overall lead of this communication process is in place. Staff members may make reference to other subject areas. Subject teaching is still in "isolation" but there is a greater chance of attaining the overall goal of the course.
4. "Nesting" attains the overall goal of the course by acknowledging/including other content in the teaching of a subject. However, the subjects themselves are still isolated.
5. "Temporal co-ordination", though overall still isolated in terms of subject autonomy, involves contemporaneous timetabling of subject teaching when there is related content.
6. "Sharing" involves collaboration between subjects that have related content, in the delivery of their teaching. Generally however, this part of the course is the exception rather than the rule.

7. “Correlation”, though still subject orientated, is aligned with an integrated component that acts as a point of consensus, joining together the subjects.
8. “Complementary programs” are the opposite of “correlation”, in that the integrated components dominate over the subject teaching. This element also requires more integrated assessment procedures.
9. “Multi-disciplinary”, for example themed by problems or clinical skills. The subjects retain some measure of individuality within this framework.
10. “Inter-disciplinary”, i.e. a “multi-disciplinary” course in which the subjects have lost any measure of their individuality.
11. “Trans-disciplinary” involves integration of subject content (which has lost its individuality) with experiential learning. The faculty defines the parameters in which learning will take place and the integration itself becomes internal to the learner.

The integration ladder as a model is theoretical rather than informed by primary research (Harden, 2000). Based on the author’s experience, this model is drawn together from no more than a handful of institutions. The distinctions between the rather complex rungs of the ladder are difficult to elucidate. When thinking about how to apply the model, it is possible to be entirely convinced that a particular course measures up to a particular rung of the integration ladder, only to then re-read another rung’s criteria and change one’s mind. Harden intended the ladder as a curriculum planning and evaluation tool, and it could be suggested that clearer distinctions between the rungs of the ladder would be more helpful in this respect. This clarity would likely come from a hypothesis formed from primary research. Nonetheless, Harden’s theory can be useful as a lens through which to view integration.

1.3.a.ii.2 Spiral curriculum

Spiral curriculum is another theory to consider when seeking to understand and describe integrated medical education. Harden & Stamper (1999) defined a spiral curriculum as:

“one in which there is an iterative revisiting of topics, subjects or themes throughout the course. A spiral curriculum is not simply the repetition of a topic taught. It requires also the deepening of it, with each successive encounter building on the previous one” (p. 141).

Harden and Stamper related this concept to studying/learning medicine. As courses of study progress, with material becoming more complex, a particular system or skill can be revisited. De novo knowledge in these areas can be used to transform previous knowledge, thus allowing students to progress towards the standard required at graduation, as measured by exams. Knowledge is therefore built on and recapped, giving a sense of order without overloading students and allowing utilisation of, e.g., basic science knowledge in clinical contexts. Whilst the spiral curriculum is a valid theoretical concept in curriculum integration, it is more applicable to research on integration between progressive stages of a course. The progressive aspect of learning is outside of the scope of this thesis as the focus is on the first stage only.

In conclusion then, there are two theoretical frameworks that speak to integrated medical education: the integration ladder and the spiral curriculum. The former is a highly relevant analytical tool (notwithstanding its limitations and flaws) in the context of this thesis. The latter is outside the scope for this thesis, but provides some context in terms of the different ways that undergraduate medical curricula are conceptualised and designed.

1.3.a.ii.3 Legitimate peripheral participation

Social learning theories conceptualise the learning process as one of imitation of others via social interaction and driven by personal requirements. Such theories therefore implicitly involve human interaction and the view that learning in such circumstances cannot take place in isolation (Jarvis, 2010, Bandura, 1963, Maslow, 1987). As such, social learning theories have resonance with group-based learning. The zone of proximal development is one such theory. This has been proposed to explain how children can educationally act up to the level of an older age group under guidance (Vygotsky, 1978). In doing so Vygotsky (1978, p. 86) defined the zone of proximal development as:

“The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers”.

Clearly medical students aren't children, but nonetheless Vygotsky's theory can be extended to these young adults.

Legitimate peripheral participation was proposed by Lave and Wenger (Lave and Wenger, 1991, Wenger, 1998). It is a key social theory of adult learning in any activity situated in a curriculum. The basis of this is that during a programme of learning, many situations will arise where knowledge and skills can be acquired by participating within a group. The authors describe participation in terms of communities of practice. These communities are groups that include learners and people with experience in the activity at hand: for example, a hospital ward medical team. In this theory, neophytes (people newly experiencing something) in a given socio-cultural situation (any group activity) will gradually participate more as they learn within this situation. Learning results from the activities taking place within the given situation. This includes understanding subject matter and performing tasks as a whole body of work rather than isolated components. Ultimately the learner graduates to become/form a community of practice. There is not a master/pupil relationship at the heart of this learning process, rather a number of stakeholders who are involved. In the learning process, experience and understanding of the learners' world are considered to interact. To show how people were both working in a job and learning as they went about their daily work, Lave and Wenger (Lave and Wenger, 1991) used examples of apprenticeships such as quartermasters in the Navy, or tailors. These workers would move in a transformative fashion from neophyte to fully participating in the respective community of practice.

Communities of practice has been proposed as a relevant learning theory in medical education (Crues et al., 2018). Looking generally at medical education, it can be seen that there are several different situations in which learning can take place in line with this theory. In the early years of a PBL curriculum in a medical school, group work can involve students who all have unique skills and can share these among each other in their group. In the clinical learning environment, the students are initially neophytes who integrate into the clinical team and progress with experience to the point where they can function as a doctor. Legitimate peripheral participation can therefore be seen in action, with students learning as a part of the social situation of the medical course they are participating in, and progressing towards becoming a certain type of person, i.e. a doctor. The ultimate community of practice is the

medical profession as a whole, within which the student experience is situated. This has been theorised as something that should be given due consideration in curriculum design (Gonzalo et al., 2017, Egan and Jaye, 2009). Today, online learning can create opportunities to develop communities of practice virtually, such as one developed in using simulation as an educational tool (Thoma et al., 2018).

The Lave and Wenger theory (Lave and Wenger, 1991) has been applied in some studies in medical education. Learning in a community of practice was shown to help medical students feel they are part of the medical profession, as opposed to an outsider only interested in being taught (Bartlett et al., 2018). Additionally, when they are doing something of use to a clinical team, students feel part of it (Jaye et al., 2010). Via questionnaires, aims to build medical student involvement in research team communities of practice were proposed. These would add value to their education (MacDougall and Riley, 2010). Faculty members were shown to exist in a community of practice when they went through a teaching qualification together, improving liaison over teaching and tending to help out other staff (Schreurs et al., 2016).

In summary then, a community of practice is a useful analytical lens through which to view integrated medical education. It is useful to bear in mind when designing medical curricula as the students are working towards joining the medical community of practice. It has been shown to help students in the learning process, and it has benefits to staff delivering teaching as students feel part of the medical profession. These communities can give opportunity to integrate clinical and basic science learning.

1.3.a.ii.4 Transformative learning

Experiential learning occurs when a student gains knowledge or skills, using, applying, talking about this, and sharing with others (Knowles, 1980, Kolb, 1984, Jarvis, 2010). Mezirow (1991) described a key experiential learning theory. He held that children learn in a formative manner, in that knowledge is tested and confirmed or modified by feedback from a teacher. A transition takes place to learning in a transformative way as adults. To understand something requires a change in the adult's way of looking at it. Transformative learning then, is a process

whereby either previous knowledge is modified, or new knowledge arises from the learning. Meaning schemes and meaning perspectives are key to Mezirow's transformation learning theory. Mezirow (1991, p. 42) defined meaning perspectives as "the structure of assumptions within which one's past experience assimilates and transforms new experience". These can be epistemic, socio-linguistic or psychological. Meaning schemes were defined by Mezirow (1991, pp. 5-6) as the "specific knowledge, beliefs, value judgements, and feelings that constitute interpretations of experience". Reflecting is part of transformative learning, in that it is the tool that transforms meaning schemes and meaning perspectives. Sometimes however, correct existing knowledge is merely confirmed through reflection; indeed transformative learning can occur without reflection, via a simple correction of an existing construct. In addition, not all knowledge acquisition requires the transformative process, as certain forms of knowledge can be added on to that which already exists (Mezirow, 1991). When reflecting on an experience, if previous knowledge was defective, it is transformed to become new knowledge in the form of a meaning scheme or meaning perspective. This process allows humans to recall when confronted with something that was transformed in the past. The process of efficient recall requires an intimate relationship generated between the recalled information and prior learning. When adult education is facilitated, it is appropriate that a construct developed via transformative learning be used to solve a problem (using reflection as appropriate), and thus to complete/conclude the learning process (Mezirow, 1991).

Transformative learning is a useful analytical lens through which to view medical education in the context of the present thesis. The theory is intuitively useful via the emphasis of reflective learning in continuing professional development for doctors in the UK. The importance of this transformative learning theory then lies in putting down the roots of continuing professional development as part of an integrated learning course. In the early years of medical school many constructs will be developed from multiple integrated experiences, and these experiences will be reflected on either sub-consciously or more formally in a portfolio. Many of these constructs will need development and will be transformed in light of on-going integrated experiences both during the remainder of the course of study and the ensuing clinical career.

Transformative learning has been utilised as an analytical lens in medical education research. An example was analysing trainee doctor reflections following elective study abroad and finding evidence of this style of learning taking place (Sawatsky et al., 2018). Similarly it was seen when mixed discipline students' reflective diaries, related to taking a course on death and dying, were studied (Cohen et al., 2015). Medical students, over the course of four years of study, were shown undertaking transformative learning via semi-structured interviews (Greenhill et al., 2018). Transformative learning has also been demonstrated by some medical professionals attending an evidence based medicine course (Sokol and Shaughnessy, 2018). Finally, an experiential diary study showed that some of the medical students who had been sent on a sailing trip with disabled people had demonstrated transformative learning (Thompson et al., 2016). Transformative learning then, in summary, whilst being under-used in medical education research, can speak to the current paradigm of reflective learning in continuing medical professional development, and has been shown to take place to some extent within medical education.

The contribution of the various theories to understanding integration will now be drawn together. Communities of practice have the potential to inform integration, as at the index case medical school, where a good proportion of integrated learning takes place in the group environment. A theory that can help to understand learning by social interaction can therefore help to understand this aspect of integration. From a different angle, the experiential style of transformative learning can add to the understanding of integration via group work but also has the potential to inform the meaning of integration via early clinical experience. Finally, the integration ladder model, despite its flaws, can be used as a tool against which to measure what degree of integration is seen in these various learning environments.

1.3.b Research questions

The research questions to be answered in this thesis are as follows:

- How is integration experienced on the ground? (Chapter 4)
- What facilitates integration occurring? (Chapter 5)
- What barriers are in place that prevent integration from occurring? (Chapter 6)

The way in which students experience integration on the ground is their point-of-view regarding the teaching delivered to them and their learning via facilitation. Facilitators help the integrated experience by setting conditions that allow it to happen. Barriers are features of curriculum design, delivery and uptake that get in the way of integrated learning. The remit of this research covers the first two years of the course and the various learning modalities contained within these years. Ethnography and semi-structured interviews are the methods of choice for the research. The ethnography component focuses on how integration is experienced on the ground, with some input from the qualitative interviews. The ethnography and interviews are employed equally, alongside one another, to identify, determine and investigate the facilitators and the barriers of integration. The ethnographic study sample consists of two different student groups (twelve in each), one drawn from the first year, and one from the second year, at Manchester medical school. The semi-structured interview study sample consists of twelve of the twenty-four students along with sixteen staff involved with teaching them. More details will follow in Methods (Chapter 2).

1.3.c Summary

The rationale for this thesis was presented in this section, including the epistemological position taken in writing this thesis, drawing on key theories of integration and adult education. Manchester Medical School, which presents itself as an integrated mixed methods course, is the index case for the research presented herein.

Integration has been described as a buzzword, and is a term employed, or a practice applied variously, but nonetheless has become part of the lexicon of UK medical education. By seeking to understand the current situation regarding integration, through detailed research situated in the first two years of the MBChB at Manchester, this thesis aims to provide insights into what integration means and how it is experienced: insights that will inform and enrich medical education practice. Ethnographic fieldwork and semi-structured interviews were selected as the methods to achieve this. The research questions for the thesis are, as stated earlier: How is integration experienced on the ground? What facilitates integration occurring? What barriers are in place that prevent integration from occurring?

Chapter 2: Methods of analysis

This chapter will explain the research methods employed in this body of work, how participants were recruited, and the analytic approaches. It will also explore the methodological choices that were made, with justifications.

2.1 Overview and explanation of the methodology

This section will give an overview of the types of methods typically used in medical education and then review the literature on ethnography and semi-structured qualitative interview research. Finally, the rationale for these latter two methods used in this thesis will be presented.

2.1.a Types of qualitative research used previously in medical education

A variety of research has been used in medical education. Quantitative methods aim to measure a point of interest. Quantitative approaches in medical education have included: quasi-experimental controlled research (Adibi et al., 2007); systematic review or meta-analysis (Tai et al., 2016, Jia et al., 2018). Qualitative methods aim to understand meaning and describe processes. Qualitative approaches have included: pre-clinical curriculum document analysis (Vergel et al., 2017); observational work (Fox, 1957, Becker et al., 1961, Sinclair, 1997, Balmer et al., 2010, Quilligan, 2015, Atkinson, 1981).

Data collection tools used in medical education research have included: Closed/Likert/pick-list/free response/coded questionnaire type studies (Helmich et al., 2011, Lassen et al., 1989, Schapiro et al., 2011, Macaulay and Nagley, 2008, Latif et al., 2018, Menezes et al., 2016, Chen et al., 2007, Furmedge et al., 2016, von Below et al., 2008, Are et al., 2009, Ginzburg et al., 2018); interview or focus group studies (Hampshire, 1998, Yardley et al., 2013b, Tresolini and

Shugars, 1994, Jain et al., 2003, Muller et al., 2008); research that codes and categorises student reflective writing or reviews student evaluations (Dyrbye et al., 2007, McLean, 2004, Carreras, 1990, Elford et al., 1985, van Weel-Baumgarten et al., 2013). Finally, Delphi studies are a means of providing a consensus view on a topic. Initial views are collated and subsequently ranked by participants. Several iterations of this ranking process take place. The end of the Delphi process reaches a consensus regarding the relative merits of the views presented (Iqbal and Pison-Young, 2009, Murry and Hammons, 1995). Some studies have combined methods and this enriches the data collected.

In the process of designing the present study, certain data collection tools were considered and then discarded. A Delphi study was one such tool. It was decided that the objective of ranking the importance of various elements of integration would not contribute to understanding the nature of integration in the early years at MMS. Additionally, whilst ranking statements about integration may gain insight in the hierarchy of importance that course facets held to the participants, this was not likely to contribute to understanding the meaning of integration. Focus groups could also have been used. However, the concern would be that participants might not express views they deemed as controversial in front of others, therefore missing the full depth of opinion and potentially compromising the results. While a focus group can provide a lot of wide-ranging data quickly, and has the ability to inform interviews or even produce a hypothesis (Cohen et al., 2011), it may not produce as much data as if the participants were interviewed individually. The size and composition of the group can be difficult to get right, and can be compromised by non-attenders.

Observational research via ethnography can be covert or overt, and participatory or non-participatory. When ethnography is non-participatory and overt it is necessary to be present in the same environment as the participants, therefore experiencing their point of view. This can facilitate gaining a ground level perspective. The alternative ethnographic approaches of overt/covert participation could interfere with the function and activities of participants in the environment under study. That said, even when ethnography is strictly overt non-participation, the mere fact of being present in an environment, however passively, will have an influence on the movements, behaviours and interactions of the people within it (Parsons, 1974, Holden, 2001, Cohen et al., 2011). Covert non-participation would potentially entail

video ethnography which involves videoing participants in a given environment and using the footage to code in order to produce themes (Urquhart et al., 2018). Whilst this may be a useful approach, as it would mean that all participant interaction is captured, the logistics can present problems in certain learning environments, particularly where filming is not allowed in an environment (Cohen et al., 2011, Hammersley and Atkinson, 2007). Specific logistical issues at MMS would be the dissection room, which would not allow filming due to legal regulations. Additionally, videoing in some learning environments at MMS, such as in the CSLC and laboratory classes, would inevitably capture non-consented students.

Interviews range along a spectrum, from structured to semi-structured, and can have topic guides that are more specific or more free-flow. They can be more quantitative with closed questions, or more open, using prompts to encourage the participant to speak at length (Cohen et al., 2011). Semi-structured interviews hold advantages over a more structured interview format. They allow space for participants to articulate views, which can then be explored in depth through follow-up questions and prompts. A very open-ended interview format at the other end of the spectrum, with very free-flow, could also allow for such an exploration. However this very free-flow format could potentially mean that an opportunity is missed to explore specific areas of interest raised in the ethnography. Therefore, the semi-structured format gives a good balance. I intended the ethnography to be as open as possible: that is, I sought to play the part of a neutral observer, taking a note of everything I witnessed, without having a predefined agenda. The interviews were more focused, and followed from the ethnographic observation, taking some of their questions and themes from the initial ethnographic observations.

2.1.b Ethnography and semi-structured qualitative interviews in medical education research

Ethnographic research takes the form of observation, carried out on a participatory or non-participatory basis, of one or more people. Ethnographic studies in general tend to be directed towards where important observations can be made. Detailed notes are recorded, and quotes transcribed. These data are combined with pertinent documents and records of non-verbal elements, such as how subjects are arranged in various situations and indeed the physical

structure and organisation of these environments. One early ethnography was Street Corner Society, a study of street gangs in Boston, USA by Whyte (1993). This piece of research took the form of direct observation of gang members in a particular neighbourhood, and showed how an understanding of a culture's organisation, its social structures and activities, can be constructed through participant observation. By developing relationships with the gang members, hanging around with them, following their movements and social interactions and transactions, Whyte was able to talk to them, enriching the observational data. The insights gleaned from this ethnography were that gangs arose amongst young boys with some changes resulting from schoolboy associations. The relationships persisted into early adulthood, even beyond in some cases. The gang members spent more time on street corners than at home. This was the case even for those that were married. The social activities of the gangs were a regimented routine and the gang leader gave cohesion to the group, each member of which had their place within the gang (Whyte, 1993). Whyte's study shows the value of ethnography in qualitative research, as the understanding of the social structures in gangs was made possible by the close and detailed observations he made. This would not have been achievable to the same extent using a non-observational design.

Semi-structured qualitative interviews employ a flexible framework of questions, which target areas of interest to the research question under study. Semi-structured interviews are effective tools to gather a lot of information in an efficient manner. They can be used to explore ideas by seeking out more details and examples and explanations, which can confirm, or alternatively modify, the original ideas. This exploration of ideas can be particularly useful as an adjunct to another research tool. The semi-structured interview at the most basic level generates answers to questions in the same way a questionnaire does, but unlike questionnaires, the semi-structured interview allows narratives and follow up questions, to further add to understanding (Cohen et al., 2011).

Study designs using qualitative methodology can be made more powerful by combining two or more data collection tools. Semi-structured interviews can be used in conjunction with ethnography to augment understanding of the observations and supplement the ethnographic data, and vice versa. The data obtained during interview is not necessarily easily accessed by observations, as some circumstances may be difficult to understand without the insights,

perspectives and narratives of the participants. The success or otherwise of using interviews in this way depends to some extent on the choice of participants for interview, though this is not always controllable. An issue with interviews in combination with ethnography lies in the risk of the researcher becoming a participant. Interviewing after leaving the field can mitigate such a risk (Atkinson and Pugsley, 2005, Hammersley and Atkinson, 2007).

I will now consider the design of medical education studies that have used ethnography in conjunction with interviews. At Cornell University medical school in the USA, Fox (1957) took a mixed method approach using diary entries, interviews and observations. The diaries were sourced from 11 students over 3 years of the medical course. The students were from different years of study. Interviews were held with these students and others. Observations were made each day on the course with students and their interactions were noted down and transcribed. This design allowed the author to understand how students learn to cope with how uncertain clinical practice can be. The types of uncertainty included: lack of knowledge in certain areas of medicine, student experiences of uncertainty, and poor attainment of medical knowledge. There are some deficiencies in the design of this work. It is difficult to tell the source from which data were derived. The data collection tools themselves are not made clear. The year of study of the participants keeping diaries is not obvious, other than being from a variety of year groups. The type of interview used is not recorded, and neither are the questions asked. Details of the number of times students were observed, and the situations they were observed in, are missing.

Becker et al. (1961) carried out a seminal ethnographic study at Kansas University medical school in the USA. Their objective was to understand what happened to medical students at university, above and beyond learning medicine, in respect of influencing future careers. The authors deliberately made no assumptions regarding this; a naïve stance that I thought was important for my study as it helped ensure the data spoke for itself. The authors undertook total participant observation overtly. The objective was to observe, listen to, and question students on a daily basis. The use of overt observation was felt to best achieve an understanding of what mattered to students. Using these methods, the authors achieved a model of the research environment that they could adapt with new observations, sometimes seeking more evidence to further explain what they had discovered. Like my study the authors

observed more than one group. However they observed several groups one after the other within a semester, rather than sticking to one group per semester as I did. Observation groups were changed sometime weekly, sometimes bi-monthly and anything in-between. It wasn't clear what criteria there were for switching groups. Students from all 4 years of the course were included and daily observations made of all learning environments and in the fraternity houses over 2 years. The authors followed the students and not the faculty, something I also did. Junior doctors were observed as part of the student observations and as a bespoke 3-month block; however the authors admitted this was not ideal to understand their perspective. Detailed field notes were kept as close to the observations as possible. As in this thesis, these authors focused on points of interest that had arisen as the study progressed. They also made sure to record as much as possible in order not to be judgemental about what was relevant before the fact. Data was analysed as the work progressed, though details on how this was done are scant. Interviews were both informal conversations and formal, audio-recorded and transcribed interviews in a semi-structured format, with specific questions asked and space for students to speak more freely. These aimed to gain a more detailed understanding of observations, a point I learned from. As in the present thesis, they included interviews with members of faculty, to garner their views of the course.

Another ethnographic study covered the duration of University College London's medical course (Sinclair, 1997). It included the pre-clinical, 1st/3rd clinical years, and the first year of practice. By conducting the data collection over a full year, the observations encompassed a range of insights/experiences/aspects of student engagement with their learning. Sinclair chose not to audio-record, feeling that this would both be obstructive, and generate too much data to analyse in the time available. He found no problem in writing field notes whilst with the students, when they were writing in classes. On wards, recording field notes was done after a session of observing. The methods chapter is not clear on the use of interviews, however the findings include comments made by students to Sinclair so it seems informal questionings were used at least.

A handful of ethnographic studies have explored the process of clinical learning on hospital ward rounds. At the Children's Hospital of Philadelphia in the USA, Balmer et al. (2010) spent 8 months observing trainee and senior doctors on 2-hour morning ward rounds. The

observation was done overtly but in a non-participatory format. 47 days of ward round observation were carried out on between 3 and 10 days per month. 47 hours of observations were made during afternoons when doctors were working and also during evenings and weekends. Observations were recorded via written notes immediately following the event. Semi-structured interviews with 14 senior and 25 trainee doctors were carried out, recorded and transcribed. The objectives of the interviews were to understand what teaching/learning were occurring and relevant facilitators and barriers. Doctors were prompted to encourage talk regarding ward rounds if they didn't do so naturally. Answers to questions were probed further to garner more detail. For the sake of consistency, one researcher carried out all the observations and interviews, and to ensure accuracy and consistency in the findings, three of the authors collaborated in data analysis using descriptive coding. The authors decided on the time for fieldwork based on a desire to reduce any impact of the observer on the participants. The combination of data collection tools helped the authors triangulate data in order to produce themes that gave a good impression of the ward rounds (Balmer et al., 2010). This study was very similar in design to that in the present thesis, providing a model for me to follow.

In a similar manner to ward round observation, another ethnographic research study (Hagg-Martinell et al., 2016) was carried out on an acute medical ward at Danderyd Hospital, Karolinska Institutet in Sweden. Informal interviews were used in conjunction with the ethnography. Observations were carried out for 100 hours over 27 occasions over a period of 1.5 years, and supplemented by 15 informal interviews in order to better understand the observations. The use of interviews in this case was informal, with written notes used to document the participants' views, rather than audio-recording. The study design allowed observation of the ward community and the engagement of 21 medical and 3 nursing students with this community (Hagg-Martinell et al., 2016). The limitation in this study was not to use more formal recorded interviews. However the use of field notes for the ethnography rather than audio recording was in step with my study design. In Edinburgh University in the UK, an overt participant observation ethnography with follow up interviews of students in the first clinical year was carried out (Atkinson, 1981). This study aimed to observe interactions between medical students and doctors/patients. Whilst some occasions arose where the researcher was mistaken for a student, these were few and far between. The observations were made in the morning and written up in the afternoon. In the same way as my data collection,

Atkinson found it unobtrusive to be sitting making notes in class. Observations were highly generalised at first but as the work progressed, they concentrated on evolving points of interest. The research took place over two years. Daily observations were made, and familiarity with the setting resulted in a change to the research environment to a different medical/surgical unit every 3-4 weeks. There were scant details regarding the interviews. The university academic year provided the time limits of the time in the field in the way my study was designed. Atkinson noted he was not an experienced ethnographer with training in observation, at the start of his research.

Quilligan (2015) also carried out a ward-based observational study with 9 volunteer fourth year medical students at a pseudonymous UK hospital. The focus was on students who were learning clinical communication in ward and outpatient settings. Clinicians and patients were consented as appropriate. The students were observed over a 3 and a 5-week period for a total of 84 hours. Field notes and audio-recordings were employed to record observations and all the participants were interviewed, as were 4 of their teachers, using a semi-structured format in order to further explore the observations. The data consisted of field notes and interviews/audio-recording transcriptions, and all data were coded to generate themes that fitted clinical communication scenarios e.g. breaking bad news. In this way the author was able to understand both students' communication practice and their thoughts regarding it (Quilligan, 2015). In another study at the Toronto Sunnybrook Health Sciences Centre, Kuper et al (2010) carried out a weekly observation of during sessions on morbidity and mortality over 4 months, with 2 observers in combination with audiotaping and follow-up semi-structured interviews. One of the observers concentrated on what was happening in the room beyond the talk captured by audiotaping. I similarly thought it was important to capture both aspects in observations. As a single observer I had to consider both the talk and the ancillary activity in the room without the luxury of a second observer. Whilst I decided against audio recording due to the obtrusiveness and risk of recording non-consented students, the combination of ethnography and interview was related to my study design. Unlike Quilligan I didn't restrict myself to a particular type of observation in order that I could gain as good an overall impression as possible. The research undertaken by me as described in this thesis was conceived as observation over the course of a whole semester, for 50% of each week. All such research is selective in terms of when observations happen. This is due to time/funding constraints, specific questions e.g. for a student year, challenges that pertain to a particular

learning activity or context, to the philosophical or aspirational motives behind the research, or the researcher's experience and stance. The part time nature of my work meant that there was a risk of leaving to chance what was observed. However, observing across the whole semester rather than picking the occasional block of days or weeks decreased the risk.

In conclusion, ethnography is a powerful tool for understanding various facets of medical education and has uncovered nascent attempts at integration. Ethnography can show a wider variety of facets involved in medical education and therefore is a broad-based methodology that gives the best opportunity to understand the full picture of integration. As illustrated in the studies cited above, semi-structured interviews are a useful adjunct to ethnography and can be compared with a more prescriptive format with a list of questions requiring closed or short responses. The more closed questions that are asked, the more limited the scope of responses may be. Therefore the data generated would not be as rich. Semi-structured interviews can help understand observations made in the field and generate new data that may otherwise be unobtainable (Cohen et al., 2011, Corbin and Strauss, 2008).

2.1.c Choice of methods

This body of work was carried out using ethnography and semi-structured interviews. Ultimately, ethnography was used as a research method due to its utility in seeing, first-hand, how students experience the Manchester medical course and also, being able to observe how integration unfolds and takes shape in real time. It was decided that to fully understand how integration works, observation gave the best opportunity. The observation was overt and non-participatory, such that I was present in the environment and visible to the participant students but not actually participating in the students' activities. This was decided as an optimal balance that would give the best chance of understanding integration without influencing it. Semi-structured interviews were used due to their ability to explore participant's views and gain a more detailed perspective on observations from the ethnography. The use of semi-structured interviews allows the opportunity to explore views in a more targeted fashion. Having a degree of focus and structure to the interviews was considered to be important in the present thesis, especially as targeted questions allowed the most efficient use of the time

dedicated to the research by busy students and lecturers. These methodologies as used in the present thesis will be discussed further in section 2.4 of this chapter.

Qualitative methods were therefore deemed to be the most appropriate way to define and understand the nature of integration using Manchester Medical School (MMS) as an index case. The advantage of qualitative over quantitative techniques is the power to view by observation and interrogate how the students experienced integration. Observational methods allow a researcher to directly view the integrated learning process as it unfolds in real time. This observation can therefore give the researcher a direct impression of how integration is actually being experienced on the ground. The association of semi-structured interviews with the observational methodology adds further power as this allows direct questioning and clarification of the views the participants held regarding various tenets of the integrated learning process.

I chose ethnography, as my objective was to understand the experience of integrated learning. I decided that an observational methodology gave me the best chance of achieving this objective. There are several advantages of ethnography as a methodology. Being observational work, typically with small group sizes, ethnography can lead to deep levels of understanding of learning processes. It can be used to understand how students are working in a natural learning environment as opposed to an artificial one. It therefore allows data collection via observation of what is going forward. In turn this data collection is not highly structured which allows for flexibility. This flexibility can generate rich data without the limitation of a schedule (Hammersley and Atkinson, 2007).

I sit in the field of medical ethnography and my models/inspirations come from this field of study. *Boys in White*, a medical education ethnography, did not have a hypothesis or pre-determined data-gathering design or plan of analysis (Becker et al., 1961). This study simply aimed to establish what happened to medical students during their studies and the content/process of learning. The research question developed during the research and data analysis. Observations aimed to identify commonality between the majority of students. Like Sinclair (1997) I was a qualified doctor and familiar with the medical vernacular. The lack of

design by Becker et al. (1961) therefore really chimed with me, as I was aware from the start of the risk of bias that must be ever present due to my prior involvement with studying and teaching on the course. Not having pre-determined ideas helped to mitigate this risk, as did looking for commonality of experience.

I was inspired to undertake observation in the style of the medical education ethnographic methods used by Becker et al. (1961), Atkinson (1981), Sinclair (1997) and Hagg-Martinell et al. (2016). These studies involved observation whilst attending all the activities the students undertook over the period of fieldwork. Another ethnography did the same with doctors on teaching ward rounds (Balmer et al., 2010). My approach to recording field notes chimed with Atkinson (1981) and Hagg-Martinell et al. (2016). These authors wrote down notes in the field and transcribed them later to become a coherent set of field notes. Recording absolutely everything using field notes was accepted to be impossible by both Atkinson (1981) and Becker et al. (1961). However in the ethnography of Becker et al. (1961) activities were described in detail and interesting talk was transcribed. As fieldwork progressed, efforts were made to capture information that fitted/contradicted developing themes (Becker et al., 1961, Atkinson, 1981). Like these authors, I accepted that recording everything was impossible and endeavoured to record as much as I could of the process of learning activities. I transcribed what seemed at the time to be interesting episodes of talk. I also took inspiration from these authors' efforts to elucidate developing themes and be on the look out to find evidence for or against them. The medical education ethnography of Sinclair (1997) was also carried out using field notes as audio recording was deemed obtrusive. I agreed with this position and it influenced my study design.

Interviews with both student and faculty help to gather more information on observations from medical ethnographies (Fox, 1957, Becker et al., 1961, Atkinson, 1981, Kuper et al., 2010, Balmer et al., 2010, Quilligan, 2015). The use of student and/or staff interviews in these studies to gather more evidence for ethnographic observations influenced my choice of methods. Not all ethnographies use interviews to follow up observations and that potentially can diminish their impact. However not doing interviews doesn't mean that the ethnographic study is poor. Hagg-Martinell et al. (2016) for example used informal conversations to

understand more detail on the participant viewpoints. These fulfil the function of an interview without the formal process.

Ethnography has a number of drawbacks. It relies on the accuracy and completeness of the researcher's description of observations. Care must be taken to avoid observer/description bias in the observations that are recorded. I was a graduate of the Manchester medical course and have since been involved in teaching the undergraduates. To mitigate this potential bias I approached the observations with a naïve stance. I never allowed myself to assume anything and restricted myself to purely recording what I observed even if I knew more about a given situation than there was to be seen. Ethnography may overlook situations that happen frequently and focus on outliers. Recording repeated examples no matter how often they happen must be part of the researchers psyche. Selective recording is undesirable as it risks influencing findings, especially if this results in making fine detailed observations at the risk of missing global ones. The presence of a researcher in the environment is another issue. The participants may change their behaviour as a result of an external observer. However the risk of this so-called Hawthorne effect is mitigated to some extent by longer-term observation. Another issue with ethnography that needs continual awareness in the field is a tendency for researchers to overlook positive/negative facets of the participants' behaviour. This must be mitigated in the absence of a second observer by recording any disruptive or undesirable events in the field such as inattention, mockery and marginalisation. Finally, if observations are confined to a group they may not be generalisable to all groups and all situations. A replication of the research would be the best way to address this and in the case of the present thesis, a replication study was carried out in a different semester with different students. It wasn't feasible to carry out a replication study in another institution (Cohen et al., 2011).

There were also drawbacks to me as an ethnographer. Because I am a medical doctor the nature of my observations were likely different from a sociologist however this situation is not unique amongst medical ethnography (Sinclair, 1997). The benefit to the present thesis was that I had a good understanding of the subject matter at hand. This is offset by a lack of experience in ethnographic research compared to a sociologist. Though all medical students do basic psychology and sociology as part of undergraduate study, this would still mean that I

would observe in a different way. To mitigate this I read round ethnography in order to find studies that I could model myself around.

2.2 Study design

The research arms that made up this thesis included an ethnographic study and a semi-structured interview study, with undergraduate medical students, to understand integration on the medical course in Manchester from the student standpoint. Additionally, a semi-structured interview study with staff members complemented the student perspective of the research, and aimed to understand the staff perspective on integration.

2.2.a Ethical approval

The University of Manchester Research Ethics Committee 3 approved the project (14255) on August 28th 2014. An amendment to the study was approved on June 24th 2016. This amendment was for staff semi-structured interviews and a questionnaire study. The staff interviews were designed as a second phase in order to understand the staff perspective following the student ethnography and semi-structured interviews. The questionnaire study was designed to enrich the other aspects of the research project. For the research as a whole, the student ethnographic and semi-structured interview work provided the foundation.

2.3 Participants and research context

Students on the Manchester medical course undertake Problem Based Learning (PBL) in groups. The first two years of the course are divided into four semesters, each of approximately three months' duration. Learning in each semester takes place in newly assembled PBL groups. For this thesis, the ethnographic study recruited two different PBL groups, one in year 1 and one in year 2, each containing twelve students (in each year there are approximately 350 students in total). Sixteen members of staff were interviewed. This section will detail the participants involved in the research and how they were recruited.

2.3.a Student recruitment for the ethnography

Two groups of medical students were recruited for this ethnographic study: one first year (semester 1) and one second year (semester 3) Problem Based Learning (PBL) group. In each of 12 students, every participant was assigned the letter "P" followed by a number e.g. P1. Staff members involved in delivering the observed elements of the course were verbally consented by me, JH or SC (my supervisors). These staff weren't assigned an identification code as the focus of the observational work was the students, and no staff contributions or actions were recorded. As students change group each semester, it was not possible to follow the same group over more than one semester.

The study was advertised by a poster placed in the Consultation Skills Learning Centre (CSLC) where all the students go during the course of a week to receive the same teaching in communication skills. For the semester 1 recruitment process, student groups were informed about the study in the CSLC and asked for permission to be contacted by email with an invitation to take part. The first group to all reply (regarding the invitation) to SC in the affirmative were then invited to meet me so I could explain the study. A participant information sheet was given to each of the students (appendix 7). They were given time to read through the information and had the opportunity to ask questions, though they did not have any. Written consent was obtained from each student individually (appendix 7).

For the semester 3 recruitment process, SC posted an announcement on the medical school online learning environment known as MedLea. There was a reply the following day to this announcement from a student expressing interest on behalf of their PBL group. This implied that the group were keen to take part in the research. The group were invited to meet me in order that I could explain the study. A participant information sheet was given to the students (appendix 7). They were given time to read through the information and had the opportunity to ask questions. In this case a question was raised about whether they would be observed outside of their university timetable. It was explained that there was no obligation for this; however, they could invite the researcher to observe anything outside of the timetable if they wanted to, as long as it was related to their studies. Written consent was obtained from each student, as per the semester 1 recruitment process above (appendix 7).

2.3.b Staff recruitment for the semi-structured interview study

An invitation to take part in the study was sent by JH to 20 members of teaching staff who were involved with delivering the medical course in years 1 and 2. For the purposes of the thesis, adequate participant numbers would be in the teens with 20 as the maximum, and ethics permission was granted for this number, therefore 20 staff/tutors were initially approached. As the initial uptake was below the desired numbers, myself, JH and SC made further contacts at a later date. In total, 16 staff members expressed willingness to take part by the conclusion of the fieldwork. A participant information sheet was made available to each of these individuals via email (appendix 8). The staff members who were interviewed each signed a consent form (appendix 8) and as for the students, were assigned a letter “P” along with a participant number.

2.3.c Characteristics of the student ethnographic observation groups

Ethnographic observations were undertaken with two PBL groups, each containing twelve students (P1-P24). The two groups contained different undergraduate students; there were no individual students who belonged to both groups. Demographic information was not sought

at the outset to avoid individuals being identifiable. It was later established through data collection that both groups contained a mix of primarily school leavers, from state and private schools. It was also discovered that there were some mature students in each group, though these were a minority. Some of the mature students were graduates, with a range of science and arts degrees. Most of the participating students were home students, with a minor proportion being overseas students. It wasn't possible to know the exact demographic composition, due to not being able to interview them all, only relying on observations with the group, and for ethical reasons as mentioned above. The female/male distribution, however, was calculable. Gender demographics of the groups, by observation, were compared to statistics from the UK as a whole. The UK as a whole for the academic year 2016/2017 had 44.9% male and 55.1% female medical students (GMC, 2017). For the two observation groups together the gender split was 46% male and 54% female: similar to the demographics of UK medical programmes as a whole. The Year 1 semester 1 group (P1-P12) was 42% male and 58% female. The Year 2 semester 3 group (P13-P24) was 50% male and 50% female.

2.3.d Characteristics of the staff interviewees

Sixteen members of staff were interviewed (P25-P40). They were variously involved in PBL, consultation skills, physiology and pharmacology, anatomy, evidence-based medicine, personal and professional development, early clinical experience visits and assessments. Detailed descriptions of individual staff participants' roles have not been documented in this thesis, in order to avoid the risk of them becoming identifiable. Not all staff interviewed were PBL tutors. Some of the staff interviewees had senior leadership roles on the medical course.

2.4 Procedure

This section contains a description of the procedures followed in this body of research, including: the ethnographic observation process, writing field notes about the observations and carrying out semi-structured interviews with student and staff participants.

2.4.a The ethnographic observations

An ethnographic study, taking the form of overt, non-participant observation, was carried out with the two participating PBL groups. The rationale for using this methodology has been discussed earlier in this chapter (2.1.c), explaining how ethnography was used as a tool to understand the student point of view. Observation of the semester 1, Year 1, PBL group was carried out on 13 days during the semester. During semester 3, the Year 2 PBL group was observed on 17 days through the semester. Semesters 1 and 3 were chosen in order to give time for preliminary data analysis and carry out the ethnographic semi-structured interviews during the respective following semesters. The days on which observations were carried out were defined partly by the timetabled activity the groups undertook during the semester and partly by the constraints of being a part-time PhD student researcher.

As part of the ethnography, PBL sessions (both opening and closing cases), practical classes (anatomy, physiology and pharmacology), consultation skills, and early clinical experience teaching were observed: in the medical school and in the undergraduate centres of teaching hospitals which the students in Years 1 and 2 attended for clinical experience placements. In addition, some wrap-up lectures were observed during semester 1. Wrap-up lectures are given to students at the closure of a PBL case, to review key aspects of the learning for that week. A document review of all the lecture notes that were available on the university website (known as Blackboard) was undertaken for the purposes of the research to see if interconnections with observed sessions and lectures existed. The lectures were available as presentation slides, for the students to download and read through. More detail on the timetables follows in the next chapter.

Due to the constraints of part-time postgraduate research, it was not always possible to tie in my own availability with when the group had timetabled sessions. However, it was possible to observe examples of the timetabled sessions by changing my working days during the time in the field. The participant groups were split up into different groups, with other students not participating in the study, for their anatomy sessions, and therefore I decided to observe 4 of the consented participants in a particular anatomy group during semester 1, and 2 of the consented participants in semester 3. In order to observe selected students within the anatomy

groups, I explained the study and my research method to the non-consented group members, gained their verbal permission to be present, and made it clear I would be ignoring their contributions and would not be making notes about them.

2.4.b Keeping field notes

Field notes were written in real-time during the observation and transcribed electronically by myself within a few days of the event I had observed (appendix 10). Near contemporaneous transcription was important, as the observations were fresh in the mind, and writing up the notes quickly triggered memories of instances that had been observed but not written down. The field notes were written using a pencil and paper, writing down as much as possible about what was happening including what people were actually saying. I drew diagrams of the seating arrangements of students in the PBL environment as an aide memoire. The following excerpt, from the field notes related to a PBL session during semester 3 on 26/10/2015, serves an example of how the notes were constructed. This example illustrates my attempts to describe as much of what was happening as possible and to include words spoken by students. A series of dots were used in places where it wasn't possible to write fast enough to capture the full utterances of the participants, as follows:

P23 got up to draw about the vestibulocochlear nerve on the whiteboard nearest to him. Contributions from the group were offered. P23 said “.....which is where it links to vision”. P17 said “when it comes back down, that’s when they link”. P23 said “so that’s the primary pathway.....” P17 said “..... so basically they just come together”. P21 said “.....superior auditory nucleus for like determining where the sound is”. P15 said “.....there’s an ipsilateral..... then it goes to the trapezoid body.....” At this point P22 and P18 were distracted by a ladybird and paid attention to this for a couple of minutes then P22 said “Titus [a textbook] confuses me.....” There was now a discussion about skull air cells. P15 said “.....it seems a pretty useless evolutionary thing to me.....” having talked about mastoiditis in relation to these air cells. Anatomy learning was referred to during the discussion by P14, P16 and P15.

I kept my observations as open-ended as possible, with detailed descriptions in my notes of what actions, interactions and behaviours I observed, in order not to risk forming a prior

impression of the content that I was documenting. I endeavoured to write detailed observations of the sessions, which gave a close record of the process of what happened overall, writing words that participants were using as much as possible (appendix 10). I didn't only write down what participants said, but also what they did, how they behaved, how they occupied the room, and if they moved around. I therefore made observations about factors that weren't directly related to the learning process, such as situations where participants were caused to laugh, or when students interacted alongside the main group activity, for example engaging in small talk. As my time in the field went on, I began to notice certain instances that had started to emerge as themes, such as explicit links being made to other sessions, discussions of multiple subject areas and peers helping each other's learning. This brought some observations more sharply into focus, particularly when participants made references to similar learning in other sessions. Sometimes instances may have happened whilst writing field notes that were missed; however, overall, writing notes while observing allowed a non-directive impression to be formed, and mitigated any risk of bias in the observations.

2.4.c Student semi-structured interviews

All 12 students from each of the two PBL groups were invited to take part in a semi-structured interview during the semester following the observation period. Seven of the group of 12 participants in semester 1, and 5 of the group of 12 participants in semester 3, agreed to be interviewed (a total of 12 interview participants). The rationale for employing a semi-structured interview format is described in 2.1.c above. The interview schedules can be found in appendices 4 and 5 below. Question areas included: how the students saw interconnections between areas of the course, what they valued, and feelings about how their fellow students helped with learning. These questions were derived from a desire to know more about particular areas following observations made during the ethnographic fieldwork. The questions evolved in the semester 3 interviews, as a result of continued observation requiring further information. The interviews were audio recorded and transcribed verbatim by me afterwards, using a linguistic format (as explained in appendix 1) whereby symbols are used in order to represent e.g. word emphasis or length of a pause (Copland et al., 2015). This way of transcribing helps the reader visualise the way that the participants spoke, rather than leaving it to the imagination, and provides more accuracy and insight for the researcher in determining recurring themes and interesting features of the data.

2.4.d Staff semi-structured interviews

Semi-structured interviews were carried out with 16 staff members, who were recruited as described in section 2.3.b. I liaised individually with those who agreed to participate, in order to set up a time for the interview to take place. The interviews were held in private, either in the staff member's office or a seminar room located in the MMS building. A semi-structured interview format was used (for the rationale see 2.1.c.). As for the interviews with students, these staff interviews were audio recorded and transcribed verbatim by me afterwards using a linguistic format as explained in appendix 1 (Copland et al., 2015). The interview schedule can be found in appendix 6. The original questions were derived as a result of a desire to understand staff perspectives on what had emerged from the observations of students' learning during my fieldwork. The staff interviews were reflected on during the study and extra questions added to the interview schedule as a result. Areas discussed in the original schedule included how staff members saw integration and their view on how the students would see integration in various parts of the course. Added question areas included any attempts to liaise with other staff, how they knew what happened on in the rest of the course, and perceived threats from increased integration. The original and extra questions are highlighted in appendix 6.

2.5 Data analysis

This section describes the analytic process that was undertaken with the data generated from the ethnography and semi-structured interviews, including the process and rationale behind the analysis, and the strategy used for coding the data.

Using a data analysis package called Quirkos, I carried out a thematic analysis of all the field notes and semi-structured interview data (appendix 10). Quirkos was chosen following a recommendation (J Hart, personal communication July 6, 2016), because of the pictorial nature of data analysis that this software allowed. I have a pictorial way of thinking, as I find pictures easier to visualise than words. This was helped by the Quirkos software (see screen

shot in appendix 10). A package called NVivo was also considered, however Quirkos best suited my needs as I could better visualise it.

Data were assigned to emerging themes and under constant comparison, the data were checked as the analysis proceeded, to make sure that they were still assigned to the most appropriate theme (Cohen et al., 2011, Hammersley and Atkinson, 2007, Corbin and Strauss, 2008). Hence new themes were identified during the coding, for example when specific elements of peer support were noted, such as help with pronunciation, which fitted better as a new separate theme from general peer support. I carried out two coding cycles. In each case the coding was double-checked by me following completion of a cycle to ensure reliability. Additionally, my supervisors reviewed coding themes at key points, which were discussed in meetings. An example of this was changing my way of thinking around the nature of integration as a theme leading ultimately to the development of experiences of integration. The same coding strategy was used for both ethnographic and interview data. I interpreted integration as the presence of multiple subjects in a session or similar subject matter in different sessions. I acknowledge that utterances did not indicate whether there was understanding of subject matter.

The first cycle coding used process and descriptive coding, usually in combination, then sub-coding where appropriate. There was also simultaneous coding in the first cycle (Saldana (2013). The first cycle coding strategy (as illustrated in Figure 1) will now be expounded. Descriptive coding was found to be most useful for the purposes of this research (Saldana (2013). This utilises a single word or phrase that summarises a chunk of data. The data was not amenable to the alternative approach of line-by-line coding, as on first perusal it was immediately obvious that pertinent data was organised across different lines of text, for example when students discussed different subject areas. Assigning descriptions helped organise this data: e.g. 'Consultation Skills - Relationship with the Clinical World'. Here can be seen the use of sub-coding for the descriptive code, 'Consultation Skills'. The sub-coding approach helped to refine broader coding units. The use of 'process coding' with words ending with "ing" called gerunds, was an extension of the descriptive coding (Saldana (2013). This covered situations where participants were completing some sort of action e.g. 'Discussing – Physiology and Genetics'. Here again we can see an example of sub-coding for

the process code, 'Discussing'. 'Simultaneous coding' - applying more than one code to a chunk of data (Saldana, 2013) - was necessary due to different ways of viewing the data: for example, when the participants were discussing subject(s) and additionally, when helping other PBL group members.

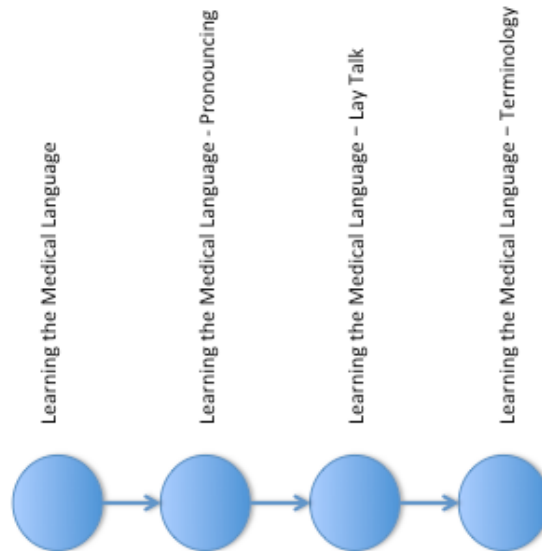


Figure 1: Diagram showing example of first cycle coding using a combination of process (learning) and descriptive coding (the medical language) with sub-coding (pronouncing, lay talk and terminology).

The second cycle coding used an eclectic strategy with pattern coding and some influences of dramaturgical coding (Saldana, 2013). This was deemed the most appropriate approach due to the multiple coding strategies in the first cycle. The second cycle principally utilised 'pattern coding' to identify patterns in the data and as such assembled bigger themes with little change in the first cycle coding. An example of this pattern coding was assembly of the first cycle themes I had called 'discussing/linking', to become part of the larger theme, 'experiences of integration'. The ideals of 'dramaturgical coding' were also found to be useful, particularly regarding barriers to integrated learning. This type of coding represents chunks of data as a social play with the participants taking part in its performance. One example of this is obstacles: i.e. barriers that get in the way of objectives (Saldana, 2013). Because of the nature of the way in which the research was carried out, data unrelated to integration was necessarily

included in the first coding cycle. The second coding cycle only included data that could be related to integration in order that the research questions could be answered. Finally, the iterative process of writing the thesis itself produced the themes as presented herein. Other types of coding (Saldana, 2013) that were not used include: 'structural coding' (a representative phrase for a chunk of data), 'in vivo coding' (a word or phrase from the chunk of data to be coded), 'emotion coding' (a word or phrase assigned to a participant's emotions recorded as data), and 'values coding' (a word or phrase applied to represent a participant's values recorded as data). These ways of coding didn't suit the way in which I wanted to organise the data for example the data wouldn't necessarily supply a suitable descriptive phrase as required for in vivo coding, and my data didn't provide the scope to understand a participants emotions and values.

In this chapter, I have provided explanation of methods considered and provided further detail about those methods I ultimately chose, and the rationale for those. I will next provide context about the setting of the ethnography in this thesis.

Chapter 3: The Setting of the Ethnographic Research

This chapter will detail the environments in which the work took place, the characteristics of the participants and the activities that participants undertook. Finally, I shall explain my perspective on carrying out the research. It is important to set the scene for the research in order that the environmental context can be understood. Without this context the analysis may not make sense.

3.1 Overview of the Fieldwork Settings

In this section the different settings in which ethnographic observations were made are described. The settings, and how participants used them, set the scene for the learning and provided the backdrop for how and where integration was experienced. The different settings include PBL discussion rooms, the CSLC, practical laboratories and lecture theatres. There was no observation of GP visits or PPD sessions and therefore these are not described.

3.1.a PBL Group Sessions



Figure 2: A PBL discussion room.

PBL group sessions were held in the same room in the medical school every time for each of the two observation groups. The room, an example of which is shown above in figure 2, was rectangular in shape with a door on one of the shorter ends of the room. The room had a rectangular table in the middle with chairs around it. At the short end of the room opposite the door was a projection instrument and along the right side's long wall from the perspective of the door were two whiteboards.

The participants sat at the chairs during a PBL session, sometimes getting up to write on the whiteboards or use the projection instrument. Participants used the table to put laptops or paper notes on. These items were used as reference material for group discussions. In the first sessions they would write down learning objectives. They would have notes or a laptop in front of them for the second session, which they used in their discussions. The tutor sat at the end of the table nearest the door. To observe, I sat in a corner of the room away from the table. The participants changed chairs and positions from session to session. The whiteboards

were used, for example, to draw diagrams linking so-called cues from the case. These cues were then used to formulate a learning agenda, also written up on the whiteboard. Sometimes participants would draw on the whiteboard to illustrate something being discussed. Each weeks' PBL sessions were chaired by a different student on a voluntary basis. A different student acted as a scribe, writing down cues and learning objectives.

3.1.b The Consultation Skills Learning Centre (CSLC)

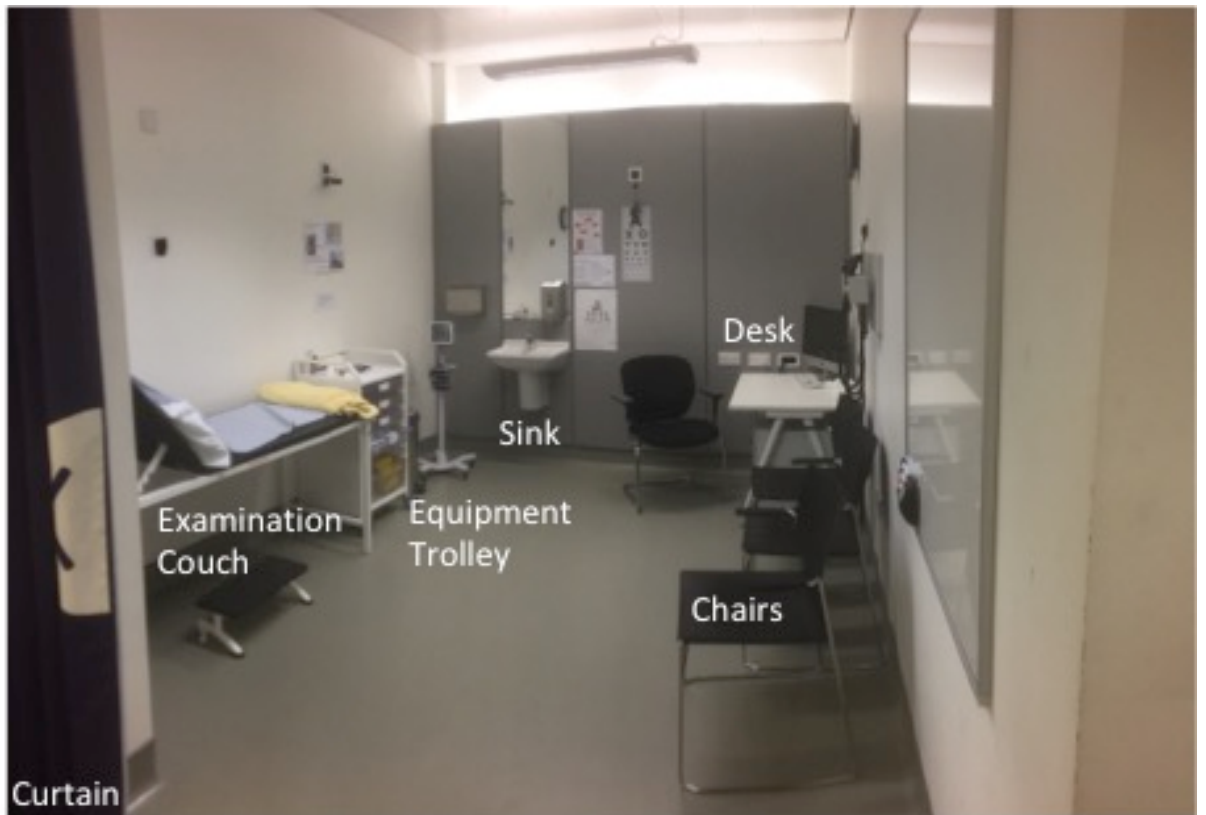


Figure 3: A CSLC side room.

The CSLC consisted of two large open areas, each surrounded by 4 curtained smaller side rooms, as shown in Figure 3 above. The open areas themselves (not pictured) could be divided in two and generally had chairs arranged in various manners, sometimes facing an examination couch between two pillars. There were AV screens on the pillars, either side of where the couch was situated when present. The open areas were used for plenary type

delivery of teaching content and interactive learning via tutor-facilitated discussion. Typically, participants sat in circular arrangements of chairs for the latter and in rows for the former.

The side rooms were closed off with sound resistant curtains. Looking inwards into a side room, there was a bed along the wall on the left side, with a trolley at the end housing medical equipment. There was a sink on the left of the back wall and a table with a PC on it at the far end of the right-side wall. This table had more medical equipment on the wall to its right-hand side. Varying numbers of chairs were present in the side rooms. The group split up in these sessions with, on average, 4 participants using a side room, plus often a tutor and/or a simulated patient. The participants used the chairs to conduct simulated patient interviews, moving between chairs in order to take turns, and adjusting chairs from one practice to a next to accommodate the best positioning. In some sessions the participants moved between different side rooms to interview a series of simulated patients. Usually a pair of students undertaking the interview would leave out of the side room to discuss their interview strategy before carrying it out. When present, the simulated patient typically sat near the sink or at the desk. When present, the tutor sat anywhere in the side room. Participants used the couch to practise clinical examination. Clinical equipment from the trolley by the couch was used. Additionally, ophthalmoscopes located by the desk, and a so-called Snellen chart on the back wall, with letters on for testing vision, were used.

3.1.c The Dissection Room

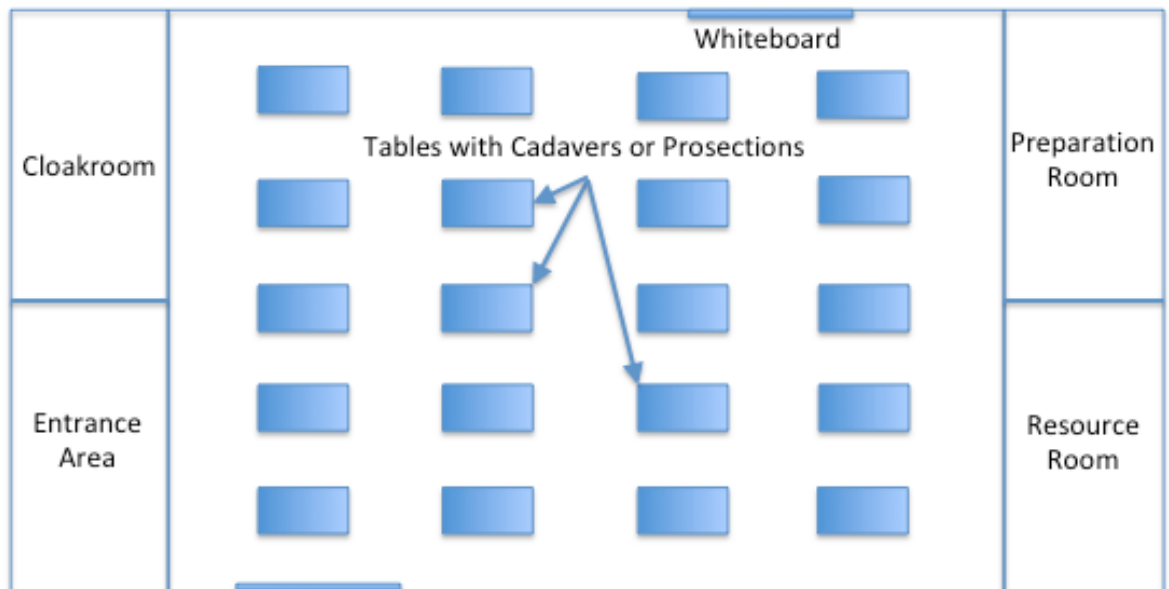


Figure 4: Diagram of the Dissection Room.

Anatomy sessions were held in the dissection room. Legal regulations excluded taking a picture of this, and therefore a rough impression can be seen in the above diagram of the room (figure 4) as seen from above. As shown, it was a large open space with a number of cadavers on tables arranged throughout the space. Extra tables were distributed in-between the cadavers, with prosections (prepared anatomical specimens) laid out. There were whiteboards on walls and pillars in the room and skeletons in variable positions. A smaller room at the far end, as viewed from the door, contained various resources including models and more prosections.

3.1.d Physiology and Pharmacology Practical Laboratory



Figure 5: An example of a laboratory where practical classes were held.

This was a large room as shown in the above figure 5, with rows of lab benches at which sat the students. An array of different equipment was provided depending on the context of the session. Students typically moved around depending on which skill they were experiencing, using the equipment provided. They wouldn't sit in the same place each time.

3.1.e The Microbiology Practical Laboratory

This was a large room with a number of tables, similar in design to the one where Physiology and Pharmacology Practicals were held (figure 5). One of the tables was allocated to the PBL group. The group were seated round the long sides of the table, which was rectangular. There were sinks in the middle and each student had agar plates in their place. The participants did not move around during the session.

3.1.f Lecture Theatres

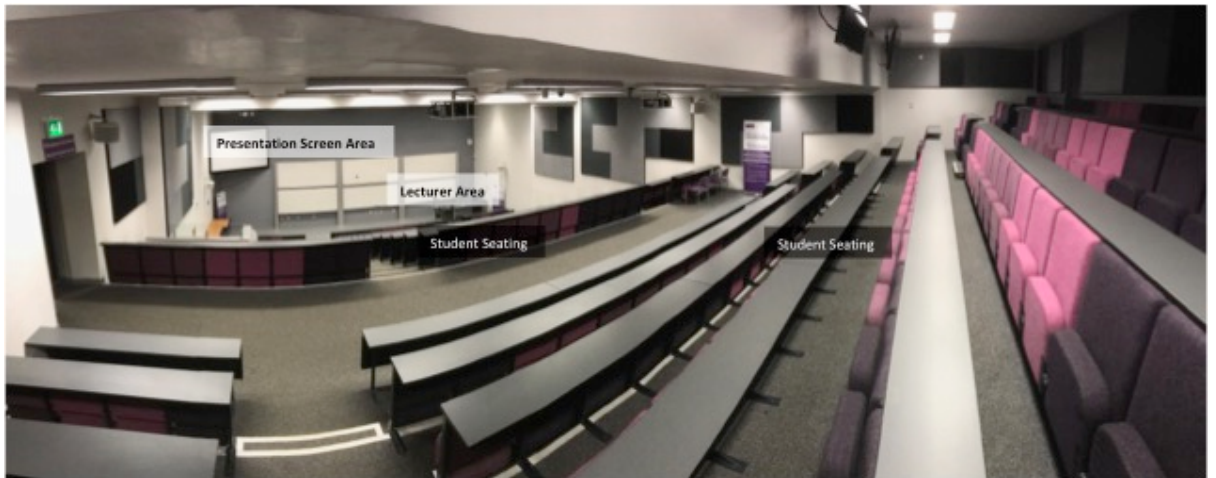


Figure 6: One of the lecture theatres in which observations were made.

Lectures were observed in a large lecture theatre (see above figure 6) typical of those found in a University, containing rows of seats increasing in elevation towards the back, with the lecturer at the front using projection equipment. The students sat in the seats facing the front. The study participants did not sit as a group and varied their seating positions from one lecture to a next, but once seated in a lecture, they did not change their seat or move around. Not all participants attended each lecture.

3.1.g Non-Timetabled Sessions

Some non-timetabled sessions were observed in various side rooms, which changed according to availability, in either the medical school or university library. These rooms were rectangular shaped and had a rectangular table in the middle. Projection equipment was usually at one end. Not all participants attended. Those that did sat around the table and did not move around, engaging with those nearest them.

3.1.h Hospital Visits

Hospital visits were observed in rooms situated in the Undergraduate Education centres of two different teaching hospitals. These rooms had chairs available to sit on and flipcharts for writing. The students sat in a circle of chairs, and did not move around during tutor-facilitated group discussions. They returned to the same chairs after going into the hospital environment where they would interview patients on the hospital wards, for follow-up discussion about the patients they had met. The students were not observed in the hospital wards, as this would have required NHS ethical permission in order to observe in a patient environment, and was beyond the scope of the work.

3.2 Overview of the Student Timetables

The following section describes the timetables followed by participants during semesters 1 and 3 when the fieldwork took place. The types of session undertaken by the participants are given as part of the context in which they experienced the nature of integrated learning on the medical course. Semester 1 happened during Year 1 and contained subjects including reproduction, pregnancy, genetics, growth, cancer and ageing. Semester 3 happened during Year 2 and contained subjects related to the nervous and musculoskeletal system, such as disability, mental health, vision, hearing and stroke. General observations from carrying out the ethnography provide some context to the students' timetables, as follows. The PBL groups met twice weekly in order to establish learning objectives related to the course content and discuss the resultant learning. Between PBL sessions the students independently studied the areas defined by the learning objectives. Students also met to work on their learning together, and shared resources via online networking. All PBL tutors were university staff members. Healthcare professionals tutored the participating students in consultation skills during hospital/GP visits. In consultation skills sessions in the university, tutors were a mix of faculty and non-faculty, from a range of specialties and disciplines including psychology, communication, general practice, physiotherapy, and hospital medicine; and SPs acted as facilitators in their capacity to give feedback on the consultations from the patient perspective.

3.2.a Semester 1

	Monday	Tuesday	Wednesday	Thursday	Friday	
0900			Lecture	ECE Visit		
1000	PBL Case Opened		Lecture		ECE Visit	PBL Case Closed
1100		EBM	Lecture			
1200		Lecture			Lecture	
1300	PPD Group Session/ Consultation Skills					
1400		Lecture				
1500	Microbiology Practical	Lecture			Anatomy	
1600		Lecture			Anatomy	

Key:	Regular Session	Intermittent Session
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Figure 7: Semester 1 consolidated timetable

An example of the semester 1 timetable is shown above in Figure 7, with the regular sessions and the intermittent sessions highlighted. There were between 13 and 22 hours a week of classes. The week began with a Problem Based Learning (PBL) session in which the case providing the basis for the week's learning was opened, and the learning objectives for the

week were elucidated. Lectures happened on Tuesday afternoon and Wednesday morning with a further lecture on Friday afternoon. The PBL case closed on Friday morning, giving the opportunity to discuss the learning objectives established in Monday's session. An anatomy session took place on Friday afternoons. Consultation skills sessions happened on a Monday afternoon, with 7 consultation skills sessions during the semester: 2 in September, 3 in October and 2 during November. There were three weeks with early clinical experience (ECE) visits: 1 week at a GP surgery and 2 weeks at a hospital. There were also 3 weeks with an evidence-based medicine session (EBM), 2 weeks with Personal and Professional Development (PPD) sessions (also known to the participants as 'portfolio'), and 2 weeks with a microbiology practical class.

3.2.b Semester 3

	Monday	Tuesday	Wednesday	Thursday	Friday
0900		PBL Case Opened	ECE Visit		Consultation Skills
1000					
1100			EBM	Anatomy	
1200					
1300	PBL Case Closed	Physiology and Pharmacology Practical			
1400					Lecture
1500				Lecture	Lecture
1600	Lecture			Lecture	Lecture

Key:	Regular Session	Intermittent Session
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Figure 8: Semester 3 consolidated timetable

An example of the semester 3 timetable is shown above in Figure 8, with the regular and the intermittent sessions highlighted. There were 13 to 18 hours of classes per week. The structure of the principal components of the timetable was slightly different in this semester. PBL cases were opened on a Tuesday morning and closed the following Monday afternoon (the last case

was closed the Friday afternoon of the same week). Lectures were on Monday, Thursday and Friday afternoons. Anatomy sessions were on Thursday and sometimes Friday mornings. Physiology and Pharmacology practical classes (also known to participants as Phys-Pharm) were on Tuesday afternoons most weeks. Consultation skills sessions usually took place on a Friday morning. In total there were 7 sessions during the semester with 3 in both October and November 2015 and 1 during December. On 3 occasions there were EBM sessions, on 1 occasion there was a GP visit, on 1 occasion there was a hospital visit and on 1 occasion there was a PPD session during the week.

3.3 Experience of Carrying out the Research

My background lies in bioscience and medicine and I had not done any qualitative research prior to carrying out this study. I thus experienced a very steep learning curve in embarking on this research. My background reading before starting the observational fieldwork informed my application and practice of ethnography (see sections 1.3.a.i and 2.1). Reading is of course a valuable activity; however, theory somewhat goes out the window when faced with observing an interacting group, pencil in hand. I retained the importance of writing down the actual words of participants as much as I could, whilst also describing processes such as the setting of learning objectives in PBL and situations such as when students were helping each other. I experienced times of frustration, in that it was impossible to get everything down on paper that I observed to be happening. I did find, nonetheless, that I was able to record a range of elements of the process of the student experience, for example discussion in PBL sessions, and the words students were using. I was however aware that whilst I was writing, I was missing anything that happened in the room during that time. By writing up the field notes as close as possible to my observations, I was able to plug some gaps that I had noticed peripherally in terms of process in the room, and that allowed me to make sense of what I had written down. To this end, my annotations and additions helped make clear something a student had said or done, and supplemented what had been written down in the field.

I experienced a difficulty in keeping quiet during the sessions I observed, when the students were discussing something that I was familiar with from my area of medical specialty. This was

also an issue in practical classes where I had direct and extensive experience in the subject matter. I managed not to interfere in the groups' learning; however, I didn't find it easy, particularly when I knew the students were going wrong. I had to keep reminding myself I was not present as a teacher, but as a researcher, in the position of observing and documenting, rather than evaluating or commenting.

In theory a second observer could have ensured a means of checking for observer bias, by producing their own set of notes (and the two researchers could then have coded both sets of notes). Whilst a second observer could have helped with reducing bias, it was not feasible as this was a PhD project. It would also have been more intrusive due to having another added person in the room, and impractical to do this in a small room like those used for PBL.

It was difficult making observations when other students were present in the particular environment. In certain circumstances, such as in the dissection room and some consultation skills sessions, I had to make it clear to students from other groups that I was not making observations about them. These students were not consented, and yet they were present as part of the timetabled learning in the same environment as consented students. This was problematic, as it meant there was a hole in my data due to not being able to observe their contributions, which potentially were valuable to the learning process. On one occasion, one of the semester 3 students participating in the research said to me she was happy with me being there, but confused as to whether they could talk to me or say anything to me. None of the participating or non-participating students expressed any concerns about me being present. This understanding was improved by going to lunch with the group on invitation and also to the library. They were pointing things out to me as the semester went on, which added sharpness to my observations.

I found the interviews much easier to adjust to than the observational fieldwork. As an experienced clinician I had been trained, and had experience in, medical interviewing. I saw the research interviews as an extension of this. My consultation skills strategy is generally to say as little as possible and let the person talk. This proved rather effective in the research interviews as well. I found that the interviewees spoke extensively in answer to my questions

and prompts. The interview style that evolved during the course of my research was therefore one of letting people talk with minimal input from myself as an interviewer. Allowing the participants to talk as much as possible helped avoid leading their responses. It also allowed the opportunity to follow up on points being made and in some cases led to a question being added to the interview schedule, as has been documented by others regarding this data collection method (Cohen et al., 2011).

I didn't find any of the interviewees reluctant to speak, and I thought they were all rather candid. In the case of the students, they had got to know me over the course of the semester, and I think this made the interviews flow more smoothly. I knew most of the staff that I interviewed from previous involvement with teaching and examining on the course, at least peripherally. That probably helped those interviews to flow. The first semester student interviews ranged between 25 and 51 minutes with an average time of 35 minutes. The third semester student interviews ranged between 32 and 42 minutes with an average time of 38 minutes. The staff interviews ranged between 12 and 47 minutes with an average time of 30 minutes. These timings were rounded to the nearest whole minute.

The main difficulty with the interviews was that I had to take a naïve stance regarding the course. This was due to my past involvement with studying on the course and later, teaching and examining on it. However, it was important that I had information in the words of the research participants rather than my own ideas and impressions of things. I asked questions that I knew the answer to in order that this could be achieved, for example asking a student to tell me about PPD or ECE.

Data were generated during the fieldwork. I coded all of this; My supervisors reviewed samples of coding which were discussed during meetings, and changes were made following this. Once the coding cycles were complete, I selected data for the thesis that I thought was best representative of the themes that I was writing about. In order to select these examples, I read through all the data that related to each theme. I kept a mental note of the best example as I read, updating as I felt another was superior. In this way, by the end of this process I had decided what would go in the thesis.

Chapter 4: Experiences of Integration

The aim of this chapter is to demonstrate both how students on the Manchester medical course experienced integration and how staff viewed the student experience. Three analytic themes are explored. Firstly, 'PBL learning agendas set the stage for integrated learning' (4.1), in which I consider how PBL enabled parallel learning of different subject areas such as basic, clinical, behavioural and social sciences, alongside each other in a contemporaneous interconnected fashion. Secondly, 'Discussions were the principal way in which integration was experienced' (4.2), in which I consider how discussion and interaction between students, in PBL and other learning environments, are key to the process for students of making connections between and across multiple subject areas. Thirdly, 'Related subject matter was encountered in different sessions'(4.3), in which I focus on the various learning environments, to explore the opportunities provided within and by these environments for students to make connections between and across subject areas. The focus in this chapter is initially on student ethnographic data as this gave the best impression of how such integration was experienced, with staff data being brought in towards the end of the chapter to provide another perspective on the data; the rationale for this will be explored in the Discussion (Chapter 8).

4.1 PBL learning agendas set the stage for integrated learning

The integrated experience at MMS could be seen in how multiple subjects were learnt in parallel, alongside each other via the PBL process. Settings for PBL and learning timetables have been detailed in Chapter 3 (3.1 and 3.2). By experiencing the PBL process, students in turn experienced integrated learning. The PBL process required learning agendas to be developed by the group members. This theme will address how these learning agendas encompass multiple subject areas and therefore encourage integrated learning of the subjects being studied in parallel to each other.

4.1.a PBL learning agendas aided holistic integration

Learning agendas were drawn up for each PBL case based on the subject areas required to understand and explain it. These learning agendas drove integrated learning by bringing the various subject areas together into one learning process. This led to integrated learning taking place. The student participants noted this. One Year 1 student P2 talked about how the various subjects link into the PBL case for the particular week such as “*sciencey [sic] stuff and social stuff*” (P2). Another Year 1 student articulated how links were not just within the prevailing PBL case, saying:

the physiology that you learn for the next case is actually like (.) applicable to the last case also (.) so that links up.

Example A1: Year 1 Student P7, Interview, 20/3/2015

When asked about what made their learning joined up, Year 1 student P11 talked about formulating the learning agenda for the week and how lectures, online resources, consultation skills and practical classes would reference their PBL case and PBL learning that week:

all the teaching throughout the week will then be based on that ... you have the lectures to back it up (.) the resources online, ... anatom:y phys-pharm (.) ties it all together.

Example A2: Year 1 Student P11, Interview, 30/4/2015

These participating students perceived integration in terms of multi-subject learning outcomes related to PBL cases. PBL therefore contributed to the process of such integration on the course, by creating interconnections between subject areas in its method of teaching delivery. The way that PBL is employed at MMS involves multiple subject areas learnt in parallel. This approach was valued by Year 1 student P2, who viewed PBL as more relevant to a future doctor than textbook learning, and who appreciated how it led to a varied week of study:

with (.) PBL I find it (.) a lot better (.) because (1.0) you do a lot of different things I (.) like my week's always (1.0) really varied (.) and (1.0) you can (.) I just value that you can remember the stuff better (.) it's more relevant to (.) you as a future doctor rather than (1.0) trying to (.) memorise a textbook kind of thing

Example A3: Year 1 Student P2, Interview, 29/4/2015

4.1.b Setting multi-subject learning agendas

Whilst the PBL learning agendas themselves differed from week to week in their specifics, they consistently contained multiple subjects to be learnt in parallel. They therefore set the stage for integrated learning. Within PBL, not all learning agendas were composed with the same order of subject areas. During one particular Year 1 PBL session, a student was noted to acknowledge that, as a group, they should prioritise social topics in the list, as they normally put those at the end:

P5 then said "should we start with the social, we always put that at the end".

Example A4: Field Notes, Semester 1 PBL Case 3 Session 1, 20/10/14.

The following long quotation from the field notes describes the Year 2 PBL group setting a learning agenda. They had already developed a set of cues upon which to base the learning outcomes for the week. The result was framed (as was typical) using a series of questions. However, as the process went on, a physiology question regarding myelination arose, and it was decided to put this before the clinical questions. Another clinical question was added regarding depression, and two further questions covered the psychosocial issues of advanced care planning and coping strategies:

Setting the learning objectives commenced. The first question was, what is multiple sclerosis, with link to cranial nerves, course of disease plus prognosis, types, epidemiology, diagnosis. P14 pointed out “doesn’t Scotland have one of the highest rates of MS in the world or something?” There was some laughter at this statement. The second question was, what are the test and treatments for MS with VEP, neuro-exam, MRI, LP, methylprednisolone, step i.e. progression. P15 pointed out “I’m interested in autoimmune disease but.....” wanting to look into this. For the next question P18 suggested “physiology of everything” to which there was general laughter in the group. A third question was added as what is the physiology of myelination with different types of cells and how is it lost. They then decided to rename this as question zero after concluding that it should come before multiple sclerosis i.e. the basic science before the clinical. P22 asked “what are astrocytes, they pop up every time?” P15 replied “there’re like the immune cells of the brain”. P18 asked “can we look at motor function as well ‘cause I remember nothing from sixth form about that”. They now added the third question to questions 0-2. This was: how is gait controlled – cerebellum. P13 asked “do you think it’s time for depression now?” A fourth question was, what is depression and how is it caused – symptoms, treatments (venlafaxine, SSRIs, SNRI), types, epidemiology, prognosis. A fifth question was, what is advanced care plan – lasting power of attorney. CBT was mentioned. P20 said “there was a good case resource on it for last week’s case”. P22 had pointed out “we did that last Year, I’ve got loads of notes on it. Finally, a sixth question was, what are the different coping strategies.

Example A5: Field Notes, Semester 3 PBL Case 6 Session 1, 10/11/15.

In this instance the students started with a clinical question regarding multiple sclerosis and then added in various other subject areas, demonstrating the integrated learning concept as understood in the current study. It is interesting to note that amongst these areas epidemiology of the condition was included, which is a separate subject to the clinical basis of the disease.

An example of integrated learning that resulted from a multi-subject learning agenda can be seen in the following, in which this Year 1 student (P7) talked about studying the clinical condition of pneumothorax. This demonstrated relation of normal to the clinically abnormal. In addition to learning about this particular condition, the participating students learned how the lung works when breathing normally:

about like (.) err mechanics of breathing ? (.) and like how the lung expands and stuff (.) and then (.) for (.) for our disease that (.) that case we learn about (.) pneumothorax (.) so that was like (.) really relevant so you learn about (.) how the lung breaths normally (.) and then what happens when there is a change in pressure of it (.) and afterwards you learn about the different treatments for (.) pneumothorax and stuff (xxxx) (.) so that was like (1.0) the first case and I felt like (.) it was really logical and I really like everything was interconnected

Example A6: Year 1 Student P7, Interview, 20/3/2015

Some students attempted to clarify how integrated learning was viewed. One student Year 1 student (P6) observed how, when learning about the clinical condition of chronic obstructive pulmonary disease (COPD), physiological, anatomical and psychology perspectives were being studied in parallel. The observations made by P6 refer implicitly to how the multi-subject learning agenda could drive integration:

P6: when we doing like so this semester we've been doing like about physiology of like kind of chest and lungs and stuff like tha::t (1.0) and then the case might be saying something about COPD

TM: mmm

P6: and (.) and then we'll learn (.) about that from both a physiological anatomical (.) an:::d (.) psychological perspective

Example A7: Year 1 Student P6, Interview, 13/3/2015

4.1.c Theme conclusion: PBL learning agendas set the stage for integrated learning

Multi-subject learning agendas were an important tool for driving integration from week to week as the course unfolded. From the analyses presented above, it is clear that students identified with this multi-subject approach, demonstrating an understanding of the process of integrated learning through PBL, in which the process of setting such a learning agenda in itself assisted interconnected thinking.

4.2 Discussions were the principal way in which integration was experienced

Discussions took place in all of the learning environments in which the participating students spent their time (sections 3.1 and 3.2), be it a timetabled activity (e.g. PBL, anatomy, consultation skills) or an activity in a more informal setting (e.g. meeting up to discuss a group poster project). In this section, discussion refers to verbal exchange between participating students, and can be as simple as two utterances between two students, or a more extensive exchange with several utterances (between two or more students).

The principal forum in which participating students were actively involved in discussion was PBL. PBL discussions were driven by participating students and facilitated by a faculty tutor, often encompassing two or three subjects, sometimes more. The discussions took in explanations of basic/clinical science and psychosocial matters related to the prevailing case, and were triggered in answer to the week's learning objectives which helped drive the integrated learning of different subject areas. Other sessions such as consultation skills also provided opportunities for participating students to have discussions related to learning on the course. These discussions in different environments provided evidence for how participating students were experiencing learning multiple subjects (sections 3.1 and 3.2). This theme explores multi-subject discussions within and outwith the PBL process.

4.2.a Multi-subject PBL discussions were the backbone of the integrated experience

Participating students were seen to bring different subjects into a discussion. In the following exchange, a discussion of the clinical presentation of cystic fibrosis (fatty stools) was supplemented by some physiology (malabsorption). The use of examples, comparison, and the development of a conversation, with different participants contributing, can also be noted:

P5 asked, "Does anyone know why fatty stools is a symptom of Cystic Fibrosis?" P12 replied "something to do with malabsorption". P4 said "I know like the newborn baby does poo straight away... but the CF baby doesn't". P12 added, "With the ions of the active transport it will be off as well".

Example A8: Field Notes, Semester 1 PBL Case 3 Session 1, 20/10/2014

Another illustration of participating students bringing different subjects into a discussion is the following exchange (example A9) regarding age-related changes in the human. This discussion moved through diagnosis of osteoporosis and then onto bone physiology, followed by genetics. It can therefore be seen how, as a result of the discussion, the participating students combined clinical science with basic science:

P2 talked about getting shorter with age. P11 talked about being shorter after sleep due to disk shrinkage ... P12 brought up osteoprotegrin (clumsy pronunciation). P4 said "oh, OPG" then P12 emphasised the role "binding to RANK ligand" causing inhibition. P6 brought up telomerase as aging. P1 said "telomere shortening". P6 said, "So it can only do it so many times". P12 talked about various hormones and their effect on bone formation and reabsorption.

Example A9: Field Notes, Semester 1 PBL Case 8 Session 2, 05/12/2014

During a long multi-subject discussion of the skin, involving several participating students, who had woven in anatomy/histology and physiology, fingerprints were considered:

P11 said, "contours of the skin... the fingerprints result from the way the dermis and epidermis fit together and that's genetically determined"

Example number A10: Field Notes, Semester 1 PBL Case 6 Session 2, 21/11/2014

Here, anatomy was combined with genetics. As this discussion progressed with contributions from other participants, Year 1 student P11 made another point, which in this case, combined anatomy and pharmacology to add to the other subjects in the overall discussion:

P11 said “there’s just the fat bit isn’t there... drugs are introduced into this area as it’s rich in veins and it absorbs them quickly”

Example A11: Field Notes, Semester 1 PBL Case 6 Session 2, 21/11/2014

As a final example, a PBL discussion regarding pain management, which began with covering analgesics and the concept of the pain ladder, then broadened out to include the psychological:

P18 said “tricyclic antidepressants, any thoughts?” P23 said “uncertain mechanism of action”. They talked about why tricyclic antidepressants are used in pain management. P15 said “just to refer to BSS.....they become more anxious because they don’t think they have a future..... they exaggerate their pain to how they feel”. P18 said, “Side effects anyone?” P13 said “drowsy, nausea, forgetfulness, like what’s it called, amnesia”. The group laughed.

Example A12: Field Notes, Semester 3 PBL Case 2 Session 2, 12/10/2015

Participating students were able to bring in multiple subjects to discussions themselves. During a semester 1 PBL session, Down’s syndrome was summarised by Year 1 student P1 with regards to risk, epidemiological type statistics and molecular biology, with two other students contributing:

P1 read out some statistics on Down’s births and said, “They think that when the meiotic spindle is abnormal then that causes chromosomal abnormalities”. P11 added “the longer the egg is left in meiosis 1 the more the chance of abnormalities”. P1 added the theory is that “the older the eggs are, the lower the pH”. P4 added “yeh, and that causes the increased risk of non-disjunction, at least that’s what I read”.

Example A13: Field Notes, Semester 1 PBL Case 2 Session 2, 10/10/2014

Participating students were therefore experiencing integration in terms of discussions that encompassed multiple subject areas (or topics within them). As seen earlier in this Chapter

(section 4.1), part of the integrated learning experience is learning subjects in parallel. The impact of this on the ground would seem to be multi-subject discussions.

There were a few occasions in PBL session discussions where the participating students were observed verbalising the process of joining subjects together and making links. During a discussion on cystic fibrosis, one Year 1 student (P5) linked the bioscience with the clinical picture:

P5 interjected "I've found, linking this to Cystic Fibrosis... that links to Cystic Fibrosis, which I guess we could look into now".

Example A14: Field Notes, Semester 1 PBL Case 3 Session 1, 20/10/2014

Another time a participating student articulated the idea of combining physiology with a discussion about ear anatomy:

P16 said "outer ear first". P18 was drawing to prompts from the group. He/she suggested, "Shall we do the physiology at the same time guys".

Example A15: Field Notes, Semester 3 PBL Case 4 Session 2, 26/10/2015

Both of these examples demonstrated a participating student verbalising that at these moments they were participating in an integrated learning experience, with the use of 'we' and the proposal of a next, group-based action i.e. 'we could look into it now'; 'shall we do the physiology at the same time?'

4.2.b Discussions in other environments added value to the integrated experience

PBL sessions were not the only opportunity for multi-subject discussion. Experiencing integration via discussions occurred in several other environments (section 3.1). During a consultation skills session on mental health, the participating students could be observed to discuss clinical and psychosocial subject matter in a seamless manner:

P20 brought up the pain down the leg. P13 said, “.....she knows she’s low” having pointed out “she thinks it’s the pain causing the depression”. P13 wondered if the patient was in “denial” and P22 pointed out a feeling of being “disappointed” not getting what she wants from the GP. There was a discussion about the patient’s point of view regarding the situation.

Example A16: Field Notes, Semester 3 Mental Health Histories, 23/10/2015

Another consultation skills session focussed on cranial nerve examination. In this session the participating students were facilitated in discussion by a tutor, to combine cranial nerve function with their clinical examination. They also covered some pathology, including Bell’s palsy and upper motor neurone lesions. In dissection room sessions there were a few occasions where participants were observed experiencing clinical context to the anatomy; sometimes, the session brought in clinical references to the prevailing anatomical region. Examples included: fallopian tube rupture in ectopic pregnancy; joints in the fingers affected by arthritis; causes of perforated eardrum; neurofibromatosis and lumps on the skin.

The integrated learning experience, in terms of taking part in multi-subject discussions, could therefore be observed in sessions other than PBL. The PBL environment was most clearly set up to facilitate such an experience, as has been discussed and illustrated with the examples of integrated learning of subjects in the previous section (4.2.a).

One multi-subject discussion was observed taking place in an informal learning environment. When the participating students met up to discuss their semester 1 poster project (which was about smoking cessation), it was noted they were considering the idea of addiction alongside

interventions such as clinical treatment using patches, and psychosocial factors such as support groups. Year 1 student P6 commented that:

“giving a goal to help someone quit is important..... isn't there a link between depression and smoking?”

Example A17: Field Notes, Semester 1 Non-timetabled meeting to discuss a poster, 3/10/2014

Here can be seen an example of how the participating students were experiencing multi-subject learning outside of the more formally situated elements of the course. The nature of the integrated experience seemed therefore to have a more general impact on these students, influencing integrated learning behaviours and approaches during informal study.

4.2.c Theme conclusion: Discussions were the principal way in which integration was experienced

Multi-subject discussions in various learning environments were of paramount importance to the integrated learning process. Not only did they demonstrate integrated learning of subjects; they also allowed multiple student participation in this integrated experience. Students were able to structure their conversations within these discussions. There was evidence to suggest that students were able to understand that they were integrating when they were observed verbalising doing so, in interaction with each other. They furnished one another's utterances by adding in knowledge from different subject areas and perspectives, thereby jointly and collectively contributing to the development of their learning. An integrated learning experience is likely to be enriched by the students' insight into and awareness that such learning is happening, as it is enacted through discussion. Such discussion is seen therefore to play a part in integrated learning on the Manchester medical course.

4.3 Related subject matter was encountered in different sessions

One way in which students experienced integrated learning was in the opportunities and capacity for them to explicitly refer to other sessions where they had a parallel experience to the one at hand. This theme explores how these explicit links arose and goes on to look more generally at how integrated learning of similar material was present on the course, and how this learning enriched the integrated experience through bringing PBL to life. This theme also considers how participants explained, during interview, the ways in which parallel learning of related subject matter occurred between various different sessions on the course. This enhanced the way in which students were able to experience integration.

4.3.a Making explicit links to other areas of the course

A specific function of the way integration at MMS was experienced could be seen when explicit links were made to other parts of the course (sections 3.1 and 3.2). In doing so, the participating students were both avowing interconnections in their learning and reinforcing these interconnections at the same time, adding a further dimension to the way in which the participants were experiencing overlap between course elements. An example of this was when, in a PBL session, Year 2 student P13 made reference to experiencing the learning objective at hand, cranial nerves, in an anatomy session:

P13 said, "We can probably do this question because we've done this in anatomy, what are the cranial nerves?"

Example A18: Field Notes, Semester 3 PBL Case 5 Session 2, 9/11/2015

Participating students also linked topics (such as the skull air cells, cranial nerves and basal ganglia) to anatomy session learning, during PBL discussions. During a PBL session they were able to link anatomy learning to an online video resource that was available for them to watch:

P20 said "can I do like the three bits and the organ of corti?" getting up to draw on the whiteboard nearest him/her. Whilst he/she was drawing this P22 said, "this whole thing's pretty weird". P19 said, "watch the video".

Example A19: Field Notes, Semester 3 PBL Case 4 Session 2, 26/10/2015

Similarly, it was noted that participants were able to draw a link between a patient appearing in both a PBL case and a consultation skills session (examples A20 and A21):

P6 flagged up that in the PBL case the mother was 45 and had a child from a previous marriage and that was not the case here.

Example A20: Field Notes, Semester 1 CSLC Session, 17/11/2014

P11 said, "Mrs Benson was the woman in comms and I think she said she had neighbours that looked after her". There was a general "oh yeh" from the group.

Example A21: Field Notes, Semester 1 PBL Case 8 Session 1, 1/12/2014

There were a number of occasions where participating students were observed to make explicit links to lecture material. A number of such links were made during PBL discussions, for example when Year 2 student P13 referred to a diagram of a lecture slide regarding a particular area of neuroscience:

P21 brought up, “levodopa being carboxylated and can go through the blood brain barrier”, also talking about prevention of peripheral breakdown. P13 said, “There was a big diagram on the lecture slide”.

Example A22: Field Notes, Semester 3 Case 7 Session 2, 23/11/2015

Examples of other lecture topics that were explicitly linked in during discussions included: cell cycle, pain clinic, memory formation and stroke. There was no particular pattern or identifiable subset of subject areas, or topic areas within them, that invited such explicit links to be made.

In a series of discussions across different types of session, participants made explicit links to the medico-legal concept of Gillick/Fraser competence. These discussions were repeatedly reinforcing this particular learning. In a PBL session:

P12 said, “We did something about the next question the other week... Fraser competence”.

Example A23: Field Notes, Semester 1 Case 4 Session 2, 31/10/2014

Later in that semester, the participating students were taking part in an ethics and law session in the CSLC, when another reference was made to the same medico-legal concept:

P8 said, “She knew having a heart would prolong her life...” P11 said, “...the whole Gillick competence stuff”. P4 said, “I thought you couldn’t refuse treatment till 18 years...”

Example A24: Field Notes, Semester 1 Ethics and Law Session, 1/12/2014

The data show how articulating these explicit links reinforced interconnections that existed between different types of session. Encountering similar subject matter in different sessions, and acknowledging this, was part of how integration on the course, was experienced.

In the interviews, participating students demonstrated their ability to articulate explicit links between parts of the course. Year 1 student P1 pointed out that anatomy was mentioned in PBL and that the same material also cropped up in anatomy sessions themselves:

the anatomy's mentioned in PBL and you go to anatomy and learn that (.) ur:m (.) but I think it's also once you build up and (.) you know it's a little bit of knowledge (.) ur:m (1.0) you start to see that cropping up in other areas.

Example A25: Year 1 Student P1, Interview, 7/5/2015

In further examples of how the participating students were able to explicitly articulate links between sessions and the general benefit of these interconnections, Year 1 student P4 mentioned how the different parts of the course brought in the same aspects each week. Year 1 student P2 talked about how lectures, to the benefit of learning, supported the PBL case, and Year 2 student P22 talked about simulated patients enacting scenarios that, as medical students, they could come across elsewhere:

in the CSLC (.) so it's just urm (1.0) so it's just kind of preparing you for that so you come in you sit down you speak to simulated patients (.) ur:m who (.) enact scenarios that you could come across (.) in the ECE (.) ur::m (3.0) and they y- ye::h they give you feedback (.) on what you could do better (.) in the scenarios it does help.

Example A26: Year 2 Student P22, Interview, 2/3/2016

The foregoing examples from the interviews are general in nature. However, during the interviews, participating students also mentioned specific examples of explicit links. Year 1 student P1 talked about how they had been learning about asthma and how they had seen an asthma patient in consultation skills and in GP ECE visits. P1 went on to mention the pharmacology practical aspect of being able to experience the drugs used to treat this condition:

then comes salbutamol? (.) and th- (.) they'd be on salbutamol then (.) in comm:s (.) we practice (.) err well we (.) we take salbutamol and (.) ur::m see the effect that has on us.

Example A27: Year 1 Student P1, Interview, 7/5/2015

Year 1 Student P4 made similar points regarding the topic of asthma during their own interview. P4 also talked about how they had covered lungs in anatomy. Participants often used the topic of asthma as an explicit example during the semester 1 interviews.

Other examples of articulating explicit links between sessions were noted. P11 talked about a microbiology practical that had covered a particular type of bacteria, going on to mention its relevance to a particular PBL case:

in the microbiology session we'd be looking at the bacteria under the microscope (1.0) so it was relevant to the case.

Example A28: Year 1 Student P11, Interview, 30/4/2015

Year 1 student P2 talked about how they had performed a respiratory examination on a patient during a hospital placement. P2 then went on to talk about how it had helped to practise this on a healthy person during a consultation skills session first. Year 1 student P7 explained the benefits of the integration between PBL and consultation skills, using Down's syndrome as an example:

sometimes like (.) when you try do for like (1.0) urm communication skills they try and take like the cases that we have (.) we have been learning? (.) and like they try and like (.) urm (1.0) apply it so like (1.0) I think like f- for example like last semester we did a case on like Down's syndrome? (.) and like (1.0) then (.) they had (.) patient like (1.0) they had like the patients (.) whose (.) who were parents of a Down's syndrome kid come in so like (.) could talk to them and err (.) (sort of) explore like Down's syndrome (.) not just as like (.) a disease I read and urm (2.0) in (.) PBL (xxxx) so like (.) it's like you know like (.) urm the social side of Down's syndrome.

Example A29: Year 1 Student P7, Interview, 20/3/2015

P7 did however make the point that, as there was a two-week gap from the PBL session in question, it meant that they couldn't remember much about it. This may therefore reduce the impact on learning, and the educational value, of making the explicit link.

Further to the temporal relationship between interconnected subject matter, Year 1 students P1 and P11 thought that, most of the time, there was a good contemporaneous relationship,

often within the same week, between meeting patients in the PBL cases and then encountering the same patient situation or scenario in the CSLC environment. Year 1 student P4, however, commented that seeing patients in these two different environments could be a few weeks apart. Year 1 student P2 expressed the view that seeing a patient in consultation skills a week after the PBL case didn't help with the case as they had finished it. However, it was still of benefit to their communication skills, as they knew the science behind it rather than exploring a new patient, giving them more confidence for doing the consultation:

I think it helps (.) your communication skills because (2.0) you you know (.) the science behind it rather than (.) exploring (.) some new patient

Example A30: Year 1 Student P2, Interview, 29/4/2015

Other sessions where explicit links were articulated included evidence-based medicine (EBM) and physiology-pharmacology practicals. Year 1 student P9 talked about how EBM was relevant in that it usually taught the different case studies "in the context of the case" thus making the link explicitly. However, P9 did go on to point out that was more just to get them to learn the case studies. Finally, as a specific example of explicitly making links in the integration of learning, Year 2 student P24 pointed out, regarding the general topic of eyes:

we did a case on urm (.) the eye (.) so we were looking at nystagmus and things like that (.) and then we did the anatomy of the eye and the innervation you know the physiology (.) and then ur:m (.) in err phys-pharm (.) we err (.) did all the different examinations for the eye? So urm (1.0) we got the ur:m (.) the H tests and (1.0) yeh map it mapping out the visual fields and things like that so (.) it's very (.) compact and integrated.

Example A31: Year 2 Student P24, Interview, 2/3/2016

4.3.b Consultation skills helped to bring PBL to life

Bringing patients from the PBL cases to life via the use of SPs in consultation skills, in simulated and real clinical environments (section 3.1), was noted to be important to the integrated learning experience. Bringing PBL cases to life was also a facilitator of integrated learning (this will be discussed in Chapter 5). Staff member P25 highlighted this with their

observation “*you're mixing the knowledge and the communication skills at that point*”. Some of the participating students related their early clinical experiences to the PBL process. This relationship contributed to the framework of integrated learning, providing further evidence of interconnections between sessions. In this vein, Year 2 student P13 explicitly mentioned how patients in consultation skills were based on those in PBL cases:

P13: like (.) the person (.) the patients that we see in (.) the simulated patients in commun- in comms

TM: Okay

P13: ar::e (1.0) the patients that (.) the cases are based around in PBL (.) and have similar symptoms

Example A32: Year 2 Student P13, Interview, 14/3/2016

Year 1 student P1 also pointed out how characters portrayed by simulated patients in consultation skills sessions sometimes matched up with PBL in terms of being the same person as the PBL case, saying that:

you ask for the name and it's the same name as in the case.

Example A33: Year 1 Student P1, Interview, 7/5/2015

Staff member P26 talked about student course feedback that referred to putting into practice what the students had learnt with real people, and also how seeing a PBL case clinical scenario in real life was useful:

or we saw a case of (.) such and such in our PB u- we- we did a case in our PBL group and then we saw a patient on it (.) and that was really good 'cause it helped us to see what it was like in real life

Example A34: Staff Member P26, Interview, 31/8/2016

As well as enriching the PBL process by providing corresponding patient characters, consultation skills also gave students the opportunity to learn clinical skills that overlapped elsewhere. In this vein, Year 1 student P6 observed how, in a consultation skills session, learning how to examine a person's chest added another overlapping perspective:

in: communication skills it's the actual what you would do the listening to the chest sort of thing so I think (1.0) that's how they overlap because you're getting (.) it from three (.) perspectives which hopefully all (1.0) unite to (2.0) I don't know give you what you need I suppose.

Example A35: Year 1 Student P6, Interview, 13/3/2015

4.3.c Learning similar subject matter in different environments helped drive the integrated experience

Some staff members described the integrated learning experience as, combining the learning of similar, related content, from different angles. Integration was described in this manner by P26, using, as an example, learning chest anatomy, how to examine the chest, the related physiology, how to communicate about it with patients and also learning about chest diseases. Staff member P37 expressed a similar point of view, citing the example of students learning to teach inhaler technique to a patient. This topic – how to use an inhaler – was taught from a scientific standpoint in physiology-pharmacology practicals, and from a patient centred standpoint in consultation skills. However, staff member P27 perceived that in physiology-pharmacology practicals, students were taught isolated skills, whereas in consultation skills sessions, skills were taught in a patient centred manner. This viewpoint implied that parallel learning within sessions was not universal, though the interconnection of subjects between sessions was still visible. Integration was perceived by staff member P28 as learning subjects such as bioscience, medicine, ethics/law, consultation skills and behavioural and social sciences together rather than separately.

Staff members highlighted how basic sciences were referred to in consultation skills sessions, and how these references contributed to how the students experienced integration. P27 felt that anatomy, physiology and pharmacology were incorporated into consultation skills sessions, and that this approach showed students why learning the science was important:

TM: *Okay ur::m what:: do you say (.) is integrated at the moment*

P27: *Ur::m (.) [makes sounds] (.) within the consultation skills //sessions//*

TM: *//mmm//*

P27: *I think we are trying to incorporate anatomy //and//*

TM: *//mmm//*

P27: *physiology pharmacology*

TM: *//mmm//*

P27: *//into the// (.) consultation skills sessions (.) ur::m showing the students tha::t (.) it's important to learn the science and there's a reason for learning the*

TM: *//mmm//*

P27: *//science// ur:m so for example examination skills we've tried to talk a little bit about the anatomy*

TM: *//mmm//*

P27: *//and// physiology behind (.) different aspects*

Example A36: Staff Member P27, Interview, 31/8/2016

Further to referring to basic sciences in consultation skills, staff member P32 explained how changes had been made to allow the psychological concept of behaviour change to be brought into consultation skills teaching. Behaviour change had been taught as models via PBL, and students now had opportunities to implement these models. PBL tutors were informed, via the respective tutor notes, which consultation skills sessions provided students with the opportunity to practise models cued in a PBL case. Consultation skills tutors were then tasked with drawing out what the students had learnt in PBL (the consultation skills tutors had been provided with a summary). One example of this is adherence to medication. Staff member P36 mentioned students having the chance to discuss ethical, behavioural and social science aspects in consultation skills; this supported P32's comments as just outlined.

Students demonstrated their understanding that attempts to build links between different subject areas and learning environments (section 3.1) had been made. Year 2 student P20 felt learning about the basal ganglia (part of the brain) during anatomy whilst doing a PBL case on Parkinson's tied together really well. This student also mentioned how GP visits would attempt to tie in to the PBL cases:

they'll try to get a patient (.) that we can carry out a- an exam on like if we've been doing respiratory (.) get do a respiratory exam or do an abdominal exam.

Example A37: Year 2 Student P20, Interview, 29/2/2016

This type of interconnected content thus added to the students' integrated learning experience.

Staff noted specific and global course design features that linked learning environments. Microbiology, for example, was used by staff member P29 to illustrate how integration was designed to work on the ground. Similar content would be experienced by students between microbiology, PBL and hospital visits, and thus there would be reinforcement via content repetition:

the microbiology integrates with the PBL cases because we make sure that (.) there is (.) integration of content (.) and then that is again integrated (.) with: (.) what the students are having to do (.) with when they go out to the hospital visits so to be specific (.) urm we revise (.) w- what happens in terms of hand washing? (.) and in terms of (1.0) their understanding of (.) urm (.) you know Staph aureus and (.) and bacteriology (.) urm and made sure that (.) there's a difference between repetition reinforcement and integration

Example A38: Staff Member P29, Interview, 12/9/2016

The staff member P29 here makes an interesting observation about the difference between repetition, reinforcement and integration. This staff member viewed integration as more than simply meeting the same subject matter twice. For this staff member at least, it is clear that there is a distinction to be made between integration, and simply mentioning subject matter without elaboration. Mentioning subject matter encountered elsewhere on the course doesn't necessarily mean that students have understood the interconnections between different subject areas and learning environments. Reinforcement via content repetition on its own,

therefore, does not amount to integration. However, encountered related subject matter across different sessions provides the opportunity for students to make the connections that drive an integrated learning experience. In this case, the staff member talked about how the teaching in this particular session put the related subject matter in context, in order that the students would have the opportunity to learn in an integrated manner. It is not possible to determine, within this study, whether all students actually did learn in this way; but it is evident that the opportunity was available.

Staff member P39 expressed a global view of how integration was experienced by students, in terms of covering different subject areas and relating early clinical experience to PBL group learning and practical classes:

PBL is ur::m is integrated there are (.) the: students are expected t:o cover (.) different er:r (.) aspects of err (1.0) of medicine so from the urm (.) behavioural side of it to: (.) physiology anatomy side pharmacology (.) ur:m (1.0) and then since the: (1.0) early experience (.) err I guess the early experience visits (.) ur:m it (.) relate to the: to what they're learning in in PBL (.) urm (1.0) [tuts] practicals so physiology practicals we've tried to align those with the (.) err communication skills (.) sessions so that the students are are covering the: (1.0) ur:m [tuts] consultation (.) ur::m (.) u- alongside the: the physiology so that err I think that: (.) has worked quite well

Example A39: Staff Member P39, Interview, 19/7/2017

The above examples provide evidence of the ways in which one area of learning can support another, and thus contribute to the integrated learning experience. There were a variety of forms of support and enhancement. Interconnections between learning environments were observed by the participants as basic tenets of experiencing integration. These interconnections included clinical experiences, which put in focus what was being learnt in the university environment.

Some students had different ideas on integration. Year 2 student P22 simply characterised integration in terms of whether PBL and lectures co-exist on a course, noting that:

I'd classify Manchester as a Man- urm (.) as a PBL course (.) err you do get lectures (.) so (.) it is integrated in that respect.

Example A40: Year 2 Student P22, Interview, 2/3/2016

It is difficult to determine from the present research whether or not such a level of understanding had an effect on how integration, in terms of parallel learning, was experienced. There was a range of views among staff members regarding the extent to which students saw integrated learning. Staff member P31 thought that students only saw the course as partially integrated. However, staff member P36 felt that the students probably saw integration as quite important, and staff member P37 thought that the majority did see the course as integrated. This insight into the student viewpoint was borne out by the present data and analyses. Staff member P25 thought that students valued the opportunity to go over the same skills learnt in different environments such as in the CSLC and physiology-pharmacology practicals; and students reported that they did indeed value these opportunities and experiences.

4.3.d Theme conclusion: Related subject matter was encountered in different sessions

Making explicit links was a key respect in which the integrated learning experience was enriched. The instances of making explicit links gathered in this study made it possible to be certain as an observer that the participating students were actively experiencing integration. Their active experience of integration had a role in the reinforcement of their learning, although at times it seemed that the lack of contemporaneity between the linked experiences confounded this, as acknowledged by the participating students. By bringing PBL learning to life using simulated patients, the reinforcement became highly sophisticated. Interconnections were constructed between learning environments, providing evidence that the integrated experience was deliberately constructed for students' learning.

4.4 Chapter summary: Experiences of Integration

PBL is an integrated way of delivery teaching (Barrows, 1980, Spaulding, 1969, Neufeld and Barrows, 1974, Davis and Harden, 1999, Wilkerson et al., 2009). The initial student experience of integration for each PBL case was the construction of a learning agenda. These agendas drove integration by giving the opportunity for multiple subjects to be learnt in synchrony: in parallel time and space. Learning agendas, with their basic science, clinical science and psychosocial learning outcomes, set the stage for integration and are therefore important for how integrated learning is experienced and modelled. Discussions were also an important way in which students experienced integration. These would bring in various subject areas and therefore showed evidence of integrated thinking in terms of making connections between different subject areas: something that, from the data, appears instrumental for students to be equipped to learn from in an integrated manner. Multi-subject discussions also occurred in consultation skills, dissection sessions, and during informal learning. Multi-disciplinary learning as a component of integration has been described in other research studies (Muller et al., 2008). During discussions, students made explicit links to learning environments beyond the one at hand. These explicit links took the form of an acknowledgement that something had been experienced before. Explicit links between basic and clinical science have been noted elsewhere in the literature (Dyrbye et al., 2007, Macaulay and Nagley, 2008). The articulation of explicit links aided reinforcement of learning and interconnections between learning in different sessions. Students were able to demonstrate an understanding that interconnections existed between sessions, and that this was beneficial to their learning. This will be addressed in Chapter 7.

Chapter 5: Facilitators of Integrated Learning

This chapter explains the variety of ways in which integrated learning was facilitated on the Manchester medical course. A number of different processes and lines of communication were in place to promote, enable and support integration. These facilitators included: students' own initiatives to help and support one another; students' use of tutors as a learning resource; the sense of group cohesion and togetherness among the participating students; the opportunities for learning on clinical placements; a new form of assessment introduced into the programme; staff behaviours, perspectives and interactions with one another.

5.1 Students helped and supported each other with the integrated learning process

There were many occasions in various sessions where one or more of the participants were observed helping those who were less sure of the subject matter at hand. This assistance took the form of: definitions, clarifications, pronunciations, demonstrations, advice over propriety/professionalism, and posting resources. Here, the participating students were seen to become resources in their own learning. Of course, it can be generalised that discussions in PBL sessions were composed entirely of what could be considered potential help and support. However, when help and support was specifically observed and noted, evidence was found to demonstrate particular instances and features of such support, through the behaviours and actions of these participants.

5.1.a Peers within the PBL group helped and supported each other

Undertaking a medical training entails meeting a panoply of new terminology, some of which requires definition and some of which creates difficulty with pronunciation. During one PBL discussion, a question posed by Year 1 student P12 about the difference between diagnosis and prognosis was answered by Year 1 student P6, and then broadened out to group discussion, resulting in a consensus definition:

P6 answered “prognosis is an outcome”. This heralded a group discussion and consensus.

Example B1: Field Notes, Semester 1 PBL Case 3 Session 1, 20/10/2014

Pronunciation was a key issue for the students. There was ready help when a participating student struggled with this. Year 1 student P12 struggled to pronounce ‘oogenesis’:

P12 said “oogenesis”. There was laughter in the group at the pronunciation, followed by a group consensus on how to.

Example B2: Field Notes, Semester 1 PBL Case 1 Session 2, 3/10/2014

Other examples of this issue with pronunciation could be seen with Year 1 student P4 struggling with ‘pancreatitis’ and Year 2 student P13 with ‘binocular’ (vision). When Year 1 student P9 struggled with pronouncing ‘thoracic’, phonetic help was offered by Year 1 student P11:

P9 had trouble pronouncing thoracic. P12 corrected P9’s pronunciation. P9 got it wrong again. P11 now corrected him/her and suggested “try saying it with an s”.

Example B3: Field Notes, Semester 1 PBL Case 7 Session 2, 28/11/2014

There were times during PBL when a participating student presented what was new information to others in the group. In the following example, we can see how readily the person in question acquiesced to a request to repeat said information:

P8 then defined late onset puberty in males and females. P5 said it “occurs in 3% of all children”. P4 was writing down this information and asked P8 for clarification. P8 repeated the information and P4 wrote.

Example B4: Field Notes, Semester 1 PBL Case 4 Session 2, 31/10/2014

Another example is Year 1 student P11 clarifying an aspect of bone growth:

P4 said “is that appositional growth?” P11 clarified this.

Example B5: Field Notes, Semester 1 PBL Case 4 Session 2, 31/10/2014

Sometimes participating students would talk alongside the protagonists during a topic discussion. During a prevailing topic during a PBL session – folic acid in pregnancy, in relation to which the dose was being considered – two of the participants discussed the answer between them in order to clarify:

P12 then said “I’ve got the study so I’ll check”. There was then a side discussion between P11 and P12 over the computer screen. They agreed it was 4mg, and P12 read out “4mg, 72%”.

Example B6: Field Notes, Semester 1 PBL Case 1 Session 2, 3/10/2014

This example showed a side discussion relevant to the topic at hand. This wasn’t always the case, however. During a discussion about neurological pathways, a tangential, off-topic side discussion occurred, when Year 2 student P21 tried to clarify with Year 2 student P20, regarding the point P20 had made:

P21 said to P20 “what was the third pathway that you talked about?” P20 said “so that one goes to the hypothalamus but I don’t know”.

Example B7: Field Notes, Semester 3 PBL Case 2 Session 2, 12/10/2015

Such off-topic side discussions could be viewed as disruptive; in this case however, this discussion was facilitative to the integrated learning process, as without the clarification, P21 may have been left behind.

The participating students could also be seen to help each other in environments outside their PBL sessions. The support they gave each other sometimes took the form of a definition, such as when Year 1 student P12 explained chronic kidney disease to Year 1 student P1 on enquiry during a hospital visit. Or when P12 was observed helping Year 1 student P3 with defining the terms tubercle and tuberosity, in a non-timetabled session. And in another non-timetabled session, P3 was observed asking those present what CBT was:

P3 asked the group "what's CBT". P4 said "cognitive behavioural therapy".

Example B8: Field Notes, Semester 1 Non-timetabled meeting to discuss a poster, 3/10/2014

In this same non-timetabled session (example B8) the participating students were also observed to be helping each other with learning their anatomy. Year 1 students P4, P5 and P7 were working together on the structure of the pelvis, and then in the subsequent anatomy session, their co-operation continued:

P4 explained which was anterior and posterior on the pelvis and P4/P5 discussed where ligaments attached. All four of P7, P5, P11 and P4 worked together to identify structures.

Example B9: Field Notes, Semester 1 Anatomy, 3/10/2014

There was further support with learning about bones in a non-timetabled session, where one of the participating students was unsure about the bones of the skull:

They were all looking at the bones of the skull and P22 asked the others about a skull bone and the region at the top of the skull, both of which P16 and P18 helped P22 out with.

Example B10: Field Notes, Semester 3 Non-timetabled session, 10/11/2015

The participating students attended laboratory practical sessions as part of their timetabled learning. During these practical classes, peer support with learning the meaning of medical terminology was observed. One such example could be seen when one of the participating students wanted to know what astigmatism was, in a physiology-pharmacology class (B11a). Later in that session there was a follow-up question, whereby the same student wanted to confirm their new understanding (B11b):

- a. P19 said “*what's astigmatism*”. P16 said “*it's when your eye is like rugby ball shaped*”.
- b. Later P19 said to P16 about astigmatism “*so it's the degree your eye is not spherical*”. P16 confirmed this.

Example B11a and B11b: Field Notes, Semester 3 Phys-Pharm, 13/10/2015

The participating students would also help each other with the tasks in practical classes. This can be seen in physiology-pharmacology, when Year 2 student P16 figured out how to use an ophthalmoscope, and helped Year 2 student P18 to learn a particular exigency of the equipment:

P16 had figured out how to get different sizes of light on the ophthalmoscope. Watching this, P18 said, “oh, how do you get the target one”. P16 showed P18.

Example B12: Field Notes, Semester 3 Phys-Pharm, 13/10/2015

On another occasion during a physiology and pharmacology practical, Year 2 student P22 clarified with Year 2 student P16 that he/she was doing near point measurement correctly. There were other types of practical classes where peers would assist each other, for example during a microbiology practical session when help was requested and readily given:

P9 and P1 asked P11 [who was sitting opposite them] “how you do the blotting thing?” P11 said, “you touch it really gently”.

Example B13: Field Notes, Semester 1 Microbiology Practical Class, 17/11/2014

On some occasions, students would share resources, to help other group members. During a PBL session it was noted that Year 2 student P21 had talked about a point of interest, which he/she had picked up on after looking at a resource that another participating student had provided:

P21 talked about an “interesting theory” about hydrogen peroxide, free radicals and damage to the substantia nigra. P21 had referred to P18 posting this on the group’s Facebook page and P18 said, “you’re welcome”.

Example B14: Field Notes, Semester 3 PBL Case 7 Session 2, 23/11/2015

A further example from another PBL session is when, following a discussion about cerebral oedema and hydrocephalus, Year 2 student P18 offered to put a relevant paper on the group’s online page.

Sometimes there was physical demonstration, such as when three of the participating students demonstrated to Year 1 student P8 where the thoraco-lumbar area of the body was. The question posed by P8 hadn’t been prompted by anything; indeed, the points that were addressed leading up to it had been regarding microbiological investigation and medications:

P8 asked “what’s the thoraco-lumbar area?” P4, P12 and P6 all demonstrated where it was.

Example B15: Field Notes, Semester 1 PBL Case 8 Session 1, 1/12/2014

In an anatomy session, Year 1 students P4 and P5 were observed working together on the orientation of the radius bone, with P4 demonstrating how they remembered what supination meant:

P4 said “supination is carrying soup” and demonstrated.

Example B16: Field Notes, Semester 1 Anatomy, 5/12/2014

Sometimes the assistance would involve drawing, such as Year 1 student P11 helping Year 1 student P1 with a diagram of a bone:

P12 threw a pen to P1 at the other end of the room, and getting up, P1 drew a bone and where osteoblasts and osteoclasts were located, with P11 helping verbally.

Example B17: Field Notes, Semester 1 PBL Case 8 Session 2, 5/12/2014

During consultation skills sessions, the participating students were a resource for each other in the learning process, in that peer feedback was expected following simulated encounters. This feedback sometimes took the form of positive reinforcements, such as when Year 1 student P2 complimented the body language of Year 1 students P6 and P11 during a simulated interview:

P2 pointed out there was good body language, they [P6 and P11] nodded to show they were listening and explored well.

Example B18: Field Notes, Semester 1 CSLC Session, 17/11/2014

Sometimes the feedback was in the form of constructive critique, for example when two participating students were involved in feedback regarding correct consultation protocol for establishing the patient's identity:

P11 said to P12 "not sure if you established if you had the right patient?"

Example B19: Field Notes, Semester 1 CSLC Session, 20/10/2014

Whilst learning cranial nerve examination during a consultation skills session, Year 2 student P24 experienced help from two other participants when endeavouring to refine carrying out the Weber test (a test to classify type of deafness):

P24 did the tuning fork Weber test. P13 said, "oh shit, I got an electric shock" when P24 applied the tuning fork to his/her forehead. They all laughed. P14 suggested, "put it on quicker" to avoid this shock. P24 tried again and P13 suggested he/she apply more pressure. With this feedback, P24 got the pressure right so the tuning fork could be heard.

Example B20: Field Notes, Semester 3 Introduction to Cranial Nerve Examination, 23/11/2015

Numerous occasions can therefore be seen where help with a variety of different aspects of the learning process was given by fellow students. The forms of help given ranged between pronunciation, clarification of points, feedback and physical demonstration. The PBL environment was the main place where the help and support occurred, and the group-driven ethos of the course provided the opportunity for it. These forms of help and support became

part of the integrated learning process, with the group members themselves becoming another learning resource for each other.

In addition to the ethnographic observations presented above, the interviews with students and staff provided illustration of the importance that participating students attach to the input from others.

From the student perspective, Year 1 student P7 summed this up as relying on fellow students for teaching and learning:

I think like you definitely rely on like (1.0) on like your classmates a lot for like your own teaching and learning? (1.0) ur:m in terms of like (.) in PBL and stuff

Example B21: Year 1 student P7, Interview, 20/3/2015

Year 1 student P1 talked about how all the group's members need to contribute when forming the learning objectives for the week's PBL case, in order to optimise and enrich the process:

everyone has to contribute to get those (.) ur:m (.) you wouldn't reach (1.0) the sort of the learning objectives (1.0) if (.) everyone wasn't contributing

Example B22: Year 1 student P1, Interview, 7/5/2015

During an interview with Year 1 student P11, he/she mentioned how working together in the PBL sessions, both where they set the learning objectives for the week and where they discussed the week's learning, allowed the group members to achieve more than could have been done individually. Year 1 student P1 observed how other students gave feedback in consultation skills sessions, as part of their response to being asked if the other students helped:

they give (.) ur:m (.) they give feedback urm we were doing it the other day in our mock OSCEs (.) an:d (.) yeh (.) so (.) they give //feedback//

Example B23: Year 1 student P1, Interview, 7/5/2015

In their interviews, Year 2 students P18, P22 and P24 all talked about how they valued the input of other PBL group members in their learning. Year 2 student P20 valued how they could go and ask peers for help both within and outside of the PBL group:

if you don't understand something (.) I know there's several people that I could go to and they'll sit down and (.) explain it to me and they won't (.) call me stupid

Example B24: Year 2 student P20, Interview, 29/2/2016

Year 1 student P2 talked about the value of PBL in terms of creating a community of students, helping each other, forming friendships, getting to know different groups, working with people rather than on your own, and preparing for working in teams:

one of the best things with PBL for me is that (1.0) we're a group (.) and we change groups (.) and you (.) make more friends and (1.0) like you get a community and (.) help each other (.) and I think it's quite important to help each other (.) rather than be stuck in your room (.) studying on your own (.) completely lost (.) to (.) have direction and (.) work with people and I think (.) stuff like that's really good (.) for the future when you're in teams

Example B25: Year 1 student P2, Interview, 29/4/2015

Year 1 student P2 talked about how other students help in physiology and pharmacology practicals, giving an example about being taught by a peer how to get blood from a thumb:

Ur:m (2.0) well (.) last week I was in phys (.) physiology and pharmacology (.) and ur::m I'd missed the sectio- (.) the session with the blood (.) on the thumb (.) s:o I just asked my friend (.) okay will you do this with me and then (.) he/she taught me how to do it (2.0) and (.) then we checked with the (.) leader and they said it was right

Example B26: Year 1 student P2, Interview, 29/4/2015

Staff members also expressed views on peer support. P32 and P36 observed that students worked well together in small group teaching. Staff member P35 though, did not necessarily think that working together impacted on integrated learning. P35 however, was very impressed with how students worked together, particularly in groups, and how they would find a way to collaborate when they are very different people in a clinical partnership. Staff member P31 pointed out that there wasn't an issue regarding school leavers and graduates working well together, although graduates were noted to anticipate this as a source of concern:

interestingly enough I haven't seen any tension between graduates and undergraduates you know sometimes the graduates on admission (.) urm they're a bit worried about working with undergrads (.) but actually they all just seem to get on (.) quite well

Example B27: Staff member P31, Interview, 11/10/2016

Staff member P37 talked about how the students “love to help each other out” and staff member P33 extolled the virtue of good group dynamics:

sometimes there are groups where they're just absolutely (1.0) they click and they just (1.0) you know you can come back and you can (.) relax as a tutor 'cause you're almost like (.) these are excellent they're just (1.0) working so well together

Example B28: Staff member P33, Interview, 20/10/2016

5.1.b Students received help from peers outwith the PBL group

In addition to the participating students serving as a resource for each other's learning within the context of their PBL group, they also, as observed via the ethnographic process, or as acknowledged in interviews, could be seen to benefit from the help and assistance from other students outside their PBL group. These other individuals, therefore, by providing help and support in the manner of that required in particular circumstances (such as ensuring depth of learning, and addressing the variety of learning outcomes), become learning resources themselves and contribute to the integrated learning experience.

In semester 1, the Year 1 group were required to produce a poster in the area of behavioural change, and selected smoking cessation. Following arrival by invitation to a non-timetabled

session where the participating students were working on their poster, a presentation was observed on a screen that had been obtained from a student in the year above. The group were using it as an example of what was required of them:

I assumed the group had already made some slides and were discussing a plan. P2 pointed out to me that the slides had come from a student in the year above who had done a presentation on a different topic. They liked the pictures and found this useful. It was looked at by the group to see the sort of thing that was required and then they concentrated on their own plan.

Example B29: Field Notes, Semester 1 Non-timetabled meeting to discuss a poster, 3/10/2014

In an interview, Year 1 student P2 talked about using second year students as a resource to gain understanding of the required depth of learning. Year 1 student P1 reported the benefit of working with students from outside the PBL group:

I mean obviously yeh in (.) in form (.) formulating your learning outcomes that you've got to study for the week (.) ur:m (.) you do that with your PBL group (.) err (.) but I think it's mor::e about (1.0) friends from the course I think that::s (.) cause I I I find it really beneficial to work with someone else

Example B30: Year 1 student P1, Interview, 7/5/2015

P1 went on to talk about the benefit being related to diversity of learning objectives and perspectives between PBL groups. This may help with understanding interconnections between subject matter. Year 1 student P9 recounted asking friends in the same year when stuck on a particular aspect of the learning, to see where they found relevant information. Year 2 student P24 also referred to the role of friends on the course in terms of explaining uncertain subject areas. Year 2 student P20 talked about going to the anatomy room twice weekly with a friend and fellow student, saying:

we'd go once to like (.) just quickly go over everything and then we'd go again (.) and we'd test each other

Example B31: Year 2 student P20, Interview, 29/2/2016

5.1.c Theme conclusion: Students helped and supported each other with the integrated learning process

The help and support peers provided was wide-ranging and valued by students. It could be seen in a variety of session types; thus, it was not simply a product of PBL. However, it is possible that peer help and support, occurring firstly in PBL, initiated it taking place elsewhere on the course. Peer support sits in the dimension of facilitating learning on the course. It is a key facilitator of the integrated parallel subject learning process.

Whilst group learning is part of the PBL process and is a given in PBL, it is nonetheless noteworthy that, through PBL, students actively helped each other to make connections between the different areas of their learning. Students' assistance in each other's learning is evident through a variety of instances, in different learning contexts, as observed and reported in the ethnography and the interviews in the present data. The question is might it affect relations elsewhere in the students' social interactions. This question goes beyond the scope of the research. As a result of the peer help and support, participating students became resources themselves in the learning process. It isn't possible to state that this was a consequence of integration; however it was very much part of integration on the Manchester medical course. Peer assisted learning was not a formal part of the Manchester medical course: as observed in the present research it was more of collaboration amongst peers, and it was seen to facilitate integrated learning.

5.2 Students used faculty as learning resources

This theme sets out how tutors facilitated the integrated learning experience by becoming resources that helped and supported the students to integrate their learning. The data illuminated how the participating students experienced this valuable learning resource. The specific focus in this analysis is on the ways in which staff teach by guiding a student through a process of learning. This entails pointing out or helping the student see connections for

themselves, thereby supporting the student in their integration of knowledge and learning from different subject areas and domains.

5.2.a Help from PBL tutors

The participating students were observed to experience help from their PBL tutors, such as in correct pronunciations: for example when Year 1 student P12 wanted to know how to pronounce 'ichthyosis vulgaris'. The student participants would ask direct questions of their PBL tutor, such as when Year 1 student P6 wanted to know the meaning of 'chemotactic', or when Year 1 student P1 wanted to know, with regards to HIV infection:

“what happens to the host cells DNA or does it just have both?”

Example B32: Field Notes, Semester 1 PBL Case 5 Session 2, 7/11/2014

Another instance of this direct questioning occurred when Year 2 student P16 wanted to clarify an aspect of the neurological tracts with the tutor, asking about which one the medulla was involved in. In a slightly different vein, relating to tutor support, Year 1 student P11 talked about how they could ask the PBL tutor for guidance on how much they needed to know, and highlighted the role of the PBL tutor in formulating learning agendas:

we have the tutor there to make sure that the learning agenda stays on course?

Example B33: Year 1 student P11, Interview, 30/4/2015

Such guidance from tutors was key to integration, encouraging students to navigate and make connections between their multi-subject learning agendas. However, Year 1 student P9 expressed a view that, from their experience, the tutors in PBL took more of a back seat. Therefore it seems that not all students experienced the same degree of support from their PBL tutors; and perhaps that some students navigated the interconnections for themselves and with their student peers, rather than looking to the tutor for guidance.

5.2.b Help from tutors in other sessions

Tutors always facilitated timetabled sessions and were available throughout these sessions to help the students. During part of an anatomy session in which the pelvis was the topic at hand, Year 1 student P4 wanted to confirm a part of this structure with the tutor, asking, “*so is that the pubis?*”. Other questions that the participating students required support with during anatomy included: being able to correctly identify connective tissue (Year 1 student P11), and asking for help with how to pronounce terms, for example Year 2 student P24 regarding the pronunciation of ‘buccinator’. Also observed was how use of the tutor as a source of support could stray beyond the formal part of a timetabled anatomy session:

P19 stayed behind at the end and asked the tutor about why pressure changed in the Eustachian tube when it was blocked.

Example B34: Field Notes, Semester 3 Anatomy, 22/10/2015

During the interviews with students, Year 1 student P9 talked about how, in anatomy, they didn’t need to rely on peers so much because of the presence of the faculty anatomy demonstrator:

usually the demonstrator just does all our answering in anatomy

Example B35: Year 1 student P9, Interview, 13/3/2015

Here we see the facilitator of peer support replaced with another facilitator (the anatomy demonstrator) for this session type. The implications of this are the normalising of peer support for this particular student, and how much peer support is relied on.

In consultation skills, the participating students were observed experiencing help from tutors with certain aspects and elements such as how to take the pulse correctly, and how to track a patient’s eye movement during cranial nerve examination:

P15 said, “actually, can I ask a question, do you need a pen or can you use your finger”.

Example B36: Field Notes, Semester 3 Introduction to Cranial Nerve Examination, 23/11/2015

During the interviews, Year 1 student P1 talked about learning clinical examination in consultation skills with a tutor-led demonstration. This was followed by the opportunity to

practice, when the tutor would circulate *“and put you right”*. Staff member P34 pointed out in interview how consultation skills tutors would be *“encouraging the students when they were consulting with a patient and carrying out the examination to think about the anatomy”*. Staff member P33 had concerns that some students didn’t see the integration in physiology-pharmacology practicals, tending to work through the protocol without relating it to anything. In this situation, staff members quizzed students in order that they related the session to the PBL case. This served as facilitator of integration as it prompted students to think about, and make connections between, different subjects that they were learning in parallel.

Hospital visits also provided opportunities for tutor help and support. At one hospital visit, Year 1 student P6 wanted to clarify a point regarding hand hygiene with the tutors, in relation to a cardiac arrest situation:

P6 asked “what’s the protocol if there’s a cardiac arrest and you are with a patient and have to run?”

Example B37: Field Notes, Semester 1 Hospital Visit, 17/10/2014

At another hospital visit, Year 1 student P1 wanted to clarify what to do when in the ward environment if there weren’t any chairs, as they once had to stand to carry out the patient interview. Whilst observing the participating students being given a talk by radiographers during a hospital visit, Year 2 student P13 wanted to know more about radiation burns:

P13 asked “are people more likely to get the burns with radiotherapy?”

Example B38: Field Notes, Semester 3 Hospital Visit, 11/11/2015

There were therefore tutors in clinical settings, not formally part of the teaching faculty of the medical school, who contributed to the facilitation of integrated learning by providing help and support with the process of making connections between different subject areas.

5.2.c Theme conclusion: Students used faculty as learning resources

The students used the faculty resource in their integrated learning by clarifying points with staff and by seeking assurance from staff that their learning was on the right track. Without this staff contribution, the students’ ability to integrate the different areas of their learning may

be compromised. It is acknowledged that there is a difference between explaining something to a student by simply giving them answers and helping them integrate knowledge from different domains. As some tutors took more of a back seat, it wasn't possible to determine whether questions addressed to tutors was a universal facilitator of integrated learning. However, where it did take place, it certainly was both a means of delivering teaching and facilitation of integrated learning by the students.

It is important to acknowledge here that PBL tutors aren't specialists in all subjects that are discussed. The amount of experience they have in each subject will inevitably vary from one tutor to a next, and in general tutors did not spend much time explaining subject matter to students. Whilst I was not observing staff during PBL, from standing on the periphery and witnessing the PBL tutors' interactions with their students it became clear that the PBL tutors did not spend much time on explanation of subject matter. This lack of explanation is therefore a potential issue in a PBL driven integrative learning process.

5.3 How participating students attended to the human and personal side of learning medicine

The help and support experienced by and among the participating students contributed to building group togetherness. Other, peripheral factors, that were part of the human and personal side of medical learning, served to enhance the overall help and support among the students in relation to the integrated learning process. These peripheral factors related to the sense of group identity, the role played by humour, and notions of propriety. Building group togetherness, particularly occasions where humour assisted group bonding, is an important consideration in terms of students helping each other, and is inherent in the integrated learning process on the Manchester medical course. Additionally, engaging with the complex and person-centred topics being studied, such as consideration of propriety, contributed to the integrated learning process. While the factors considered in this section are features of any learning environment, they play a key role in student engagement, and as such have the potential to integrate student learning.

5.3.a Humour was in ready supply

A number of situations were observed where the participating students were occasioned to laugh. During a non-timetabled meeting between the participants, when they were tasked to put together a poster about smoking cessation, consideration was given to the services available, and Year 1 student P12 suggested a course of action that led to group laughter. The laughter, in itself, may promote togetherness, through shared amusement:

“we should go to the GP and say we need to stop smoking” the group laughed

Example B39: Field Notes, Semester 1 Non-timetabled meeting to discuss a poster, 3/10/2014

In a PBL session discussion regarding puberty, testosterone was mentioned in terms of its risks. Amongst suggestions given in response, Year 1 student P6 drew a parallel between this and puberty, prompting laughter in the group:

P6 said “irritability, that’s just like puberty”. There was general laughter in the group.

Example B40: Field Notes, Semester 1 PBL Case 4 Session 2, 31/10/2014

During a PBL session discussion about tricyclic antidepressants, the side effects of this group of medications were brought up, leading Year 2 student P13 to suggest a list, which precipitated laughter in the group:

P13 said “drowsy, nausea, forgetfulness, like what’s it called, amnesia”. The group laughed.

Example B41: Field Notes, Semester 3 PBL Case 2 Session 2, 12/10/2015

At a hospital visit the participating students had the opportunity to carry out a consultation with an SP, in which the patient had a torn cruciate ligament. During the feedback that followed, Year 2 student P18 highlighted what they thought was a pun and in doing so provoked laughter:

P18 pointed out “when she [the SP] said that was excruciating pain, that was a good pun wasn’t it”. There was a lot of laughter in the group at this.

Example B42: Field Notes, Semester 3 Hospital Visit, 11/11/2015

During a PBL discussion about gait, Year 2 student P19 initiated laughter when recounting a story from outside the University environment in which medicine had featured. Again, this shared amusement may promote group togetherness:

P19 said, “my flatmate was like my leg really hurts, can you look at it, I was like sorry, I haven’t done the leg yet”. There was laughter in the group.

Example B43: Field Notes, Semester 3 PBL Case 9 Session 1, 8/12/2015

When the participating students were initiating a discussion about skull fracture and methods of treating different types of fracture, a side discussion developed between two of the students, which then spread to their neighbour, with laughter occurring:

P14 said to P20, “take paracetamol and have a hot bath and you’ll be fine” laughing as he/she spoke. P20 and also P15 sitting next door also laughed.

Example B44: Field Notes, Semester 3 PBL Case 10 Session 2, 18/12/2015

Finally, at a hospital visit, the group were thinking about a particular acronym for listening to patients. Two of the participating students, rather than paying attention at this point, were engaged in small talk which showed evidence of bonding, facilitating the group togetherness at the heart of the MMS integrated learning process:

P4 laughed at P12’s socks, they both had Monday on and it was Friday. P12 explained he/she was in a rush that morning.

Example B45: Field Notes, Semester 1 Hospital Visit 2, 14/11/2014

5.3.b Consideration of propriety and professionalism

The participating students were observed at times to be highly conscious of propriety. This surfaced in comments made in the context of their integrated parallel medical learning: comments that might not be interpreted in the same way by the public at large. Propriety was also observed in terms of what the students recognised as denoting inappropriate behaviour by a future medical professional, such as professionalism issues. During a non-timetabled session, the participating students who were present were discussing anatomy of the pelvis and

had moved on to a discussion of growth plates. This topic is pertinent to paediatric anatomy; however, there was a note of caution regarding how lay people may view the discussion, and hence the students were taking propriety into account:

P11, P12 and P1 talked about where the growth plates were on the pelvis. P12 said “it would be good to see a child’s pelvis”. P11 said “be careful who you say that round”. P12 said “I meant the boney structure”. P11 said “I know but don’t say that on the bus or anything”.

Example B46: Field Notes, Semester 1 Non-Timetabled Session, 10/10/2014

Similarly, regarding propriety in a consultation skills session, Year 2 student P13 was conscious of the ethics and sensitivities of discussing patient problems in public with regards to consideration of those with similar issues:

P13 pointed out being careful discussing patients’ problems as it might be related to someone who can hear you with regards to them having the same issue.

Example B47: Field Notes, Semester 3 Mental Health Histories, 23/10/2015

During a consultation skills session, Year 1 student P1 was considering what questions were appropriate to ask a patient, and how to ask personal questions:

P1 commented he/ she felt it was more difficult to ask personal questions and was worried about being too blunt.

Example B48: Field Notes, Semester 1 CSLC Session, 17/11/2014

These examples showed how the group had bonded well together, as they were able to provide the sort of advice that went beyond just normal group learning. This bonding therefore facilitated the interpersonal side of the integrated learning process. Another example of this sort of situation regarding propriety occurred when Year 1 student P12 was conscious of the professionalism around timekeeping, apologising for being late to a PBL session. On a separate occasion, Year 2 student P19 was observed to do the same. The act of apologising appeared to be important for maintaining group togetherness: as, if group members weren’t thought to be taking these issues seriously, group cohesion may have been compromised.

5.3.c Theme conclusion: Building group togetherness added to the integration learning experience

Group bonding was an example of facilitation of integrated learning. Bonding improved the conditions within which integrated learning took place. Laughter implied humour, and is likely to have improved group togetherness by breaking down interpersonal barriers. Evidence of this happening came not only from impromptu and spontaneous jokes in the course of building knowledge or practising a skill, but also from discussions around propriety, and side discussions. Such discussions went above and beyond factual learning and were a sign of students who were comfortable with each other.

5.4 Real and simulated clinical experiences had a role in the integrated learning process

This theme sets out how students would undertake real and simulated clinical experiences. These early clinical experiences facilitated integrated learning by giving real life context to academic basic and clinical sciences.

5.4.a Simulated clinical experiences

Consultation skills sessions were held in the Consultation Skills Learning Centre, a purpose-built unit located in the medical school, designed to closely simulate a clinical environment (see Chapter 3 for a description of this setting). In consultation skills sessions, clinical subject matter was taught alongside the basic sciences. The sessions therefore facilitated the process of integration in the early years at a curriculum planning level. Sometimes the consultation skills sessions would involve more than one group of medical students together working on the same activity or skill. As for anatomy sessions in which the group configurations involved a blend of PBL groups, my approach was to not record any observations of students outside the consented group. There were simulated patients (SPs) in most consultation skills sessions,

whereby an actor would take on a defined patient role-play, and thus allow the participating students to conduct a patient interview in a protected environment. The design of this course using SPs specifically allowed controlled learning objectives, designed to integrate/link to PBL. Examples of scenarios encountered were shortness of breath, chest infection, HIV in the context of medication review, talking with the parents of a child with Down Syndrome, and pain with depression. Sometimes participating students would role-play the part of a patient, as can be seen in the following example:

P11 played the patient and P12 the interviewer. An outline was provided in terms of the history for P11 to use. The problem was a patient with shortness of breath. P11 lay on the bed on the sidewall. Shortly after starting the interview P12 paused to clarify with the others what the objective was. There was consensus among the other 3 to take a history.

Example B49: Field Notes, Semester 1 CSLC Session, 20/10/2014

History-taking skills went beyond simply asking about a medical problem. The participating students were taught how to gather information in a structured manner using communication techniques such as: effective opening/closing of a consultation, signposting/summarising during the consultation itself, using open questions which could then be narrowed down, building rapport, and legitimising patient concerns. They were able to experience utilising these techniques, facilitating integration of clinical skills within the context of learning the sciences. I observed insight into how students understood they were learning skills such as these in a discussion between Year 1 students P1 and P9 at the beginning of a session, where the group were invited to talk and share their thoughts amongst themselves:

P9 said to P1, "introduction, take a history, make the person feel welcome". P1 said "open questions". P9 said "yeh, encourage them to talk... it's like a skill trying to get the right information out of them".

Example B50: Field Notes, Semester 1 CSLC Session, 20/10/2014

Clinical examination skills, such as the simple act of taking a pulse or the examination of the cranial nerves, were also covered in consultation skills sessions. The participating students would get the opportunity to practise, following a demonstration. They were observed being guided by tutors in the pathological findings that could be seen during a clinical examination.

During an interview, Year 1 student P11 talked about how they were learning to do respiratory examination whilst studying respiratory cases (in PBL). The opportunity to learn the two in concert was therefore a facilitator of integrated learning. Staff member P36 suggested that consultation skills sessions themselves provided an arena for students to discuss different subject areas:

the CSLC seems to be (.) urm (.) where students can (.) [tuts] you know really (.) sort of start discussing (.) aspects of (.) err different aspects of the course like for example (.) urm behavioural and social sciences and (.) err even potentially (.) evidence based medicine and (.) err (.) you know what they're sort of hearing about in the lectures and ethics and law and (.) and various things like that
Example B51: Staff member P36, Interview, 9/5/2017

This shows how consultation skills were able to facilitate integrated learning within a session by inviting students to make connections across subject areas through their discussions.

One particular session was observed to have a marked similarity to consultation skills, as it involved consultations with simulated patients. This session was focused on particular aspects of ethics and law as related to medical practice, rather than communication in consultations per se. Again, this facilitated integration in the context of the semester in question. The session revolved around the real-life case of a girl who had refused a transplant, with simulated discussions between the participants, the girl and her mother. It included a presentation covering: confidentiality, capacity and consent; parental responsibility; GMC guidance about acting in the best interests of children and young people. The presentation stimulated discussion amongst the participating students about refusing treatment and the capacity to do so:

P4 said "you can't refuse treatment till 18..." P7 said "you can if you have capacity". P4 said "...you can't refuse treatment till you're 18 but you can consent to treatment".

Example B52: Field Notes, Semester 1 Ethics and Law Session, 1/12/2014

During the interviews, participating students articulated how they viewed clinical correlation with their learning, thereby showing how the correspondence between clinical details and an individual session's content facilitated integration. For example, Year 1 student P1 talked about how he/she saw patients who linked up with PBL cases. Another Year 1 student P11

talked about how taking a medication such as Salbutamol in a practical class allowed them to gain insights into future medical practice:

how it affected us and it (.) really gave us an insight into (.) what we're actually going to be giving patients in the future 'cause there's no better way t:o (.) talk to a patient about symptoms

Example B53: Year 1 student P11, Interview, 30/4/2015

Year 2 student P22 noted in interview that early clinical experience helped make it feel like they were studying medicine. During interviews, Year 1 student P2 talked about learning skills such as blood pressure during physiology-pharmacology practical classes, Year 1 student P4 mentioned practising blood pressure during a hospital visit, and Year 2 student P18 talked about learning clinical skills during physiology-pharmacology practical classes. In the case of P18, this was motivational and good preparation for the clinical years. Staff member P31 explained that clinical reasoning, and simulation sessions aimed “*to bring together a lot of the basic knowledge*” and “*integrate the underlying bioscience*” with the clinical science.

5.4.b Real world clinical experiences

During the fieldwork, I accompanied participating student groups on their visits to three different large teaching hospitals. These visits facilitated integrated learning: inviting students to consider the relationships between clinical skills and the traditional early year basic science studies. As already stated (Chapters 2 and 3), observations were confined to the university undergraduate centres on site. The format for these visits generally encompasses group discussion of a particular topic, followed by the opportunity to interview a patient on the wards. After the completion of the interviews, there was a tutor-led debrief with the students. Skills useful to a consultation were covered during the aforementioned group discussions. An example was the mnemonic SOCRATES. This particular mnemonic was an aid memoire that prompted the questions to be covered in a medical history where pain was a presenting complaint:

Suggestion from the group expanded the pneumonic to site, onset, character, radiation, associated symptoms, time, exacerbate/alleviate, severity 0-10.

Example B54: Field Notes, Semester 3 Hospital Visit, 11/11/2015

Students could therefore study topics such as pain in an integrated manner, from the basic science and clinical standpoints, in the context of taking a clinical history in a simulated consultation.

Year 2 student P18 talked about the educational value of seeing patients on hospital visits. P18 had observed how he was able to form an action plan to learn what was going on, rather than getting weighed down with factual learning:

P18: ...as well as kind of you (.) appreciating (.) the illness and you (.) you can see an action plan to learn (.) what's happening (.) it's (.) I think more for me it's been just (1.0) motivate- motivating like (.) emotionally [laughing whilst saying this] the (.) what I'm doing is (.) bloody important and (.) th- this is what it's about (.) 'cause you can get (.) like when we had a big we had a big phase of not going to one and you just get (1.0) kind of lost in (.) just (1.0) facts (1.0) which is just (.) not good it's

TM: mmm

P18: it's boring and (.) ur:m (.) you don't appreciate (.) what (.) what everything is about (.) you do (.) there is a bigger picture

Example B55: Year 2 student P18, Interview, 14/3/2016

Here we can see P18 demonstrating integrated thinking, by seeing the 'bigger picture' of what they were learning and being trained to do. In the same vein as the preceding observation, Year 2 student P21 commented on the importance of remembering they were dealing with real people:

"we do anatomy and physiology and stuff but we've got to remember these are real people with real problems".

Example B56: Field Notes, Semester 3 Mental Health Histories, 23/10/2015

The benefit of consulting with real patients in hospital was also articulated by Year 1 student P11 in an interview. This benefit was couched in terms of putting real-world context behind learning. To have such an opportunity was therefore a facilitator of integration, as it brought to life the academic course content:

I talked to a patient on the respiratory war- (.) ward at Salford hospital (1.0) and that was good because you could actually (.) you could (.) see for real (.) the effects of what we'd just been researching

Example B57: Year 1 student P11, Interview, 30/4/2015

Although it wasn't possible to attend and observe a GP practice visit, some insights into students' learning experiences on their visits were gleaned from the interviews. These visits were also real-world early clinical experiences alongside the basic sciences, thus providing evidence of integration at the curriculum planning level. Whilst GP visits didn't always interconnect with the rest of the course, there was evidence that even so, the context and opportunities for students to make connections between the learning on visits and the learning in other areas of the course learning was being provided. These visits were therefore facilitators of such integration. Year 1 student P11 talked about a GP visit which, while it hadn't tied directly into what they had been researching for their learning, the clinical experience itself was still beneficial, especially for practising clinical examination. On recollecting performing a respiratory examination during a GP visit, P11 commented how it was a good learning experience:

so this was (.) great practice and I had the GP there to (1.0) make sure I was doing everything properly and to (.) give me any hints

Example B58: Year 1 student P11, Interview, 30/4/2015

Here was evidence of the integration of clinical skills in parallel with basic science content delivery. In an interview, Year 1 student P4 had also talked about practising a respiratory examination during a GP visit, providing more evidence for how these visits facilitated integration of learning for the students. Year 2 student P22 articulated a view of GP visits that went beyond the simple clinical experience, talking about how it impacted on them as a person, in terms of increasing their maturity. This was a facilitator of integration as it allowed students an insight into the functioning of a healthcare professional, at an early stage in their course:

when you see (.) people come in and speak to a GP and you're there (.) and it's about something pretty serious and stuff (.) ur:m (.) you'r::e you- y- yo- you like (.) you feel more responsible like (.) err the fact that you're there is quite a big deal (.) urm (.) because it's quite a big deal for the patient who's there so (.) I I come away thinking like (1.0) a bit more f- (.) kind of like (1.0) mature?

Example B59: Year 2 student P22, Interview, 2/3/2016

5.4.c Theme conclusion: Real and simulated clinical experiences had a role in the integrated learning process

The Early Clinical Experience programme was an important facilitator of integrated learning by inviting possible connections and interrelationships between students' experience of their hospital or GP visit and their learning in the university. ECE demonstrated the thought that went into curriculum planning in order to allow delivery of integrated teaching.

5.5 Staff took steps to aid delivery of teaching to enable integrated learning

This theme sets out how staff went about delivering teaching to enable integrated learning. In striving to achieve this, the staff facilitated integration. The theme encompasses how staff referenced other sessions that covered similar subject material, and how they attempted to improve integrated learning via liaison and pro-active observation. Formal attempts to facilitate integration at the curriculum planning level could be seen in staff meetings, organisation of teaching delivery via lectures, and in integrated assessment. This theme is specific to staff behaviours that had an impact on the learning process undertaken by students and therefore mostly contains staff data, with some student insights from the interviews to complement the staff perspectives.

5.5.a Referencing other sessions and staff liaison

Staff delivering teaching in one subject area referenced other subject areas. Staff member P34 observed in interview that, when teaching students, he/she always tried to relate different topics and subject matter, and to build on knowledge the students already had. He/she highlighted that when teaching clinical histories and examination he/she tried to "*relate it back to the basic sciences*". P34 was therefore making efforts to facilitate integrated learning. Staff member P25 observed how lectures and anatomy were referred to during consultation skills

teaching. As part of preparing for delivering consultation skills session teaching, tutors were expected to look at the lectures and see if any were relevant. The lecture notes were then obtained in order that pertinent material could be highlighted. Staff member P32 pointed out how efforts had been made to connect psychology with consultation skills, with a view to both having status and meaning in relation to each other:

everybody (.) hated psychology but everybody loved consultation skills [laughing whilst saying] (.) and I sort of felt that (.) I wanted psychology (.) to benefit from the love of consultation skills (.) urm (.) and because (.) you know for the good reasons that it (.) it makes sense to have it integrated (.) ur :m (.) so (.) ur:m (.) I approached (.) the consultation skills team and said (.) can we start to look at (.) natural points (.) of crossover (.) and s- and there are a few of those

Example B60: Staff member P32, Interview, 11/10/2016

Some staff observed sessions in different subject areas, and this could promote opportunities for integration. Staff member P27 talked about how sitting in sessions from a different part of the course allowed them to familiarise themselves with what was being taught, and in turn helped students to see connections between the different areas and subject matter in the course, facilitating their learning. Staff member P35 had observed physiology-pharmacology, anatomy, and PBL sessions. He/she also taught portfolio sessions and carried out portfolio review with students. Though admittedly not having seen an EBM session, P35 therefore thought he/she had “*quite a good sense*” of what goes on in the course due to having “*a bit of an overview o- of everything*”. Again, this demonstrates the efforts being made by staff towards supporting integrated learning. When giving a particular lecture, staff member P33 had often spoken to other lecturers in the past to see what they were doing, though not recently, as he/she had been “*doing it for quite a while now*”. Staff member P25 talked about making deliberate efforts to connect consultation skills teaching by drawing parallels with other course content:

when we're doing ou:r consultation skills notes we'll look at the (.) lectures that are on and see whether there's any relevance with them? and if there is email the person and ask for the content of it so we can highlight it

Example B61: Staff member P25, Interview, 3/8/2016

Staff member P30 drew a distinction between connections between different subject areas that were written down, for example points from lectures corresponding with consultation skills sessions, versus what he/she called “*soft integration*”: chance conversation with staff colleagues. This facilitated overall integration. The distinction between the two carried some importance. ‘Soft integration’ is only likely to happen if key stakeholders share their curriculum knowledge through spontaneous conversations and encounters:

I guess there's a (.) there's a certain integration that'll be written down and (.) sort of educational strategies (.) and then there's a sort of soft integration that (.) happens because (1.0) of who you share an office with o:r (.) who you have a meeting with

Example B62: Staff member P30, Interview, 13/9/2016

Staff member P32 also talked about what he/she termed “*soft integration*” helping staff to be aware of other parts of the course. P32 defined the term as staff informally prompting others to make links:

So I mean I think that is just literally people saying to each other (1.0) ur:m (.) oh I heard you deliver that lecture on (.) whatever (.) ur:m (.) there's a really important thing that you could link in with here (.) and (.) those sorts of things

Example B63: Staff member P32, Interview, 11/10/2016

Staff member P35 observed that Year 1 and 2 (Phase 1) review meetings provided the opportunity for staff to update each other. Staff members P25, P28 and P30 talked about the ‘end of Phase 1 meeting’ where staff would talk through and evaluate their experiences, express their opinions and think about improvements. This meeting also allowed staff to feel, in the words of P25, that they were a “*group of people providing a course*”. Meeting in this way helped facilitate integrated learning through curriculum planning. Staff members P28 and P29 talked about a summer meeting, in which the various leads for different elements of the Year 1 and 2 programme tried to identify how integration could be improved. The view of P28 on this meeting, as expressed in the following quote, was that it helped identify course aspects that could be improved and where integration was weak between different years:

we actually tried to identify really (.) how we can improve (.) integration (.) er:::r and when we are (.) appreciating is that is that (.) integration within one semester within one Year of the different (.) aspect of the of the course (.) is working well (.) we identify aspects where we could improve it (.) but

we also identify that integration between the different years of the course (.) is is pretty weak and this is where actually we ne- we need to improve (.) y- err integration (.) err so (.) addressing what works well we are (.) we are appreciating that (.) that doesn't really work really well and we need to improve that

Example B64: Staff member P28, Interview, 12/9/2016

Lectures helped facilitate integrated learning. With regards to the module he/she was involved with, staff member P29 observed how “*the lectures for the week*” were integrated at module lead level with the core teaching of PBL, and how the introductory lecture for the module gave “*evidence of integration*” to the students. This is an example of using integration as a term to link course components at a curriculum planning level: in this case, lectures and PBL. The effect of this was to facilitate the integrated learning that took place in PBL as outlined in Chapter 4. Lectures were a part of the course. Wrap-up lectures containing multi-subject content aimed to bring together the key parts of the teaching for a week’s PBL case. These wrap-up lectures were a product of staff efforts to interconnect teaching delivery by referencing other sessions. Integration was described by staff member P28 as working well in semester 3 wrap-up sessions, where students could ask questions of the faculty members involved in different aspects of the course. Year 1 student P9 expressed positivity about how the wrap-up lectures brought their learning together, saying to me following a PBL session:

“I like these wrap-up lectures, they help bring everything together”

Example B65: Field Notes, Semester 1 PBL Case 6 Session 2, 21/11/2014

This showed the value of a particular type of lecture that contributed to integrated learning. Year 1 student P4 liked the pharmacology lectures and, during an interview, Year 2 student P24 commented how they liked to use the lecture podcasts to guide and focus their learning. This showed potential for the podcasts to foster links between course elements at the curriculum planning level.

5.5.b Staff thought implementing an integrated OSCE helped integration

An integrated objective structured clinical examination (OSCE) was introduced for the Semester 3 participating students. This was a new development at the time of this study, seemed to prompt integrated learning by students, because the assessment was more integrated than previously. In this section, firstly the rationale, description, and views of the integrated OSCE as expressed by staff are described. Secondly the views of the students who undertook the assessment are reported.

Staff member P26 described how the integrated OSCE worked in practice, giving an example of a patient at a GP practice for whom a history was to be taken and an examination performed. These particular skills would be assessed in a way that facilitated integration, by setting clinical skills alongside basic sciences:

Urm well they have a (.) ur::m (1.0) certain amount of time well they b- they first of all read (.) some- we- urm an instruction which would say like they're going to see a (.) a patient at a GP practice who's agreed to talk to them (.) and they have to take a history and examine them (.) so they'll be marked on the consultation skills (.) ur::m (.) and then they'll be marked (.) on how they (.) examine which includes gaining consent

Example B66: Staff member P26, Interview, 31/8/2016

Staff insights into the integrated OSCE revealed a number of features of this assessment that play a part in integrated learning. Staff member P33 observed that multi-disciplinary staff planned OSCE scenarios together. The rationale for this OSCE, as described by one of the staff members (P27), was the combination of communication skills, examination skills, physiology, pharmacology and anatomy. P27 talked about how implementing an integrated OSCE allowed students to be examined in these multiple topics. If the task was, for example, peak flow, then students would be asked physiological questions about that task. In one station, there might be components such as patient consultation, measurement of peak flow and some questions on physiology. P27 was of the opinion that the integrated OSCE had encouraged integration of learning, and hoped that the students would recognise that learning the science was important and incorporate this into consultation skills. In this example,

assessment was aiming to prompt a different way of learning. In a similar vein, staff member P29 reported how the integrated OSCE aimed to align physiology-pharmacology with ECE. This again promoted parallel subject learning:

there's (.) particularly through the integrated OSCE work of try to bring (.) phys-pharm in alignment with (.) ur:m ECE activity

Example B67: Staff member P29, Interview, 12/9/2016

Staff member P37 talked about how the new integrated assessment had sparked discussions over OSCE marking schemes, due to different staff groups teaching the same content areas in distinct ways. It would seem that this at least presented an opportunity to standardise teaching delivery between sessions, by improving interconnectivity and therefore, facilitating integration. However, staff member P26 expressed reservations about the marking of an integrated assessment, in that it was important to make sure that those examining an integrated assessment were competent to mark it. The challenges in marking across subject areas created a difficulty in finding suitable examiners.

Whilst, as described above, the staff view of the integrated OSCE was relatively positive and supportive, the student view of this assessment, having undertaken it, was less complimentary. Year 2 student P13 didn't think that the integrated OSCE was actually integrated. He/she observed that although attempts were made to interconnect the teaching, when it came to the exam the subjects were treated separately:

TM: Okay well tell me about the integrated OSCE

P13: Ur::m (2.0) it turns out it wasn't that integrated th::e the teaching for it (.) the- they tried to tell us when (.) when we were i:n (.) ur::m phys-pharm (.) they tried to get us to think like when we were doing (.) I don't know lets say when we were doing (.) like the subdermal injections (.) they tried to say (.) well (.) tell me about (.) like the pain pathway (.) about this and the pharmacology and //try//

TM: //mmm//

P13: and get it all together (.) but then in the actual OSCE (.) it was completely separate (.) ur::m (1.0)

Example B82: Year 2 student P13, Interview, 14/3/2016

Year 2 student P18 didn't think the integrated OSCE was integrated either, pointing out how, although the stations contained within the assessment had history taking and examination, a physical separation of the two skills occurred:

you have your (.) conversation (.) and then (.) the person cuts you off (.) and you do your examination (.) like it wasn't even like err okay now I'm going to just be (.) when they have to stop us there and all this it was literally just a cut-off

Example B68: Year 2 student P18, Interview, 14/3/2016

The contribution of an integrated OSCE to integrated learning is there to be seen in theory, with multiple subject areas being tested and juxtaposed in time and space. It can also be seen how this new integrated assessment could act as a driver to integration via interconnected learning, in terms of standardisation across different subject areas of teaching, and by promoting liaison between staff. However, some students didn't see the assessment as integrated, and thus the potential and value of the assessment for promoting integrated learning might be lost.

5.5.c Theme conclusion: Staff took steps to aid delivery of teaching to enable integrated learning

Staff facilitated integration, both formally and informally. The referencing of sessions containing similar material and staff liaison were important facilitators, but when the connections and links made were informal, through conversation and discussion in a session due to what was described as soft integration, the integration of the different subject areas and content were at risk of being lost. Though the idea behind this OSCE did contribute to integration on the course, there was a risk that it was not able to encourage integrated learning due to a cut-off between components during assessment. Any inconsistencies in teaching delivery between components has the potential to compromise efforts to integrate these components in assessment.

5.6 Chapter summary: Facilitators of integrated learning

This chapter presented facilitators of the integrated learning process. The presence of facilitators should be important parts of any model of integration. A significant contribution to the facilitation of integrated learning was the way that students helped and supported each other with the integrated learning process, both within and beyond their PBL group. In this way peer support set the background against which integrated learning could take place. Such a background is important for any model of integration. PBL has been shown to be an environment conducive to peer support (Orsmond and Zvauya, 2015). Further contributions to integrated learning were made when students used tutors as resources and forms of support. Building group togetherness facilitated the integrated learning process by supporting engagement in it, particularly the use of humour within the PBL group. This strengthened bonds between peers, in turn making it more likely that they would support each other's integrated learning. Similarly to supporting engagement in integrated learning, previous work has found students can want more PBL group interaction than actually happens, such as in presenting differing views (Visschers-Pleijers et al., 2005). These authors therefore demonstrated the value students place on engagement in a learning process.

Early clinical experiences, both real and simulated, were an important facilitator of integrated learning and are key factors in any model of integration. Previous work has found ECE to be integrated. Students tend to value the motivational aspects of ECE, how it relates clinical work to their basic science learning, and helps reinforce the basic sciences (Hampshire, 1998, O'Brien-Gonzales et al., 2001, Dyrbye et al., 2007, von Below et al., 2008). Learning consultation skills such as history taking and clinical skills such as blood pressure during physiology and pharmacology practical classes gave students the opportunity to learn skills in a supportive environment. Practicing history taking and blood pressure during a hospital visit showed the value in ECE of providing the opportunity of learning and then taking this skill into the real clinical world. Clinical visits also gave the students the opportunity to see real patients with the sort of conditions they were studying. Therefore at a curriculum planning level, the early clinical experiences happened alongside the delivery of academic science teaching and enriched it as has previously been advocated (Dornan and Bundy, 2004). This integration was seen across the semester as a whole.

Integrated assessment was a curriculum planning intervention that also contributed to facilitation of integrated learning across a semester. In this way, previous work has shown OSCEs to be integrated via relationship between clinical and basic sciences (Furmedge et al., 2016). Staff members adopted strategies and approaches to facilitate integration via curriculum planning and delivery of their teaching. They did this by referencing other sessions, liaising with each other, and sharing experiences through programme meetings. These strategies contributed to the interconnections for the students' learning within the course, thereby helping to facilitate integration. Such strategies should therefore be reflected in a model of integration and I will address this in Chapter 7.

Chapter 6: Barriers to Integrated Learning

This chapter considers barriers to integrated learning. Barriers, in the context of this study, refer to obstacles that had the potential to compromise the integrated learning process. The barriers can be characterised into the following themes: subject compartmentalisation that threatened integration; students not assisting the integrated learning process; the challenges for students and tutors in their efforts to integrate, and boundaries between course components. This chapter will draw on interviews with staff and students, and ethnographic observations.

6.1 Subject compartmentalisation

Divisions between different subject areas were observed and reported to present barriers to integrated learning. This compartmentalisation was noted, in the interviews with staff and with students, and in the ethnographic observations, to take place across all subject areas, though less so in PBL. PBL depended on students drawing together knowledge from different subjects in order to learn about each week's case.

In the research interviews, staff observed that the actual course delivery, with subjects presented as discrete from one another, was a barrier. They talked about the challenge of delivering a course that was integrated on paper, in such a way that it remained integrated in actual/day-to-day teaching and learning. In this respect, staff member P31 observed that on paper the course looked as if it was integrated. Similarly, staff member P30 took the view that the design of the course implied integrated learning was taking place. However, P30 observed that the actual delivery of the course might make it look like separate elements as opposed to integrated teaching. P30 postulated that PBL requires the integration of all subjects, and yet at the same time carries the challenge of having to present different areas as discrete, such as behavioural and social sciences, because these are individually contained in lectures:

the whole urm notion (.) of learner led education and problem based learning (.) is something (.) that really requires (.) urm an integration of everything within (.) the course because (.) if you look at (.) a

particular clinical problem which is what the students do in years one and two (.) urm you can't kind of dissect out (.) the behavioural science bit (.) and the bioscience bit and kind of (.) tick and say oh I've done those (.) tick them off (.) and move on to the next thing (.) because all those things will always (.) be involved in the basis of the medical problem (.) that the students are learning from and using as the driver for their (.) their learning so the very nature of the programme that we provide for the students requires urm an integration (.) of of everything (.) but never the less you have to present it (.) to the students as (.) a bit of the course because they'll have a lecture on (.) the behavioural sciences implications of whatever case they're looking at this week

Example C1: Staff member P30, Interview, 13/9/2016

Presenting individual subjects as distinct from others could make it easier for students to think about a subject in isolation. In particular, regarding the presentation of different parts of the course to students, P30 observed compartmentalisation between subject areas.

Some staff members reported that they noticed students compartmentalising subjects. As an explanation for this, staff member P38 pointed out that students had “*come from a school system when they've done A levels which are very much into blocks*”. This, staff members reported, contributed to some students struggling with an interconnected approach, and instead seeing subjects such as anatomy, physiology and biochemistry, as individual and distinct from one another. Staff member P28 talked about how students tended to compartmentalise subjects in PBL sessions:

they try to (.) they have a simplistic approach of the PBL case and and their learning agenda (.) and (.) and because it's quite difficult for them to take over the case they have the tendency to say okay we're going to do bioscience first (.) and (.) and all of them what they do is (.) is discuss bioscience and then they are going to (.) to clinical (1.0) and then after that they're going to BSS and then they're going to do a little bit of ethics and laws

Example C2: Staff member P28, Interview, 12/9/2016

The relationship between bioscience and psychosocial subject matter was challenging, in the delivery of teaching and learning. Staff member P39 was concerned about students not thinking about the wider picture, with regard to concentrating on biosciences in PBL sessions and leaving any behavioural aspects to the end. P39 was of the opinion that students thought the bioscience would get them through the exams without spending much time on the

behavioural science. Staff member P40 expressed a view that the students didn't necessarily learn in a connected manner, compartmentalising their learning into different areas, and also compartmentalising the various subjects:

I think that students: (.) have a tendency to compartmentalise (.) ur::m (.) they treat the bioscience in isolation from the social science side of things and they tend to neglect social sciences (.) it's always been what they've done at the end of the (.) err PBL session even if (2.0) I as a tutor tried to (1.0) to make them deal with: err:r the the social (.) sciences aspects of the case in more detail (.) they resist it (.) I think it's part of the medical student culture in Manchester

Example C3: Staff member P40, Interview, 19/7/2017

It is interesting to note that though this thesis is a case study of Manchester medical school, P40 expressed a Manchester specific culture. This could either mean that a specific culture may not always be in existence se in other medical schools, or that P40 was simply commenting on the culture they knew. However, it is not possible to know this for sure, from the present data.

Staff members were asked in the interviews if they thought students saw the course as integrated. P32 felt that they probably didn't at all. Staff member P28 thought students saw weak integration and fragmented content delivery. P28 expressed a view that this fragmentation would likely impede integrated learning:

Er:::r pretty weakly I think (.) pretty weakly I think err:r (.) they see some integration and they are trying to to to (.) emphasise that at the beginning of the Year (.) err and I'm sure there are many other ways (.) other ways that that cause them to to to emphasise the way that the course is integrated ur::m (.) but err I think they s:till see the course as as as being fragment of (.) of teaching delivery really (.) ur::m (.) and (1.0) as I said before maybe they see the course somehow integrated (1.0) within one semester within one Year (.) but maybe not fully integrated in term of (.) of (.) of them (.) (going) as a student through the different Year of the course (.) er:r we cou:ld we could certainly improve on that

Example C4: Staff member P28, Interview, 12/9/2016

It is interesting that this staff member observed the course design and delivery were not sufficiently interconnected to help students see the value of integrating and to help students be able to integrate their learning. Staff members P30 and P31 above, described the course as

integrated on paper. This raises the question of how staff could view a course as integrated whilst acknowledging that this was not how the students experienced it.

Whilst students may need to consider a subject independently without reference to other subject areas during their process of learning medicine, the staff who see them day in day out were of the view that students were not integrating the subject matter they were learning across different areas of the course. Students may need both to attend to subjects individually and to integrate them throughout their learning. Evidence of students learning subjects in isolation was observed during the fieldwork. During a semester 1 PBL session, for example, it was noted that the participating students considered the specific subject molecular biology in a compartmentalised way, when they talked about transcription and translation:

P9 said “well there’s transcription and translation” going on to describe the first and ending with splicing, capping and polyadenylation. P6 said “is that the editing bit”. P9 said “yes”. P5 said “and translation?” P11 described this.

Example C5: Field Notes, Semester 1 PBL Case 3 Session 2, 24/10/2014

Other such subject specific discussions during PBL sessions included immune system hypersensitivity reactions, medical history taking skills, the anatomy of breast lymphatics, the development of the spine, and blood supply to the brain. There was therefore no clear trend in the subject content of these discussions. Whilst these observations represented instances in time and could be simply part of a need to consider a single subject at that time point as part of integrated learning, various experiences and insights from student and staff suggest that moving away from individual subject learning and beginning to combine and cross-reference learning across more than one subject, was challenging and presented a barrier to integration. The examples presented here demonstrate that boundaries between subjects weren’t being blurred to the extent that they might facilitate integrated learning.

Practical classes also added to the evidence of the fragmented content delivery observed earlier in this section by P28. Physiology-pharmacology practicals provided the opportunity for participating students to experience clinical skills such as ophthalmoscopy, visual field measurement and reflexes, as seen in the following example where the second year participating students focused on discussing a tenet of clinical examination:

P22 tried the knee jerk on P18. P15 was reading from the practical manual telling P22 what to do supporting the weight of the knee.

Example C6: Field Notes, Semester 3, Phys-Pharm, 24/11/2015

Some participating students arranged to meet with each other outside the timetable, with the aim of discussing the general subject of anatomy. Following a meeting to discuss a poster the group needed to produce during semester 1, some participants stayed behind to talk about anatomy. Year 1 student P6 made it clear that the transition to anatomy was happening:

P6 pointed out to me that they had “moved on to anatomy”

Example C7: Field Notes, Semester 1 Non-timetabled meeting to discuss a post
3/10/2014

Later in the semester it was noted that eight of the students specifically met up with this aim of discussing anatomy and invited me along:

All those present were working on the anatomy of the pelvic floor muscles, the topic for the week’s anatomy timetabled session.

Example C8: Field Notes, Semester 1 Non-timetabled session 10/10/2014

During semester 3 some of the participating students would also meet up and discuss anatomy. In one such meeting outside the timetable, those present were discussing the lower leg:

During the session, whilst they were looking at anatomy, there was a discussion on the posterior blood supply of lower leg, P22 thought it was the post tibial artery, P23 thought it was the peroneal, there was some contribution from P19 and P16, a few minutes later after I had thought the discussion was over, P16 announced “it was posterior tibial”.

Example C9: Field Notes, Semester 3 Non-timetabled session 24/11/2015

These foregoing anatomy discussions point to the subject compartmentalisation, as observed by staff members and by myself during the observations of sessions, extending beyond the formal elements of the course. In dissection classes the focus, perhaps unsurprisingly, was also on anatomy: further evidence of the fragmented content delivery that P28 referred to. In semester 3, Year 2 students P19 and P24 were observed, in a typical example of these classes, naming anatomical structures of the leg, and later in the semester a similar compartmentalisation was observed, while learning the anatomy of the neck:

The third station was at a table, which had on it a prosection of the head, neck and torso. The triangles of the neck were covered and the muscles of the neck were pointed out. P24 volunteered, "omohyoid". P24 named, "carotid" as a triangle on the prosection. P24 named, "subclavian artery" as the structure in the subclavian triangle. P24 named, "digastric" as a structure. P24 said, ".....submandibular, submental and carotid" as neck triangles.

Example C10: Field Notes, Semester 3 Anatomy, 17/12/2015

Students did discuss anatomy individually a great deal of the time within dissection sessions. This could be a contributor to their anatomy-only discussions outside of the timetable. The focus on anatomy in these sessions at a teaching delivery level may have validated, in students' minds, that anatomy was something that could be compartmentalised. It is equally possible that the students simply needed to think about anatomy on its own at these times.

6.1.a Theme conclusion: Subject compartmentalisation

An integrated curriculum on paper is difficult to translate into integrated learning in practice. Students find it challenging to think across subject areas whilst they are learning. Integrated learning represents a departure from the way students may have learned prior to university. Evidence has been presented that integration via parallel subject learning wasn't always happening due to students compartmentalising subjects on the medical course. This compartmentalisation of subjects, studying each in isolation, presents implicitly a barrier to integration. Delivering an integrated course relies on a blurring of boundaries between subject areas in order for students to approach their learning in an integrated manner. When the students are not thinking in an integrated manner due to the compartmentalisation of subjects, this blurring of boundaries cannot take place. Compartmentalised discussions took place against a backdrop of a holistically integrated course. It must be acknowledged that at any one

point in time students may focus on a particular subject area they need to know, in order that they can integrate their learning later.

No trend in subject area was observed that might offer an explanation of why certain subjects over others were prone to silo type thinking. However, anatomy, with lots of the parts of the body to learn, may be more prone to silo thinking. These first encounters with anatomy and dissection with the physical presence of a body likely made anatomy a dominant thought at that point in time. It is possible this may pre-dispose anatomy to being less integrated. The question is does this matter to integration as a whole? At an early stage in medical studies, students may not be able to integrate as well as curriculum planners would hope.

6.2 Peer support with the integrated learning process didn't always occur

This theme sets out to explore how a barrier to integrated learning was presented when peers didn't help and support each other with the learning process. Help and support facilitated integrated learning, providing structure. Other issues impacting on integration that were more peripheral can be seen here, such as competition and group integrity. A particular barrier to learning subjects in an integrated manner was different types of allegiance to, and interest in, behavioural and social sciences among the students, creating tensions and/or resistance to its place in integrated learning. The data illustrating these barriers stems from the observational work and interviews.

6.2.a Impact on the shared learning experience

As noted in Chapter 4, discussions were the principal way in which integration was enacted and experienced. One barrier was when participating students chose not to contribute to discussions, despite having relevant knowledge to share. An example observed was following an anatomy session, when Year 1 student P11 alluded to not getting involved in discussions during the session. It was possible, though P11 didn't expand on why, that he/she was concerned about being seen to know too much. However, the result was still not contributing:

P11 commented at the end to me that he/she had done a lot of reading but didn't want to get too involved.

Example C11: Field Notes, Semester 1 Anatomy, 24/10/2014

Ultimately, this non-contribution was a barrier to an integrated learning process, in contrast to the ways in which integrated learning was facilitated by peers helping each other as seen in Chapter 5.

Year 1 student P7 talked in interview about being too shy to ask questions during semester 1 of the course. While this subsequently improved as the course progressed through the semester through the positive impact of help with learning from other students, this was nonetheless a barrier in the early weeks of the course. Year 2 student P20 expressed a view that having a dominant person in a group made them quieter, demonstrating how this particular barrier of non-contribution was not necessarily alleviated by peer assistance. Staff member P33 talked about the undesirability of students not contributing in PBL sessions:

they've done the work but they don't want to share the work (.) which are probably the worst sort of the people but they (.) they've done the work (.) or they might be too frightened to say something

Example C12: P33, Interview, 20/10/2016

The interviews explored the participating students' thoughts around contributions to integrated learning through taking part in discussions and supporting each other's learning. As reported in Chapter 5, Year 1 student P1 related that while working within the PBL group helped formulate learning outcomes, it was also beneficial to work with students from other

groups on the learning during the week. These learning outcomes were part of the multi-subject learning agendas driving integration. Non-contribution to PBL discussions was seen as problematic by Year 2 student P13 who talked about how “*very clever people didn’t want to contribute*”. P13 felt this could negatively impact on learning as it meant potentially missing out on knowledge which otherwise may not be covered. Again, this would have a detrimental effect on the process of facilitating integration. Year 2 student P24 held the view that if people didn’t contribute then one wouldn’t be able to tell if they knew the material, and that this would be to the detriment of their learning:

in the end that would affect their learning (.) so ur::m (.) you know it’s all well and good letting people talk but if you don’t actually know it yourself then (.) you’re just a- hindering your performance at the end of the Year

Example C13: Year 2 student P24, Interview, 2/3/2016

Not contributing to discussions therefore became a barrier to the process of integrated learning, both via an absence of peer assistance with learning, and also by compromising the flow of peer interaction during the learning process.

Not all student groups worked effectively together. Staff member P28 talked about how groups not working well together impacted negatively on integration of the course. In response to a question regarding if there was an impact “*on the learning experience or the integrated learning experience*”, P28 expressed a view that non-participation drags down all the students:

Yes it does (.) yeh yes it does er:::r (.) probably (.) for the student who actually tried to make the group work? And then we can see that they are dragged back (.) by the by the student who don’t participate? (.) er::r (.) an:d and that has an impact on on on (.) probably the student as well who don’t really participate because there is they (.) they don’t feel that there is a (.) a group dynamic (.) err that drive them to t- to a participation although we are here as PBL stu- tutor to try to do our best (.) but (participate) but I think that has an impact on on on integration because (.) they don’t have the capacity to see (1.0) the integration of the of the (.) of the different (.) part of the course here

Example C14: Staff member P28, Interview, 12/9/2016

Staff member P33 had experienced some PBL groups containing students who would not contribute. Sometimes there were students who would talk so much it stopped others from contributing. Staff member P38 thought that the ethos of PBL could be compromised, by the

disruptive effect of a member of the group not contributing or not getting involved.

Disrupting the PBL process implicitly undermined integration, given that the discussions that facilitate learning in PBL were reported to be the principal way in which integration was experienced (see Chapter 4). P38 had explored this matter with students who felt they didn't want to share material with peers after working hard on it themselves:

I have spoken to students who feel that they're doing all this work why should they share it with (.) with others if they've spent (.) 35 hours in the library (.) reading and understanding material why should they then (1.0) give that material to other people (.) surely it's (1.0) the amount of work you put in is the amount of work you get out (.) but (.) hopefully they can see by (.) the end of (1.0) the process that actually it does help (.) by (.) explaining to other people what you've learnt actually (.) and working with others and working through things as a team actually (.) improves the outcome

Example C15: Staff member P38, Interview, 19/7/2017

In order for a smooth, integrated learning experience, it was important that the group were able to interact freely. Year 2 student P22 noted that during one particular semester this had not been the case. P22 attributed some responsibility for being able to work well as a group to the particular tutor:

as a group we don't really (.) work too well (.) like (.) there's not much flow it's kind of broken (.) and I always feel like the kind of (.) tutor that you get (.) u- helps a lot s:o (.) in semester 3 we had [uses tutor's name here] (.) really good (.) tutor (.) kind of kept everything together (.) urm (.) the one we have (.) this semester's really unresponsive?

Example C16: Year 2 student P22, Interview, 2/3/2016

Not interacting freely in a group put up a barrier to integration. In a similar vein, staff member P40 observed that students could be resentful about peers that didn't contribute in PBL. However, any negative impact was softened if the student in question was active socially with the group:

They::: (.) can be resentful (.) if people don't contribute? (.) ur:m (.) I think it depends (.) to a certain amount on (.) how much the:: (2.0) u- (.) the group socialises if if someone is: (.) ur::m (2.0) a complete outsider (.) they don't socialise with the rest of the group they don't contribute in PBL (.) then the resentment (1.0) seems to be (.) greater than if ur:m someone is err going out for a drink and (.) is just quiet in PBL

Example C17: Staff member P40, Interview, 19/7/2017

Both Year 1 student P9, and Year 2 student P13, talked about how arguments between students during PBL sessions could impact negatively on the group's togetherness, with the potential to put up a barrier to the integrated learning process. P13's perspective on this was that it created tension in the group if two people each thought they were correct in their differing views, impacting negatively on confidence within the group:

well I suppose (1.0) if someone's adamant that they're right (1.0) or two people are adamant that they're right but they've (.) both got different things then (1.0) it puts everyone in the room at doubt in doubt and (.) it's awkward? (1.0) it creates tension (1.0) and I suppose it's just like (1.0) decreases everyone's confidence

Example C18: Year 2 student P13, Interview, 14/3/2016

Staff members had seen examples of both effective and ineffective group work. Staff member P25 commented that a student's failure to merge on an interpersonal level with people in their PBL group could isolate them. This could put up a barrier to the integrated learning process. Staff member P35 highlighted how some students would seem to be working in isolation:

it does strike me that (.) there are (.) a minority of students who (.) choose to you know sit by themselves in the computer lab and who (.) err I (.) w- w- (.) would you know extrapolate and imagine that they would (.) probably urm (.) you know prefer to study alone for whatever reason and (.) ur:m (.) you know I (.) I guess that's (1.0) err you know it's a (.) potential (.) concern I think?

Example C19: Staff member P35, Interview, 23/3/2017

Just as helping other group members could build group togetherness (Chapter 5), it has been shown in this section that the converse was also true: not helping other group members was detrimental to group togetherness and thereby to the integrated learning process. There were other peripheral factors at play when the participating students from one PBL group were divided into other groups in certain sessions, for example in anatomy. Some anatomy groups were observed to only contain one or two of the participating PBL group's students. Year 2 student P20 articulated in interview how different tutors, known as demonstrators in anatomy sessions, taught topics in different ways. P20 observed that sometimes this could lead to clashes of information:

P20: and (.) they all teach you in a different way (.) and then sometimes somebody will draw (.) a diagram and then they'll say well my demonstrator said it's this

TM: mmm

P20: so sometimes we can get (.) a clash of information

Example C20: Year 2 student P20, Interview, 29/2/2016

Further issues with group composition arose in anatomy and in other practical classes. During interview, Year 2 student P22 expressed a view that though they did appreciate the opportunity to meet different people, it would probably be easier to learn during anatomy sessions if they stayed within the same group as PBL sessions:

I think I think it would be nice t:o stay with your PBL group (1.0) urm (.) but I can see why they split us up because you need to (.) work with different people i- it's nice meeting other people obviously

Example C21: Year 2 student P22, Interview, 2/3/2016

During my observations of physiology and pharmacology practical sessions, I noted that Year 2 student P17 tended to work separately from the participating students, preferring to work with someone from another group. Another time, during a PBL session I observed a side interaction between Year 2 students P18 and P24. P24 was deliberately trying to go to sleep, in a physical display:

P24 put his/her head in his/her hands on the table to go to sleep. P18 said, "we're learning, wake up". P24 said, "I'm learning by diffusion".

Example C22: Field Notes, Semester 3 PBL Case 10 Session 2, 18/12/2015

Both of these instances had the potential to compromise togetherness in the group, due to physical separation, not joining in, and P24 displaying poor attitude, thereby perhaps affecting bonding. These behaviours and characteristics therefore presented a potential barrier to integrated learning.

Studying is competitive, with students wanting to feel they are learning and performing well. This feeling depends on having personal subject knowledge, and having the confidence, competence and sufficient understanding of a subject to pass assessments. It also requires the student to keep on top of their own learning, week to week, so there is a sense of making progress. A competitive culture, however, is distinct from this normal competition. During the interview with Year 1 student P6, he/she expressed a view regarding the competitive culture of medical school and how this negatively impacts on the learning in general on the integrated course:

unfortunately (1.0) medicine has a very competitive culture (1.0) so (.) I think (.) that's kinda inhibiting (1.0) the educational development (.) of (.) peers of each other because unfortunately a lot of people are viewing (.) there's there is a competitive culture so it's kinda (.) people are acting as (.) rivals and then by other people knowing stuff rather than having a (.) developmental effect on others it's having more of perhaps an intimidating or (.) feelings of aghh I don't know as much as them

Example C23: Year 1 student P6, Interview, 13/3/2015

P6 also expressed a view which spoke to the competitive culture, that there was too much focus on being correct and being the best, and if an individual student got things wrong then it was seen to be a dramatic event in a negative way, rather than a beneficial one. Staff member P31 felt that students viewed themselves as in competition with each other. Staff member P25 talked about the barrier to learning resulting from competitiveness between students and their tendency to compare to each other. Staff member P38 also remarked that some students were competitive, causing a struggle with the idea of sharing information and working with peers. This competitive culture was therefore a barrier to learning on the integrated course.

6.2.b Attitudes to behavioural and social science (BSS) learning

Behavioural and social sciences were a part of the medical course at Manchester. These subject areas were equally as important on the Manchester medical course as basic and clinical sciences, and were always included in PBL group learning outcomes. However, as observed by one student during a PBL session near the start of semester 1, the participants were leaving the psychosocial topics for discussion at the end of PBL sessions (see example A4, Chapter 4.1.b). This instance implied that BSS was more of an afterthought, becoming a barrier to integrated learning.

Differing views and starting points among the students, in relation to the various subject areas, sowed the seeds of division in the group. This was not the fault of the students, but the effect was ultimately a barrier to the integrated learning process. It was observed during the first semester that Year 1 student P6 was much more interested in psychosocial subject matter than the other group members. This led to the impression of P6 being a little isolated when talking about it, therefore potentially compromising the group's togetherness and putting up a barrier to the integrated learning process. There was evidence that P6 was conscious of the risk of this, in a side discussion with Year 1 student P11 during a PBL session:

P11 said "I haven't got the exact definition of a carer but..." P6 pushed his/her tablet towards P11 (they were sitting next to each other). P11 said, "I'm not reading out your notes". P6 said, "people will get sick of the sound of my voice..." then read out the definition.

Example C24: Field Notes, Semester 1 PBL Case 6 Session 2, 21/11/2014

During interview, Year 1 student P6 talked about the issues he/she perceived to surround the group's learning priorities, articulating how he/she viewed the peer pressure of a basic science focused group of students:

perhaps ur:m if there was (1.0) more focus: o:n (.) perhaps n- (1.0) not just science and kinda (.) th::e (3.0) urm (.) sort of like the social stuff I think the problem with that is because obviously (.) the way the PBL session is designed is that it's student led and student directed (.) so it's quite difficult if you're in a group whe::re (.) the vast majority (1.0) are going for a much more kinda science directed approach to the case than if some peop- like then if a min - (.) minority would like to

kinda (.) add some more kinda psychosocial (.) s::tuff (.) in ther::e and I think that's a bit of a (.) that's a different issue and that brings up kinda (.) issues as well as about kinda you know (2.0) peer pressure

Example C25: Year 1 student P6, Interview, 13/3/2015

Year 1 student P7 related how, as a group in general, the participating students did not have much regard for their psychosocial learning:

most of the time we are just like (.) oh it's just like psychosocial like no-one like (.) everyone can't really fit into more like really cares about it like it's not really going to be relevant I just need to be (.) to learn like my drugs so I can be a good doctor

Example C26: Year 1 student P7, Interview, 20/3/2015

Observing the PBL sessions, it was clear that P6 was not given an easy time within the PBL group, and this seemed largely due to liking BSS more than the others. An example of how the group were treating Year 1 student P6 could be seen when one participating student laughed at him/her whilst he/she was talking about emotions:

P6 then read out about emotions and a model relating to coping, with an aside in the middle of reading that went "that's a very clinical way of talking about emotions which I don't approve of". P4 was sitting by P6 and laughed when P6 said this. P6 said "very serious here" and was talking very quickly.

Example C27: Field Notes, Semester 1 PBL Case 7 Session 2, 28/11/2014

On another occasion the laughter at the expense of P6 was among the rest of the group as a whole, and occurred when there was a PBL session discussion about the function of the breast. The participating students had considered functionality in terms of milk production; P6 had a more psychosocial viewpoint, which led to mockery:

P9 moved on to function of the breast. P1 talked about that it "produced milk" and P9 said "yeh, that's pretty much it". P6 talked about how it "has a sexual and cosmetic function..." P6 said to P9 "don't pull that face". The group were all laughing and P6 was indignant. P12 "loved how indignant he/she was". P9 changed the subject.

Example C28: Field Notes, Semester 1 PBL Case 7 Session 2, 28/11/2014

As the student experience of integrated learning included discussion between students, laughter at the expense of one student (P6) detracted from the effectiveness of this discussion and its capacity to provide interconnections between different subject areas, thus presenting a barrier to integration.

It became apparent, from observing the Year 1 group, that the participating students delegated talking about psychosocial topics to student P6. At the start of a PBL session, following a decision to start the session with social topics, a group member called on P6 to do so. Another time, student P12 didn't think the case for the week was very social and ceded to P6 for confirmation of this. P6 talked about how the medical school could implement a strategy to make sure students don't completely ignore this field of study:

*that's kinda to avoid people completely saying well you know (.) I'm not going to learn (.) look at
urms (.) BSS because that's just a waste of my time:e*

Example C29: Year 1 student P6, Interview, 13/3/2015

P6 therefore seemed to be aware that the group were not particularly interested in BSS. This quote demonstrates this view in terms of using the phrase 'waste of my time' in relation to BSS. The integrity of the group's learning was therefore at risk. Compromising the integrity of group learning in this way was a barrier to integration.

6.2.c Theme conclusion: Peer support with the integrated learning process didn't always occur

The examples presented in this theme show how receiving help and support from peers became intertwined with the integrated learning experience. Participating students began to expect such support, and indeed to resent when it wasn't seen to be happening. Faculty also commented on the value of peer support, reinforcing the idea that it was indeed part of integration. Where peer support didn't happen, this presented a barrier to integration that could detract from the integrated learning experience. This could be in terms of a student becoming isolated, as in the issues with P6 and BSS, or could be a generalised issue that has a more wide-ranging impact on the group as a whole. An example of impact would be deleterious effects on bonding, and thereby on the learning process. There was also an

implication here that tutor facilitation was lacking in allowing such a situation to develop. The difficulty posed by BSS to integrated learning lay to some extent in the stark difference between this way of thinking and the viewpoint of the basic sciences. The competitive culture that was demonstrably present on the course had an impact on student interaction, and therefore on their ability to act as resources in the integrated learning process, by sharing information with each other.

In this section I outlined how students led their PBL sessions. This raises an interesting question of who is in charge: students or tutor? The role of a tutor in the PBL sessions would seem to be to make sure the students set an appropriate list of learning objectives and hence integrate their learning. The role of the tutor is also to guide the students in their discussions. The barrier of peer support not occurring is therefore present despite a tutor who should prevent such a situation from happening.

6.3 Behaviours challenging to integration

This theme describes how particular behaviours, attitudes, awareness and forms of communication among the participating groups of students and the staff members, presented barriers to integration on the Manchester medical course. These challenges, identified in the interview data, include: students receiving conflicting information from different areas of the course, staff members not always liaising with each other, staff members' lack of awareness regarding the areas of the course outwith their own.

6.3.a Conflicting information in related sessions

Students received conflicting information about various subjects across different sessions with different tutors, due to lack of communication among the teaching staff. This conflicting information represented inconsistencies in teaching delivery. Staff member P27 voiced the idea that students may perceive there to be conflicting messages in different parts of the

course, and expressed a need to amend these potential differences in teaching, as they could cause confusion. Staff member P39 felt that there were discrepancies, in the teaching of approaches and techniques for clinical examination, between physiology-pharmacology and consultation skills. P39 commented that students didn't necessarily appreciate that there was more than one way to do something, and they would more likely focus on what they thought would get them through the assessments, to the detriment of their learning:

I think they will (2.0) perhaps ig- ignore one (.) side of it so err what they're interested in is how they're going to be assessed so they (.) they might (1.0) say well I I'm (.) I'm not going to: (.) err I'm going to (2.0) going to do it in the way that's going to get me the marks rather than I'm going to: (2.0) do it a more long winded way (.) so that I learn (.) what u- (.) u- the reason behind it all is the physiology (.) behind it

Example C30: Staff member P39, Interview, 19/7/2017

Seemingly conflicting information, given at different ECE sessions, was talked about by Year 1 student P4 in relation to an experience during a GP visit:

when we were doing the respiratory examination like (2.0) when he like (.) said (.) stuff that we hadn't been taught (.) or like said that we'd been taught wrong or some (.) something?

Example C31: Year 1 student P4, Interview, 16/3/2015

One staff member P37, whilst observing a consultation skills session in which they were not taking part, noticed a simulated patient saying something P37 thought was incorrect, when the group had been left without a tutor.

The following summary of staff perspectives (from P25, P27, P31, P32 and P37) about the teaching of cranial nerve clinical examination is presented anonymously, as quotations would identify particular staff members. Cranial nerve examination was learnt in two different settings: in consultation skills and physiology-pharmacology. It was taught from a basic science viewpoint in the physiology-pharmacology practicals, and from a clinical perspective in the CSLC. As a result, students were taught to perform this skill in different ways depending on the location in which it was delivered. The handouts for cranial nerve examination differed in the two sessions. The differences existed because cranial nerves are tested in certain ways depending on the reason for testing them: i.e. clinical function or physiological demonstration.

Additionally, there was variation between techniques as taught by individual tutors in the CSLC.

The duality of the cranial nerve issue caused challenges for CSLC tutors, who didn't want to contradict the physiology-pharmacology session. However, there was an observation that students wouldn't necessarily remember that they had been taught in a previous session, when a topic was revisited in a later session. When cranial nerve examination was included in the so-called integrated OSCE assessment, a question was raised, regarding what was actually being tested. This led to a realisation that there had to be an interconnection between what was taught and learned in each setting, in turn leading to integration of the two aspects of cranial nerve testing. It was suggested that the two staff groups should teach a session together. There was therefore a challenge to integration, where the same topic area was taught in two different learning environments, as exemplified here. The desire not to contradict colleagues in an endeavour to teach something from two different standpoints presented a barrier to integration.

Around the time of the fieldwork, there had been a faculty merger affecting the medical school. The former faculty of life sciences merged with medicine. Staff member P37 talked about how this had led to challenges. This was because the two factions of basic science and communication skills approached learning from different points of view. Staff member P35 explained the difficulty in learning clinical skills in a non-clinical environment and how it led to a separation of sessions:

anatomy and phys-pharm (1.0) physiology and pharmacology are sciences (.) and consultation skills is about (.) ap- application of science in practice ur::m (1.0) I:: think that it's actually there's there's a it's dif- it's difficult there's a sort of a difficulty here because (.) err (1.0) the physiology pharmacology sessions are practicals that then leads them to become areas for practicing for clinical practice (.) but that isn't informed by clinicians so there's a separation there that I think is a bit of a (.) difficulty still and it's still a (.) and it does present a difficulty in assessment as well

Example C32: Staff member P35, Interview, 23/3/2017

There was a barrier to integration created by such a division of responsibilities in that for integrated teaching delivery, curriculum planners should join up basic and clinical sciences. Here we can see that wasn't the case.

6.3.b Staff didn't always communicate with each other

Members of staff expressed frustration that not all colleagues would communicate with each other, nor had the opportunities to communicate with each other, regarding course delivery. P31 felt that *"they [staff] don't always talk to each other"*. However, staff member P37 mentioned how there was not the opportunity to talk to other lecturers giving a talk contemporaneously to their own, and indeed not knowing who was giving the lectures. Staff member P25 related an experience of contacting a colleague due to give a lecture preceding their own (both of the lectures intended to reference the week's PBL case), to ask what they were lecturing on in case there was any crossover, and was met with a negative response:

and he replied and had no idea that the PBL case was that and we wasn't willing to kind of share (.) // anything/ /

Example C33: Staff member P25, Interview, 3/8/2016

Staff member P31 thought that the perception of students was that the course wasn't integrated, due to people teaching different parts of the programme, and coming from different schools and faculties.

Any discrepancy in teaching related subject matter would likely compromise efforts to integrate as it implied that staff members were not liaising with each other, whether out of choice or because of lack of opportunity or time to communicate with each other. Either way this is a barrier to integrated learning, as joined up teaching delivery must have joined up planning as a prerequisite. The issues with cranial nerve teaching described in the preceding section reinforced the idea of protectionism, providing evidence of further compromise to the integration of learning. Even more potentially challenging was one staff member's experience of a colleague obstructing efforts to integrate the content.

6.3.c Staff didn't understand course elements outwith their own

There was evidence that staff didn't have knowledge and understanding of the areas of the course outside their own remit. If staff were involved in teaching a certain session, there may also be elements of that same session that were outside their own subject area and that they were not familiar with.

Staff member P38 opined that staff members were not aware of elements of the course outside of their own teaching remit, observing that there was not a “*holistic understanding of the whole programme*” amongst all staff, and this was something that should be encouraged in order that students have a better experience. Staff member P39 remarked that there were a lot of PBL tutors who were probably unaware of what else was happening around the course. Indeed, staff member P27 rated staff awareness of other departments' teaching at seven or eight out of ten. Staff member P40 perceived lack of insight into the programme as an issue:

what I've discovered since I've been in Manchester is that there are very limited number of people who have an overview (1.0) of (1.0) everything that's going on on the course (.) people like [uses staff members' names] probably (1.0) know the course inside out but (.) people who were u- (.) involved at err (1.0) urm (2.0) [tuts] more of a coal face (.) teaching level? (1.0) don't

Example C34: Staff member P40, Interview, 19/7/2017

In a similar vein, staff member P25 talked about tutors not understanding the topic that was being connected into a session as a reason why attempting integration didn't work, and that such lack of understanding of a subject area or topic within their own teaching delivery presented a barrier to integrating students' learning. Staff member P40 thought that the pressing issue with the course related to their particular opinion was that the only people who could deliver an integrated programme of teaching, are those with training in all its component aspects. As such, in their view, only clinical practitioners should teach medical students. Staff with insufficient knowledge of the different subject areas in their teaching could thus have a detrimental impact on the opportunities for students' integrated learning of the curriculum components.

Staff member P29 observed that there was more that could be done to integrate the first two years of the course. Full integration, in the view of staff member P26, would require “*the same people delivering everything to know fully what was going on*”. In saying this, P26 had implied that a smaller teaching faculty with greater insight into the course would assist integrated learning.

Staff expressed difficulties and resistance to making connections with other subjects outside their own area of expertise and outside their own teaching remit, presenting a barrier to integration. Staff member P31 saw such a difficulty as residing in the faculty itself, in that whilst the staff were committed and well-qualified, they were “*very protective of their areas*”. Staff member P27 commented that there was a perception that different messages were given to students from different tutors: for example, between anatomy, physiology and consultation skills. If staff lacked understanding of other course areas, then these mixed messages were a likely result. Staff member P27 thought that shortage of time, and lack of resources such as sufficient tutors was a particular issue. Staff member P40 expressed concerns regarding the type of staff delivering the teaching programme. This was in terms of PBL cases relating to patient interaction, with staff not necessarily having experience of this:

Well (.) when facilitating a PBL session (2.0) students start to discuss:: ur::m (.) aspects of the course of the err the case that relate to (.) doctor patient interactions? (.) I had no experience of (.) of interacting with patients (.) I can only imitate (1.0) ur::m (1.0) yes imitate is a good word (.) imitate experience (1.0) because I've heard other students discuss the same case (.) for the (.) past ten years (2.0) but I think the problem is that (.) when you when you start to get very integrated (1.0) you're (.) diluting the expertise in the people who are (.) inter- (1.0) [tuts] (.) (you're diluting) (.) [tuts] (.) yeh (.) I think you are you're diluting the expertise of the people delivering the programme

Example C35: Staff member P40, Interview, 19/7/2017

Here P40 is not only referring to the expertise of the staff delivering teaching. P40 is also highlighting that expecting staff to deliver integrated content as individuals is diluting their expertise.

From the interviews with staff, there was evidence that staff did not always know what lectures were being delivered outwith their own area. Staff member P29 talked about how an individual staff member might come and give one lecture and then go away again. As a result, it was noted that it was hard to engage with that colleague for more than that one lecture, and that it was unlikely they knew about the level of integration and context of the students' learning in the course or semester as a whole. Staff member P32 talked about how lecturers weren't informed about the other lectures being delivered that same week:

other people will receive (.) invitations (.) err which will (.) have information about (.) the module and the case? (.) but not tell you what the other (.) ur::m lectures are being delivered that week

Example C36: Staff member P32, Interview, 11/10/2016

This lack of knowledge of other lecture content was therefore a barrier to integration, as efforts to integrate require some general understanding of the course as a basis. Staff member P36 similarly reported not knowing much about the content of other lectures in the same week in which they gave a lecture, other than having a rough idea of the subject areas that those other lectures covered. Staff member P37 did not think there was the opportunity to talk with other lecturers about their lecture content, nor did they know who those individuals were in order to be able to be in contact with them. Staff member P28 raised the issue of lecturers' lack of awareness of student expectations, regarding how much detail to provide and how the lecture they were giving might relate to assessment:

where they were probably were not aware of is:: student expectation (.) an::d and how we link (.) their ILOs with with the exams (.) I think I think (.) the lecturers are absolutely not aware of that so they've got an idea of what the student are (.) are are studying? (.) ur::m but there are certainly not aware (.) of (.) of of student expectation what is the level (.) of of (.) of studies to what detail the student needs to go into and how (.) was the expectation of the student related to their (.) to their exam

Example C37: Staff member P28, Interview, 12/9/2016

With respect to the Personal and Professional Development portfolio staff member P39 remarked that they didn't know much about "*what happens in portfolio*", and commented that it would be useful for them to know about this portfolio process. Staff member P40 echoed this observation by saying, in relation to PPD portfolio, "*I have a vague idea but not, no specifics*". P40 had commented that they were not directly involved with PPD. Staff member P26 talked

about how the GPs contributing to ECE knew what they had to teach, but not how the teaching they delivered fits in with what the students are learning at the University. Staff member P40 didn't think that students applied what they learnt from their ECE visits in the PBL cases. Staff member P28 was aware of ECE hospital visits taking place, but not so sure of what happened on them, or whether the learning on the visits connected with students' learning in the University:

I'm (.) not sure there is a great link there I'm not sure of all the detail of the of the visits and what they do there (.) er:::r but er:r (.) they they visit hospitals we give them an insight into into how (.) what is what (a (.) hospital service) is

Example C38: Staff member P28, Interview, 12/9/2016

The integrated OSCE was a new development that was introduced during the period of this research. Staff member P36 reported that they didn't know too much about the integrated OSCE. Though staff member P29 stated they knew about the integrated OSCE as an attempt to join together physiology-pharmacology and "ECE activity", they didn't know about it in detail, as they were not part of the OSCE integration working group.

Staff member P26 mentioned that meetings about integration occurred, but that it was difficult for part-time staff to attend due to the timing of those meetings. I asked staff member P32 if there were any formal meetings to talk about how the different components and subject areas in the assessment are combined. P32's response indicates a dearth of formal meetings, and an absence of an expectation of informal liaison or any directives from the colleagues overseeing the design and delivery of the integrated OSCE:

so (.) I've only attended one (.) an::d (.) that was (.) a direct result of the work I did with the OSCE (.) where I actually asked for it to happen (.) urm (.) [tuts] other than that no (.) I haven't attended anything formal where (1.0) there's been a sort of (.) you're ethics and law (.) you're psychology (.) you need to (.) have a conversation about how you should be integrating (.) no

Example C39: Staff member P32, Interview, 11/10/2016

6.3.d Theme conclusion: Behaviours challenging to integration

There were a number of challenges faced during efforts to integrate students' learning on the Manchester medical course. These challenges put up barriers to integration. By receiving conflicting information, students could struggle to interconnect their learning. If students received conflicting information in related sessions then this detracted structurally from an integrated learning experience and became a barrier. This points to a deficit in staff liaison, which will be revisited in Chapter 7. The obstacles to liaison between staff members, whether for reasons of protectionism, lack of will, or structural factors involving faculty organisation, hindered the integrated learning process. Equally, staff lacking knowledge or understanding of areas of the course other than their own created a barrier, as interconnections between elements would require knowledge of other areas of the course as a starting point. It is possible that this had a deleterious effect on integrated learning. Similarly, lack of knowledge among staff about key assessed course elements presented a barrier to integration, as integration of assessments plays an important part in driving integrated learning. As presented above, one example is the delivery of cranial nerve teaching, shared between consultation skills and physiology-pharmacology. The difficulties expressed by staff in relation to students' learning about cranial nerve testing and examination, in both consultation skills and physiology-pharmacology, highlighted the need for greater integration of learning across these two learning environments, in order to ensure a consistent approach in assessment.

6.4 Boundaries between knowledge-based, practical and general skill components

This theme describes the boundaries that existed between certain areas of the Manchester medical course: resulting in barriers to integrated learning. These areas are: knowledge-based, practical skills and general skills. Consideration of these boundaries includes: how PPD, EBM and physiology-pharmacology were viewed as separate; how lectures contained individual content unconnected with other elements of the course; how anatomy was a standalone course element; and how, more generally, the basic sciences and BSS components lacked interconnection.

6.4.a Knowledge-based sessions

There were two different strands to knowledge-based science learning on the medical course: basic sciences and BSS. One Year 1 student, P6, postulated that the science and social parts of the course were often “*quite divorced*”, not seeming interlinked. Year 2 student P22 viewed the psychosocial elements of the course as disconnected from other course components, saying:

the BSS kind of stuff is (1.0) I find the hardest stuff 'cause it doesn't really (1.0) connect with anything it's just kind of there and you just have to read Ogden or something

Example C40: Year 2 student P22, Interview, 2/3/2016

In this quote P22 commented ‘it’s just there’ as if BSS was floating, unconnected, and somehow random. The phrase ‘you just have to read Ogden or something’, implies no transparent connection being made for the students as to why BSS is core to their studies.

Lectures were a knowledge-based course element, delivered to the whole year group in an auditorium and made available as podcasts. Curriculum planners intended these lectures to support students’ learning in the other areas of the course. Lectures were often criticised by the participating students. Staff members P28 and P36 commented how the lectures could be better integrated. Year 1 student P11 expressed a view during interview (which was also echoed by Year 2 student P13 in their interview), that lectures weren’t always connected with other elements of the course:

occasionally as I said earlier I don't think that always the lectures (.) help (1.0) I've but I would say that's probably the only thing that isn't interconnected

Example C41: Year 1 student P11, Interview, 30/4/2015

Staff and student participants therefore questioned whether lectures were integrated. Year 1 student P4 mentioned a lecturer who had talked about their research in a way which didn’t appear to address the content of the week’s case, and P4 questioned the relevance of this to the learning at hand. Year 1 student P7 also complained about a lecturer who, in their view, talked more about their research area than was required by the students. Year 1 student P6 thought that, in general, the lecturers could cover topic areas that were likely to be more important to know about. Year 1 student P4 described a lecturer going off topic, questioning the relevance of doing so. Some staff knew the students’ dislike of lectures: for example staff

member P39 felt that “often” the students didn’t take the lectures “very seriously”. P39 also commented that although students were generally happy with lectures, some of them were less so.

During a consultation skills session, I observed a discussion in which participants raised issues regarding lectures, attendance and their perceived poor quality. A perception of poor quality, as well as the placement and timing of the lecture in relation to other components with similar content, implied a high likelihood of lack of attention being paid to the lecture and its content:

P16 said, “are you going to lectures today?” P15 was going to the first one, not the second, as he/she didn’t learn anything in that particular lecturer’s talks. P15 talked about podcasting lectures and learning more from this. P15 pointed out that having a Parkinson’s disease lecture in the schizophrenia week wasn’t good. P14, P16 and P15 wondered why the lectures were, “shit”. P14 particularly thought that the lecturers were talking about their own research interest and he/she didn’t understand what they were talking about. P16 found that he/she got lost in lectures. P15 admitted that he/she normally daydreamt in lectures.

Example C42: Field Notes, Semester 3 CSLC Session on Integrated OSCEs,
18/12/2015

Year 1 student P7 pointed out that his/her lecture attendance was good compared to that of other students:

compared to other people like (1.0) ur::m I go for lectures a lot more?

Example C43: Year 1 student P7, Interview, 20/3/2015

P7’s report reinforced my impression gained through observation, regarding poor lecture attendance, and implied that this is a general phenomenon. Year 2 student P22 further illustrated this point, relating that he/she didn’t use lectures and preferred to read books:

lectures are the part of the course that I (.) ur:m (.) use the least? (.) I prefer to just go and do my own thing kind of use my own (.) books

Example C44: Year 2 student P22, Interview, 2/3/2016

If a question mark exists over structural integration of lectures at a curriculum planning level then in turn, a barrier to integrated learning exists. Whether or not lectures were integrated, if

students did not attend, then this presented a barrier to integration. If the lectures were not seen as interconnected, then this had the potential to create a vicious circle with lecture attendance, reinforcing the barrier. It can be inferred that whilst lecturers may have felt it was of academic interest for the students to know about the areas they covered, students wanted lectures that were interconnected with their learning. However, it can be argued that academic interest does integrate learning and that students would do well to be exposed to wider academic study. It is possible that if lecturers made their objectives clearer, more student engagement may result. Nonetheless in terms of the course overall here was a barrier to integration.

6.4.b Skills-based sessions

Skills-based sessions included clinical skills such as clinical examination and practical skills such as dissection. The clinical skills learning that students undertook on the medical course was generally well valued; however, there were some dissenting voices. Year 1 student P1 was unsure of how joined-up PBL was with learning clinical examination:

TM: *Okay (.) ur::m (.) does it relate to your case at all*

P1: *Ur:m (.) in the respect that (.) this term was the (.) cardiorespiratory*

TM: *mmm*

P1: *ur::m term and (.) we've learnt (.) the respiratory examination and cardiovascular examination (.) but (.) in terms of is it ever mentioned in the PBL (.) it's not I think it's something separate (.) ur:m (.) and the examinations are something separate to that*

TM: *okay*

P1: *ur:m (.) yeh.*

TM: *Ur:m (.) does it add to the PBL (.) or not*

P1: *Definitely definitely 'cause err (.) I think (1.0) I think (.) urm some things you're looking for*

TM: *mmm*

P1: *so it (.) it links in in the respect that (.) ur::m (2.0) the PBL sort of teaches you:u (.) some things you're looking for*

TM: *mmm*

P1: *an:d (.) the examination teaches you how to find them*

TM: *//okay//*

P1: *//so// in that respect (1.0) yeh (1.0) definitely adds to it*

Example C45: Year 1 student P1, Interview, 7/5/2015

P1 thought the two session types of PBL and clinical examination were integrated in terms of clinical examination findings, with P1 saying the sessions linked up in that respect. However, P1 was clear that the two sessions were separate. This impression of separation therefore carried the implication that, in the view of P1, there was a boundary between the sessions. This presented a barrier to integrated learning.

Year 1 student P9 commented that although learning communication skills was important, sometimes these skills were not relevant to the case:

P9: sometimes especially when we did examinations after we'd been learning about the chest (.) then we'd learn (to do) a chest examination it does (.) but sometimes it can be a (.) bit random

TM: mmm

P9: but I think it's still really important to do it to learn all the communication

TM: mmm

P9: (.) so ye:b that's but sometimes it's not (.) really relevant to the case it just kind of has to be done

Example C46: Year 1 student P9, Interview, 13/3/2015

Here P9 observes that clinical examination can be random or even not relevant to PBL. P9 makes the point that communication skills are something that 'just kind of has to be done'. By saying this, it can be inferred that P9 didn't see a relationship between the sessions. If students didn't see a connection between the sessions, then a barrier to integration presented itself.

In an example of thinking of subject areas in silos, Year 1 student P7 expressed a view that physiology and pharmacology were sometimes learnt as two separate subjects. P7 also thought that the physiology-pharmacology laboratory sessions were not relevant to the cases and that the sessions lacked sufficient explanation of why observed physiological changes were happening. P7 commented on a perceived general deficit in interconnectivity between subject areas:

and I think like those life sciences professors are like (.) more interested in like (.) their part of research so you have like (.) physiologists who are like (.) who know a lot about something and like (.) pharmacologists who know a lot about drugs and stuff but they might not know like (.) how it all links together (.) so you normally get like (1.0) like you get some like repetition and like stuff

Example C47: Year 1 student P7, Interview, 20/3/2015

These observations by P7 indicate boundaries between the subject areas of physiology and pharmacology. By using the phrase 'how it all links together' P7 implies that, in their view, a barrier to integration existed. When those delivering the teaching lacked knowledge of each other's subjects, this caused a barrier. P7's observation was that this stemmed from staff only being interested in their own subject. Staff also observed that physiology-pharmacology lacked

integration: for example, staff member P30 was unsure if, or to what extent, this area was integrated with other areas in the course:

I know we (.) do phys-pharm practicals (.) and I'm sure they probably are integrated but I haven't experienced (.) that integration I can't say whether they are or they're not (.) but it'd be interesting (.) to see (.) how (.) how well they're (.) they're integrated

Example C48: Staff member P30, Interview, 13/9/2016

Staff member P35 reflected on how lack of integration caused consequent difficulties in assessment, in terms of laboratory practical classes in which clinical skills were learned without clinician input:

the physiology pharmacology sessions are practicals that then leads them to become areas for practicing for clinical practice (.) but that isn't informed by clinicians so there's a separation there that I think is a bit of a (.) difficulty still and it's still a (.) and it does present a difficulty in assessment as well

Example C49: Staff member P35, Interview, 23/3/2017

Anatomy tended to be seen as a subject that stood alone. This was the expressed view of staff member P37. Staff member P33 thought that there was a difficulty in fitting the anatomy in to the course. As a result, tenuous links were being made to other subject content. Staff member P31 didn't think that the anatomy was well integrated within the programme and observed that it was more orientated to structural anatomy than clinical anatomy. Nonetheless P31 felt that students saw full body dissection as a real strength of the programme:

P31: //other// strengths of the programme it's a PBL programme? Well it uses PBL? (.)
[makes clicking sound] ur::m a real real strength of the (.) u- (.) of the teaching? (.) ur::m (2.0)
[makes clicking sound] other:: (1.0) full body dissection? (.) is:: is is a real strength of the:: of the
programme I think the students see it that way as well [loudly inhales] ur::m the flip side of that is
that a weakness is that the anatomy's not very well integrated with the rest of the programme (.)
//ur::m//

TM: //mmm//

P31: (.) there are no anatomy lectures or anything like that that would kind of tie it in or no (.)
there's no clinical anatomy that's (.) that's a real (.) u- sort of real thing it's all (.) it's all s- (.) it's
all structure //ur::m//

TM: //mmm//

P31: (.) though we've not got quite to that stage of linking structure to the function (.) and then
even further to linking the (.) pathology

Example C50: Staff member P31, Interview, 11/10/2016

The PBL groups were split up for anatomy and this split could hinder integrated learning. Staff member P31 thought that anatomy sat on its own and that there was potential for more interconnection between anatomy and physiology-pharmacology and consultation skills. Staff member P35 observed that the anatomy, consultation skills and physiology-pharmacology parts of the course could join together more effectively, and that this could be achieved in part by clarifying the relationships between these different course elements:

I think it's the (.) I think it's the (1.0) relationships between (.) anatomy and phys-pharm and the other areas of consultations (.) is (.) is sort of needs more work (.) ur::m an- and more conceptual kind of joining up (.) err (.) I don't know if so much of it's it's a sort of a structural weakness I would say (.) but I think it does mean that (1.0) they are like (2.0) different worlds with very different teaching and learning methods (at the moment) th- the methods (.) could be a little bit more integrated (.) bit more joined up

Example C51: Staff member P35, Interview, 23/3/2017

Where this joining together of anatomy, consultation skills and physiology-pharmacology was not transparent, a barrier to integration presented itself. This barrier effectively existed at the curriculum planning level in terms of the 'conceptual' integration between the areas. Methods of delivering teaching were another part of the barrier and curriculum planners could address this.

The difficulties in aligning and interconnecting anatomy with other subject areas in the course implied a lack of integration and the existence of a barrier. Students valued anatomy, but this was not because of it being well integrated. However, it can be suggested that anatomy could be considered part of the process of integration as it gave the opportunity to meet subject matter covered elsewhere in the course.

6.4.c General skills

This section considers boundaries between the general skills of reflection/personal and professional development, and evidence-based medicine gained by students on the medical course. The primary focus here is on PPD, of which reflection was the key part. Some participating students and staff members expressed views on the integration of these course components.

PPD was something seen as standalone by students and staff. Staff member P25 expressed doubts as to how integrated the students would feel the PPD part of the course was. PPD was not seen as being integrated by Year 1 students P1 and P2, with P1 thinking that PPD was “*not intended to be connected*”. PPD was “*way too separate*” from the rest of the course, according to staff member P32. Staff member P37 viewed the PPD aspects of the course as standalone, however did not feel that these aspects required integration:

*I mean the other stuff like PEP and portfolio (5.0) [tuts] (.) ur:m they're stand alone aren't they s:o
(.) they don't need to be integrated*

Example C52: Staff member P37, Interview, 18/5/2017

Whilst P32 did think PPD was separate, they took an opposing view to P37 in that there was “*loads of stuff that could be integrated into PPD*”, such as psychology, sociology and ethics and law. P32 therefore did think that PPD required integration, despite being separate at the time of this research.

Participating students had views on PPD. While observing a non-timetabled session, I was given the distinct impression by Year 2 student P18 that PPD was not a popular activity; although there was an acknowledgement that it needed to be done nonetheless. During the interview with Year 1 student P2, further evidence of this disregard for PPD came to light:

it's definitely the thing everyone kind of (.) would forget about

Example C53: Year 1 student P2, Interview, 29/4/2015

Year 1 student P1 expressed a view on the triviality of PPD:

it can seem as I said earlier a bit trivial (.) writing a big piece on the reflection of (1.0) how you've sort of (.) fitted in into your PBL group

Example C54: Year 1 student P1, Interview, 7/5/2015

The question of whether PPD was interlinked with other elements in the course was raised by Year 2 student P22, who observed that PPD was done as an afterthought and didn't really fit in with the course, other than with ECE:

not particularly it's just on the side of it (1.0) I tend to just do it when I've err run out of things to do? (.) because err (.) I just kind of pops up (.) so (.) I d- I don't feel it links in (.) just it links in with ECE that's about it

Example C55: Year 2 student P22, Interview, 2/3/2016

Here we see instances of PPD being viewed as less important or of lower priority as other areas of the Manchester medical course.

Most participants had reservations about PPD. P1 commented regarding PPD that it was “*something totally different that’s preparing for after medical school*”. P2 observed that PPD was not as connected with the PBL cases as other course components, and that it was “*more for you*”, suggesting he/she thought it was more personal than academic. Whilst acknowledging “*the benefits of being able to reflect on your own learning*”, Year 1 student P11 thought there was “*far too much emphasis placed on PPD*”, questioning the necessity of reflecting on aspects such as group interactions and the GMC code and whether it was fair to fail the course due to poor reflection:

is it (.) fair that (.) you could f- despite doing very well on the course (.) you could fail (.) because you::r reflective piece isn't up to scratch

Example C56: Year 1 student P11, Interview, 30/4/2015

Here P11 was complaining that a failure at PPD shouldn't mean a fail overall on the course. P11 had separated the ideas of success on the Manchester medical course from meeting the standard of adequate reflection in PPD. This student therefore saw a separation between PPD and the rest of the course.

Year 1 student P6 did see that there was some value to PPD, but pointed out in the following long quote that it could be made more relevant:

so I think we need to be more shown and more value needs to be placed on that sort of purpose with it and that it's not just something which is (1.0) just a bit tedious and monotonous (.) an::d what it's trying to show is that (.) by being more self-reflective (.) this is going to make you much more efficient (.) as a doctor (.) because urm (1.0) not efficient but just kinda (.) well just a b- a better doctor because (1.0) by being self-reflective you are able to kinda both work on the things (.) and acknowledge (.) fo- (.) for some people I think it's an issue that (.) they actually there are some things that they're not very good at (.) ur::m which you can work on and also (.) prevents you being a potential danger because I think it's (.) I think it is very dangerous (.) to walk into this medical profession and think well I'm great at everything

Example C57: Year 1 student P6, Interview, 13/3/2015

Staff member P35 observed that students sometimes saw doing PPD as “*really frustrating*” as it was too prescriptive. Staff member P26 thought students viewed PPD as “*bit of a bane*”. P26

went on to suggest that doctors also felt this was the case, suggesting that it was “*an unpleasant but necessary part of everybody’s lives*”. Staff member P30 thought that students saw PPD as an optional extra, and a box to be ticked. Year 2 student P13 saw the issue with PPD as the prescriptive nature of the reflection required and talked about the problem of people copying reflective pieces:

You could have a (.) you could reflect on an experience that you had (1.0) and g- and make an action plan and it it (.) be worthwhile whereas it’s just a- a- (.) a useless exercise really when it’s just a list of things that (.) they want to see in everyone and (.) i- I understand wha- (.) I don’t because (.) it’s obviously (.) not (.) right to copy people (.) but I understand why people ::e just can’t be arsed doing it and (.) and copy? because (.) it’s a waste of time (.) when i- it does- it doesn’t mean anything when (.) you’re just writing about (1.0) what they want you to write about

Example C58: Year 2 student P13, Interview, 14/3/2016

However, regarding documenting experiences for their PPD portfolio, P26 observed the students felt that it was “*quite cathartic to be able to write it all down*”.

Students and staff observed that EBM was sometimes relevant to PBL cases. Year 1 student P9 mentioned that the EBM was sometimes relevant to the PBL cases, and sometimes not: a view that Year 2 student P20 also held. Year 1 student P4 pointed out that while EBM is hinted at in the PBL cases, it wasn’t useful for learning the case. Year 1 student P1 talked about how EBM may relate overall to the course in a structural manner, but not to the cases, compromising integrated learning:

I’ve struggled really to se::e (.) how it relates too much to the case but it definitely relates (.) to the course? (.) ur:m (.) ‘cause there isn’t much about research

Example C59: Year 1 student P1, Interview, 7/5/2015

Year 1 student P2 echoed these thoughts on EBM, pointing out how it may link up more as the course progresses. In this respect, EBM is similar to PPD, accruing sense and relevance as the course progresses.

Staff member P36 felt that it was hard to relate the EBM topics to the part of the course at hand and that this tended to be superficial. Staff member P32 explained the lack of motivation

for students to learn about EBM in relation to the likelihood of it coming up in the assessments:

you take a tes- some tests in EBM (.) there's some questions on the (.) err u- (.) knowledge based assessment (.) it doesn't really matter if you know it or not (.) because (.) it's only tested (.) it (.) it's like five questions or something on a hundred and twenty five question paper (.) and (.) I they don't see the point of it

Example C60: Staff member P32, Interview, 11/10/2016

Staff member P36 thought that students probably didn't see EBM as integrated, and not relevant to their current learning, commenting that EBM was in their view as a staff member "fairly unintegrated". Thus the perceptions of students about the value of EBM, and its relevance to their learning in other areas of the course, was therefore a barrier to integration.

6.4.d Theme conclusion: Boundaries between knowledge-based, practical and general skill components

If part of the meaning of integration could be termed interconnectivity, or joining up between different elements of a course, evidence has been presented in this section that participating students and staff members characterised certain elements of the MMS course as not interconnected. The implication of this was therefore that boundaries around these particular elements were a barrier to integration. The elements at issue were: PPD, EBM, lectures, anatomy, physiology-pharmacology, BSS, and sometimes consultation skills. The lack of interconnection, and indeed boundaries between, the science and BSS course elements demonstrated a structural barrier to integration at the curriculum planning level. Lectures in general were an area where less value was placed, despite potentially offering the ability to meet subject matter from PBL in a different environment. It can be inferred from comments by the study participants that the off-topic nature of some lectures diminished their value as contributing to their integrated learning'. It is interesting that anatomy was valued but seemingly with the acknowledgement that it was not integrated; it stood alone as a subject. At the same time, there was overarching integration between anatomy and other learning environments in terms of learning subjects alongside each other, so therefore anatomy had a contribution to make to the process of integration. Integrated learning doesn't automatically mean value to the participating students. As the anatomy sessions required students to work in

different configurations from their PBL group, this may have a detrimental impact on the integrated learning experience. Conversely, it might be that working separately from the group in anatomy may compromise the PBL group working.

Students and staff saw PPD as standalone on the Manchester medical course. If PPD was stand-alone and/or had the potential to integrate other subjects this would imply that at this time point, a boundary existed around PPD that was a barrier to integration. It is possible that PPD could be integrated, as reflection on learning can contribute meaningfully towards integration. It can be postulated that PPD was part of the process of integration as it gave the students an opportunity to reflect on their learning. There was an observed dislike of PPD. With PPD aspects of the course viewed as trivial, irrelevant and disregarded, this presents a potential barrier to integrated learning: as, implicitly, these students were not seeing integration with the rest of the course. Additionally, thinking PPD was unpleasant but necessary was an impression of a course component that would inhibit its integration. Copying another's work happened with PPD on at least one occasion. This sort of illicit activity not only presented a barrier to integration but also was not part of a culture that would help promote integrated learning.

EBM was interconnected within the Manchester medical course overall, although it wasn't thought to be so in time and space. This was the main issue with EBM. There was also a motivational deficit in learning about this subject. The effect may therefore have been that students learned EBM distinct from other subjects rather than in an interconnected fashion and there was a boundary around it. This was therefore a barrier to integration on the course.

6.5 Staff identified solutions for further integration in the future

In the interviews with staff, one topic was staff members' ideas for facilitating integration in the future. These ideas encompass how different parts of the course, and specific types of session, could be better integrated with each other. That the staff had these ideas to share, and that they could identify areas for improvement, suggests that they perceived barriers to

integration to be in existence. These solutions weren't explored with students as they were not judged to have the insight to discuss further integration in the future, as this would have required knowledge of curriculum planning.

Staff members commented on how clearly specified, detailed interconnections between course components were lacking. Staff member P28 thought that the lectures were an area that could be more explicitly integrated, by changing their content and the order of their delivery and by using them to link bioscience/clinical topics with BSS. Staff member P36 thought more content oversight would help the lecture series and would afford consideration of how they interrelated with other areas of the programme. Staff member P31 felt that anatomy sat alone, and could integrate better with physiology-pharmacology and consultation skills, and hoped this integration would be driven to some extent by the integrated OSCE. Thus, staff members highlighted a number of areas where they felt there were opportunities to promote integration, which were lacking at that point in time and were therefore a barrier to integration.

In observing how integration could be better facilitated in the future, a number of staff presented the possibilities for more links between physiology-pharmacology and consultation skills. Staff member P25 talked about the potential for more cross-referencing of material between physiology-pharmacology and consultation skills, with a change to make integration less dependent on the consultation skills teaching. P25 also pointed out that staff in these two subject areas need to ensure they are “teaching the same thing”, particularly with the advent of the integrated OSCE assessment. Staff member P38 talked about how sessions could be run jointly between physiology and consultation skills. Staff member P37 also thought there could be better links between physiology-pharmacology and consultation skills:

phys-pharm and (.) communication and consultation can actually link up much better (.) when we teach (.) them how to do blood pressure for example you know we (.) we do it from a scientific point of view (.) what are the Korotkoff sounds and why do they occur (.) [identifiably refers to consultation skills teaching] they're much more patient centred (1.0) [tuts] and they should be you know (.) and they should be (.) but ur:m (.) [makes clicking sound] I wonder if we give them conflicting (.) advice sometimes

Example B61: Staff member P37, Interview, 18/5/2017

There were therefore barriers to integration between physiology-pharmacology and consultation skills that pointed to the improvements that could be made.

Staff member P35 talked about learning ethics and law integrated with consultation skills. P35 also thought more effort could be made referencing anatomy in consultation skills teaching. The following long quote illustrates his/her observations on this:

for example we have ethics and law (.) workshops in years 1 and 2 and they are very (.) very well delivered and they're very high quality (.) the one thing I think that there could be more of is more integration between those and (.) ur:m consultation skills generally (.) ur:m because they're not that different actually but of course people want to (.) maintain the boundaries of their particular area (.) urm and the same would apply (.) perhaps to anatomy (.) I think err (.) u- er:r and i- and it's not always easy (.) in a communication or consultation skills session (.) to remember to think about anatomy (.) from the tutors' point of view (.) but it is quite important to be able to reference it (.) to keep this holistic view of what the students are learning

Example B62: Staff member P35, Interview, 23/3/2017

This quote illustrates P35's perception that the motivation among staff members to integrate subject areas that were either closely related (ethics and law with consultation skills), or that would benefit from closer integration (anatomy and consultation skills), was quashed by the desire to maintain boundaries. These references to boundaries intimated protectionism of subject areas, which was a barrier to integration.

Staff member P27 thought the opportunity for further integration was “*really just the different departments getting to know each other*”; and also proposed that getting to know other people's areas of the syllabus better would help. The limiting factor, as some staff members indicated, was time and resources. Having dedicated time and staff roles for integration would implicitly improve the situation, as observed above by staff member P25, and would enable staff to deliver related material in a consistent manner. Such an improvement would more wholly facilitate integration. This, again, implicitly conveys that a barrier to integration existed in this area.

6.5.a Theme conclusion: Staff identified solutions for further integration in the future

The staff comments in interviews identified a number of ways in which there was scope for future improvements to barriers to integration that existed on the course. Their observations and perspectives implicitly acknowledge barriers were present and that the course was not fully integrated; if it was, there would not be scope for the future improvements the staff members raised. One of the main barriers they reported for future improvement was in creating stronger links between different course components. Without good links any integration may be simply a coincidence.

6.5 Chapter summary: Barriers to integrated learning

In summary, this Chapter considered the barriers to integration on the Manchester medical course. In the context of the wider PBL process, subject compartmentalisation sometimes occurred. Whilst peers helping each other with learning facilitated the integrated learning process, a barrier was created when this help didn't materialise. There were a number of organisational challenges faced, including: students receiving conflicting information due to discrepancies in the delivery of teaching components, issues with staff liaison over teaching, and staff lacking awareness in other elements of the course. There were boundaries around certain course elements including PPD, EBM, lectures, anatomy, physiology-pharmacology, BSS, and consultation skills.

Subject compartmentalisation is contrary to the existing model of integration as the top levels of integration in this model requires subjects lose their individual identity (Harden, 2000). When compartmentalisation took place during PBL, it should be remembered that overall PBL sessions did take in many subject areas. The inclusion of subject compartmentalisation in this chapter demonstrates that, within an overall structure of integrated learning, separations and boundaries could still occur, putting up a barrier to integration. This was implicitly a barrier to integration, as if compartmentalisation occurs then it is evidence of students not

thinking in an integrated manner. Staff confirmed that students had a tendency to compartmentalise subjects. This compartmentalisation also occurred in dissection sessions, laboratory practicals and non-timetabled situations. However, the opposing argument would be that compartmentalisation was not always likely to be an issue. It could be a necessary component of any integrated course, as it may be unavoidable that at times that even on an integrated course, students may need to focus on an individual subject for reasons of comprehension. Compartmentalisation is therefore a barrier to integration where it occurs at the expense of integration or even stems from deficiencies in curriculum planning. Any model of integration should reflect this nuance and I will address this in Chapter 7, where I propose a new model of integration.

The cultures, behaviours and beliefs that grew up around the course led to barriers to integration. When peer support was lacking there were some reasons identified, including individual student preference and shyness. There was resentment when peer support was missing, due to the culture around it and a belief amongst students that peer support should be happening. Support for the importance of this culture of peer support comes from a previous review of learning environments that postulated the role of student relationships in building an environment conducive to learning (Gruppen et al., 2018). Therefore, without support between students helping build relationships, a good learning environment is more difficult to achieve. Behavioural issues that presented a barrier to the integrated learning process itself were: arguments in PBL sessions, regurgitation of learning by rote, and dysfunctional group dynamics. Behavioural and cultural barriers included competitive student culture, and disregard of behavioural and social sciences by students. These are signs of poor student bonding that would counteract engagement in integrated learning. This should be reflected in a model of integration.

There were structural and organisational challenges in curriculum design and delivery, including opportunities for staff to communicate across their subject areas. Difficulties in staff liaison and awareness of different subject content were noted. Without this awareness, delivering a consistent message across different subject areas of the course was difficult. Any clash of information on one hand may impact on integration by impeding learning, but on the other may assist integration by enabling students to consult with peers and tutors. Conflicting

information had the potential to cause confusion, for example when split group sessions resulted in clashing information, although different viewpoints can provide a richer learning experience. A particular issue was noted at a teaching delivery level when a skill was taught from two different standpoints in that staff didn't want to contradict each other and didn't appreciate each other's viewpoints. Curriculum planners can therefore conceptualise a design that becomes challenging at the point of teaching delivery. Boundaries in medical courses have previously been noted (Muller et al., 2008). These authors observed in their study that staff didn't know about course areas other than their own and weren't talking with colleagues or trying to interlink their teaching with that of others. Any boundaries between course elements would detract from integrated learning and this should be part of how integration is modelled. I will address this in Chapter 7.

Chapter 7: Conceptual framework

The aims of this chapter are twofold. Firstly, to consider how the findings in the present thesis fit in with current educational theories. Secondly, to develop a conceptual framework for understanding and applying integrated learning in undergraduate medical education, based on the findings in this thesis. I will demonstrate how the present thesis builds on existing theories and makes its own contribution to educational theory.

7.1 Interpretation of the findings in the context of educational theory

Key educational theories that relate to integration as discussed in the Introduction (Chapter 1) are: the integration ladder (Harden, 2000); legitimate peripheral participation in communities of practice (Lave and Wenger, 1991, Wenger, 1998); and transformative learning (Mezirow, 1991).

7.1.a The integration ladder in relation to the Manchester medical course

As detailed in the Introduction, the integration ladder is a theory of integration in medical education that describes 11 rungs, becoming progressively more integrated. The first rung describes no integration, whereby each component subject is isolated from the others in the aspects of timetabling, content and assessment. The eleventh rung describes full integration whereby faculty define the learning and integration is internal to the learner. There is integration of subject content with experiential learning and subjects lose their individuality (Harden, 2000). Harden's integration ladder (2000) is a complicated tool to use. In applying my own research to this theory, it proved difficult to assign parts of the course to the ladder. Furthermore, the ladder represents attaining what is ultimately theoretical full integration,

which may not be possible in practice. There is therefore a need to develop a new model informed by research, which I shall return to later in this chapter.

My research has shown that PBL sessions provided an opportunity for integrated learning by allowing students to experience subjects in parallel during the same session. Previous work has similarly suggested that students' perception of integration related to multi-subject course content. This was compared with the more organisational view of staff which will be considered below (Jain et al., 2003). The expectation of students is therefore that they are able to experience integrated learning on the ground. It is interesting to observe that students may not think about the global curriculum plan, and perhaps unsurprising that staff would have a more global overview of integration. Staff aren't participating as learners on the course. As such staff will expect to see evidence of curriculum planning that allows facilitation of learning. They would see multi-disciplinary teaching scheduled to take place and assume this delivers integration. Learning subjects in parallel is therefore a key part of integration on the course. From the staff point of view this is planned to happen, and from the students' point of view, learning subjects in parallel is experienced on the ground. This design feature of the curriculum, whereby one subject is taught and learned alongside another in the same week of the course, was a major structural element upon which integration could be founded and from which it can build. The parallel learning of subjects was not only in relation to PBL; it also extended to consultation skills sessions with anatomy and physiology/pharmacology alongside. In terms of viewing integration through the theoretical lens of Harden's integration ladder, this would reflect rung nine as whilst the idea of problem based learning would have the potential to lead to integrated learning, there was still evidence of subject individuality within the course (Harden, 2000).

The efforts that staff made to deliver an integrated experience were important, as according to the integration ladder theory a true integrated experience should be able to blur the boundaries between subject areas (Harden, 2000). The difficulty was that learning subjects in parallel on the Manchester medical course did not automatically lead to blurring of boundaries between them. It is important to acknowledge that the delivery teaching aims to facilitate integrated learning. Student learning itself is facilitated by the design of a medical curriculum and activities that students undertake within it. The work of PBL tutors is to question students in

order to activate their thinking in integrative ways. This also facilitates integrated learning. In the present study, staff referred to other sessions in their teaching/facilitation and made efforts to look into material from other sessions or even interact with those delivering them. There was also evidence of meetings where staff could see what else was going on in the course. Without staff functioning in this manner with formal activity and so-called “soft integration”, it would not be possible to achieve such integration and this would reach rung 6 of the integration ladder of Harden. Soft integration is terminology used by staff members to mean informal discussions with colleagues for example during break times or chance meetings. As mentioned above, previous work has suggested the staff perception of integration may be related to multi-disciplinary inception of the course (Jain et al., 2003). This aligns with the findings in the present study of staff supporting multi-disciplinary teaching.

The question remains of the extent of blurring boundaries between subject areas. Merely making reference to other subject areas would be conscribed by rung three of the integration ladder, though making reference doesn't tell us if integrated learning was taking place. From the data, it seemed as if not all staff members were liaising with one other. This extended to protectionism in certain areas, and even outright obstruction to efforts to integrate, both of which had the potential to compromise integration. The observation that staff members lacked awareness of other course areas other than their own, only really achieved rung one of the integration ladder. This observation is supported by Muller et al (2008) who described that students viewed staff to be compromising integration, saying that staff: :

“did not know the curriculum beyond their own lectures, did not communicate with one another, made no effort to discover what content had already been covered or what students would be learning in the future and failed to link their subject matter with the rest of the curriculum” (p. 782).

According to Harden's integration ladder (2000), collaboration between staff is part of the ascent up the integration ladder and therefore evidence of a deficit in liaison is evidence of a deficit in integration (Harden, 2000).

Whilst it was difficult to be confident that subject boundaries were being blurred on the Manchester medical course from the evidence presented in this thesis, there were nonetheless multi-subject discussions that participating students were observed to be involved in. These

multi-subject discussions meant that the students experienced integrated learning situated within place and time. This aligns with rung seven of the integration ladder (Harden, 2000). There isn't evidence of ascending as far as rung eight, simply as this would require predominance of integrated learning and it is clear that this conclusion can't be satisfied based on the data presented herein.

There was also evidence presented of single subject discussion. Through the theoretical lens of the integration ladder the fifth rung would seem appropriate for such observed instances due to the more holistic idea of integrated learning on the course against which background, the single-subject learning took place. This temporal relationship doesn't automatically result in integrated thought, which is distinct from the idea of integrated learning where subjects are learnt in parallel. The introduction described a weakness of the integration ladder in not being informed by primary research and here can be seen a practical example of this weakness, as compartmentalised thinking does not reflect a level of integrated learning commensurate with a high rung of the ladder such as 10 or 11.

One participant suggested an objective of staff members being clinicians, with full understanding of all aspects of the course. To achieve this implies an apprenticeship for each student. This would be impractical due the numbers of students on the medical course at any one time, which is in excess of 1000. There simply aren't the clinical resources to implement such a strategy. There must therefore always be a trade-off between fully integrated teaching delivery and the risk of compartmentalised teaching. Such a trade of would reach rung 9 of the integration ladder.

When considering Harden's integration ladder model in the context of ECE, there are two ways of looking at this (Harden, 2000). On one hand, the integration ladder rung would be at least eight on the basis that ECE could constitute a clinical theme, however if it didn't always pull in different subject areas or was in any way isolated, then this could be more closely aligned to the fifth rung of the ladder of learning in a temporal manner. Evidence was presented from the staff interviews that students were compartmentalising subject areas, even ignoring the behavioural sciences. If this is a general circumstance, then the idea of integrated

learning was somewhat diminished. There was however evidence that students did experience integrated learning and therefore the staff members could either have been mistaken, or may only have isolated experiences upon which to base the observation. There are data in the present study that show the students either referring to or bringing in different knowledge. It is not really possible to tell what thinking and learning was going on in the minds of the participants. Therefore, one can't tell if integrated thinking was occurring at any given time point. The only data available is what the students were saying, and there might well be more instances than this in what students were thinking but not saying, however one can't know for sure. It wasn't possible to confirm this with the methods in this study. Indeed it may not be possible these methods.

Evidence was presented that EBM, PPD, PEP, anatomy, consultation skills, lectures and some individual subject areas were harder to integrate throughout the Manchester medical course. There was also evidence of mixed messages on delivery of common subject matter that had the potential to compromise integration. If one considers the integration ladder, this lack of interconnection would be on the lower rungs, even as low as rung two (Harden, 2000). There was room for future improvements in staff liaison, consistency of teaching and better integration of PPD, lectures, EBM, consultation skills, ethics and law, and anatomy. There were tensions due to students being asked to integrate. Students resisted incorporation of BSS into PBL and reflection in PPD. They had a clear preference for more compartmentalised activities such as anatomy. The extent integrated learning was or wasn't occurring didn't seem to correlate with student subject preferences. Students are learning to cope with a complex situation. From a logistical point of view, not everything on a medical course is, or can be, delivered in a joined-up way. Anatomy is a particularly difficult subject to integrate as it is based around cadaveric dissection. This is a new experience to any student and as such likely to focus minds on what is at hand. There was also evidence of mixed messages between different sessions. I acknowledge that students will always have incomplete, inconsistent information. They have to learn to integrate this for themselves. However if they don't learn to integrate this it is an issue for curriculum planners.

Integrated OSCE assessment would typically be on the integration ladder at a minimum of rung eight (Harden, 2000). However, if the assessments themselves weren't viewed as

integrated then the level of integration would decrease to a temporal relationship such as rung five specifies. When one considers lack of consistent teaching approach compromising the integrated OSCE then this may drop as far down to rung two of the integration ladder. The ladder is dynamic in that components can move up and down. Here can be seen a drawback of viewing integration through this lens with it depending on context.

7.1.b Communities of practice theory in relation to the present thesis

The nature of integration described in the present thesis fits with the idea of a community of practice, which is a key social learning theory as described in Chapter 1 (Lave and Wenger, 1991, Wenger, 1998). The community is ultimately the medical profession as a whole, in which legitimate peripheral participation takes place (Lave and Wenger, 1991). These authors consider someone part of a community whether or not they actually participate directly, such as can be seen in students helping or not helping group members. The PBL group locally, and within the pertinent year of study, are situated activities within the community of the medical profession (Lave and Wenger, 1991). Such situated activities allow the students space to learn both in terms of understanding subjects and performing new skills. During years one and two, there are opportunities to learn from qualified doctors in clinical and non-clinical environments. Medical students therefore participate in the doctor community and are very much neophytes in a curriculum of learning from day one, as required in the legitimate peripheral participation theory (Lave and Wenger, 1991). On the Manchester medical course, evidence of the degree of participation in the doctor community was observed to increase via discussions that include clinical subject matter such as consultation skills or medical conditions.

A handful of studies have explored communities of practice in medical education (Lave and Wenger, 1991). One ethnographic study took place in an acute medical ward at Danderyd Hospital, Karolinska Institutet in Sweden, involving staff and medical/nursing students. Observations demonstrated how students interacted with the ward environment, which was not set up in a manner that helped student-student interaction. However medical students did discuss patient care in the staff room (Hagg-Martinell et al., 2016). An element of the participation described in the present thesis is seen in discussions. In so doing students

increased their mastery and progress towards becoming part of the community of the medical profession, helping each other as they go. In this vein, part of Lave and Wenger's legitimate peripheral participation is learning how to talk in the language of the given community of practice (Lave and Wenger, 1991). One example of this in the present thesis is the particular circumstance of help with pronunciation.

Further studies in communities of medical education practice have illustrated features of integrated learning. In a focus group study by Orsmond and Zvauya (2015, p. 490), learning was seen as something one did by oneself. PBL groups were acknowledged as a forum for correcting peers when they were wrong about a certain subject, though this could potentially be a block on contribution. Peers would help each other in the PBL environment, sharing resources, and over the course of the year, peers and PBL overtook lectures and books as learning resources with "a solid group identity" being noted, (Orsmond and Zvauya, 2015). These observations chimed with those in the present study, as the authors similarly relating the changes during the first year of study to the formation of a community of practice. In another open and closed response questionnaire study of a peer assisted learning programme (Menezes et al., 2016), students in the early years of study were tutored in a clinical subject of choice by students in their later years. Menezes et al. (2016, p. 33) looked through the theoretical lens of so-called communities of practice. In addition to the benefits of knowledge acquisition and reinforcement, peer assisted learning helped generate "a sense of community". These observations are similar to those described in the present thesis, regarding creation of communities of practice on the Manchester medical course.

Lave and Wenger (1991) talk about the idea of apprenticeship being central to the formation of their learning theory. Apprenticeship in their context is applicable to the notion of discussion as part of integrated learning, in that there is learning within a structure without teaching. The way that students were observed to help each other, and interact generally, defines the year one and two integrated learning process as a social situation, and the learning is therefore part of what is a social apprenticeship. This is therefore legitimate peripheral participation by these authors' definition Apprenticeship allows legitimate peripheral participation to evolve.

The communities of practice of Lave and Wenger (1991) has similarities to the zone of proximal development of Vygotsky (1978). The zone of proximal development relates to the distance gap between a childhood learner being able to solve a problem independently and with experienced assistance. Manchester medical students have the tutor support and peer support Vygotsky deemed important. The tutor support equates to the guidance an adult gives to a child. However, the peer support Vygotsky theorised requires a higher degree of capability in the peer providing it. The PBL group environment provides the opportunity for peer and tutor support with learning. When students arrive at medical school they have a variety of experience. Most are school leavers; however some have already attained a higher educational level via undergraduate study or experience in the working world. Irrespective of their educational level they must all join the steep learning curve of medical studies. Because of the variety of experience it might take some longer to adapt to their new educational level where they can integrate learning. Additionally, whilst the PBL group are all medical students, some will progress in certain areas of integrated learning more quickly than others. The distance they progress equates to the zone of proximal development.

The peer support findings described in the present thesis are therefore in line with the zone of proximal development, as Vygotsky (1978) postulated that different children of the same age would learn at different age group levels, despite being given the same support. This was because of their different rate of educational maturity. The same is true of medical students, though unlike in the original Vygotsky theory they are different ages. The application to medical students must therefore be adapted to consider the first year of medical school as being a chronological age in itself, irrespective of students' actual age.

7.1.c Transformative learning in relation to the present thesis

The opportunity for transformative learning is present amidst integrated learning on the Manchester medical course. Lave and Wenger's (1991) legitimate peripheral participation is fundamentally a transformative process, therefore the transformative learning theory can be considered alongside it (Mezirow, 1991). Mezirow postulated that communication and social interaction were important conditions for transformative learning. Mezirow contended that taking part in discourse in the correct circumstances helped adults to reflect and in turn form

meaning perspectives. Discussion should have provided the opportunity for internal reflection in the participating students. In doing so the students could compare their meaning schemes for the subjects at hand and either confirm or modify them as appropriate. Similarly, when explicit links were made, their reinforcing function with the students was potentially transformative. The same opportunity could also be observed when help with learning was offered on the course, however the additional benefit of this in line with transformative learning is transformation of meaning schemes, which form the bedrock of the learning experience.

Returning to reflection, as already stated transformative learning according to Mezirow requires reflective thought (Mezirow, 1991). Regardless of the views expressed by participating students about having to do reflection as part of PPD, there was evidence that this was part of the integrated learning experience on the Manchester medical course. It could however be surmised that not being fully invested in reflection could limit the extent that transformative learning could happen. ECE at Manchester was a specific example of how medical students had the opportunity to develop Mezirow's (1991) meaning perspectives. Students had the potential to transform their existing ideas by experiencing real or realistic clinical scenarios. By doing this at an early stage they are less likely to develop ingrained false constructs, which would be more difficult to adapt in ensuing years, such as basic procedure for clinical examination.

7.2 A new model of integration in early years medical education

A new model of integration in the early years of medical education was constructed from the empirical data and the qualitative findings in the present thesis. This model, shown below in figure 9, consists of 3 facets: student experience, facilitators and barriers of integration. It allows a simple qualitative classification of integration.

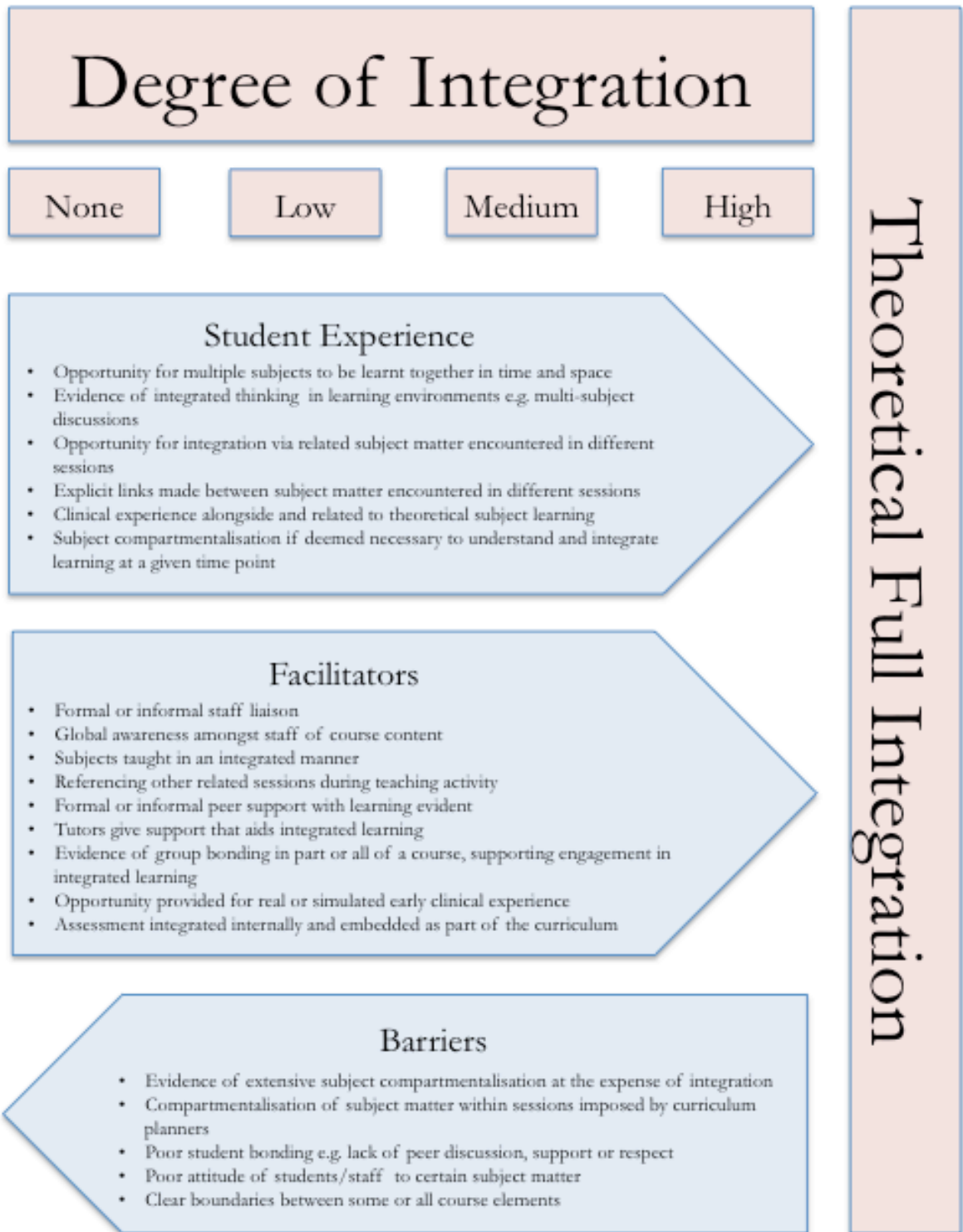


Figure 9: A new model of integration in early years medical education

7.2.a Applying the new integration model

The new model shown in figure 9 aims to determine not only the degree of integration, but also where this can be improved by identification of the area/reason integration is lacking. The degree of each of three facets of integration defined as student experience, facilitators and barriers, can be determined as: none, low, low-medium, medium, medium-high, high. This is done qualitatively in line with the statements provided as guidance shown on the model in figure 9. The measure would therefore be a qualitative judgement of the extent to which the statements reflect integration in the early years of medical education on a particular course of study. The existence of barriers should be judged in an opposite manner to the other two facets such that the more barriers are present, the lower the integration. An overall judgement on the level of integration can then be reached taking into account all three facets as none, low, medium or high.

7.2.b Mapping the Manchester medical course onto the model of integrated learning

Aspects of integration seen on the Manchester medical course informed the model in figure 9. The three facets of integration are: student experience, facilitators and barriers. The model is designed to be simple to understand and apply to any medical course. The various descriptors of each facet are as open and inclusive as possible, to recognise variations in experience and design of integrated learning elements, across different medical school programmes and cultures.

7.2.b.i Student experience

The facet of student experience as per figure 9 was derived from the learning agendas formed during PBL. These gave an opportunity for learning multiple subjects in time and space. There was clear evidence of integrated thinking seen in numerous multi-subject discussions. Students made explicit links to other parts of the course. This showed how the opportunity existed to

drive integration via reinforcement in different sessions. The early clinical experience programme alongside the theoretical learning gave examples of explicit links and therefore contributed to an integrated learning experience. Whilst PBL sessions enabled discussion by design, anatomy, consultation skills and informal environments did not. The effect of the discussions seemed therefore to become habit-forming amongst the participating students. With the observation that multi-subject discussions took place in a more informal environment, there was potential for integrated learning influencing student behaviour, even at what was still quite an early stage in the course. However there is an issue with regarding compartmentalisation. It is difficult to be sure if students compartmentalised in order to understand subject matter before integrating. My reading of the situation, and that of the staff interviewees, was that they didn't. If this was the case then it would be part of the integrated learning experience. If not then a barrier would exist. I will return to this below.

The student experience on the Manchester medical course would therefore be classified as medium-high integrated learning. This is the most important facet of integrated learning. Whilst what the student wants should not be a principal driver for curriculum planners, if students don't experience integrated learning then planning is for nought. The findings in chapter 4 dealt primarily with data obtained by observation and interview with students. The staff view was covered towards the end of that chapter. This was done in order to reflect the student experience as best as possible. The staff were focused on teaching. They observed students in limited environments, often just one, and not always throughout any given session. The data generated with the students was also observational; however the focus was on the student experience throughout multiple environments rather than teaching the students. Additionally the direct interviews with students helped clarify aspects of their experience. In this way the analysis focused more on the student experience rather than the staff opinion of the student experience.

7.2.b.ii Facilitators

The 'Facilitators' component as per figure 9 is derived from staff and student behaviours. These played a background role facilitating integration on the Manchester medical course via

setting the conditions against which it could take place. It should be remembered that not all courses are PBL based, so whilst this may help with understanding the nature of integration in the context of the Manchester medical course, it may not be necessarily the case on a lecture-based course.

Some staff on the course did try hard to liaise with each other informally and therefore drive integration. They would reference other subject areas in order to help the students integrate. There was some evidence of formal meetings that would help staff delivery the course in close cooperation. However these behaviours weren't universal. The integrated assessment, introduced into the curriculum during the data collection for this study, instilled liaison between curriculum planners and therefore had potential to drive integrated learning; although the students may not have seen this on the ground. There was evidence of group bonding seen in use of humour between students and discussions around propriety. This was evidence that the students displayed behaviours that were likely to support them in integrated learning.

Whilst peer supported learning was not a formal part of the course, it took place informally both within and outside the PBL groups. The type of peer support available acted as a learning resource that aided integrated learning. Therefore, there was a degree of reliance on peers for learning and enrichment of the learning process. If this was indeed the case then the opportunity for it to happen in order to facilitate learning on an integrated course should be present. Clinical experience was gained by the students in both the real world and the simulated environment. This provided opportunity for students to integrate their factual and clinical knowledge/skills and therefore facilitated integration. More reliable facilitation of integrated learning in future may come via integrated assessment. The facet of integration, presence of facilitators, on the Manchester medical course would therefore be rated as medium integration.

7.2.b.iii Barriers

The 'Barriers' component as per figure 9 is derived from the observations presented in this thesis. It was clear that subject compartmentalisation was present on the course. Not only was this subject compartmentalisation evident from my observations of students' learning; staff also corroborated this with their view that students compartmentalised subjects and weren't integrating their learning. The compartmentalisation extended to teaching delivery which was a greater structural issue such that it set a bad example to students who were trying to integrate. It is clear in the integration ladder model of Harden (2000) that full integration requires subjects to lose their individuality. The question therefore must be raised, is this possible? I acknowledge that at any one time, a student may need to consider a subject in isolation in order to understand it. Without this understanding they would be unlikely to integrate their learning. However there is a difference between this, which in a limited way this model argues is part of integrated learning, when compared with widespread and structural issues with compartmentalisation. These clearly existed on the Manchester medical course. In these circumstances they were not only a barrier to full integration but to any integration. This model separates out the theoretical idea of full integration from what is still a high level of integration, stemming from the research presented herein. The idea of full integration must still be aspired to. Negating the possibility that this could happen is the first step towards a self-fulfilling prophecy. In addition to the barrier of compartmentalisation, there was evidence of poor student bonding. This was in terms of a partial deficit in informal peer support and personality clashes over differing niche subject interests. There were also boundaries between some subject areas, and discrepancies in teaching derived from poor staff liaison. The facet, existence of barriers, on the course would therefore be low integration.

The three facets of integrated learning in this new model are therefore medium-high for student experience, medium for presence of facilitators, and low for existence of barriers. Overall the integrated learning on the Manchester medical course would therefore be medium. There is plenty of scope for improvement for better facilitation of an integrated learning experience. Irrespective of this, the students seem to be better at integrated learning than curriculum planners and staff are at delivering integrated teaching. With improvement in these areas, the student experience at MMS could easily be high integration.

Chapter 8: Discussion

Using Manchester medical school (MMS) as the index case, the research in this thesis presents a conceptual and empirical picture of what integrated learning is, what it means, and how it can be promoted and enhanced. Chapter 7 presented the conceptual framework including a new model of integration shown in figure 9, section 7.2, which was developed using the data and analyses from the present thesis. This chapter will summarise the key findings, consider how the findings fit with the current literature and theory, detail the strengths and weaknesses of the research and finally, outline suggestions for future work.

8.1 Summary of the key findings

This thesis covered three areas of findings relating to integration: experiences, facilitators and barriers. These findings show integrated learning to be a dynamic concept. Among tutors and students, integration may prompt new behaviours or responses, or further commitment and motivation, in learning environments.

PBL played a central role in integrating learning; formulating learning agendas in PBL sessions that contained multiple subjects. Often this led to discussion of multiple subjects alongside each other (i.e. in parallel), though sometimes discussions only took in one subject. The discussion of multiple subjects also occurred in consultation skills, anatomy sessions, and during informal learning. Meeting related subject matter in different sessions, learned at the same time, contributed towards integrated learning on the Manchester medical course. Within discussions, particularly in PBL sessions, participating students made explicit links in the form of an acknowledgement that something had been encountered in learning before. These explicit links helped reinforce interconnections between different sessions.

The facilitators component of the integrated learning model in figure 9 was part of a structural aspect of integration as they provided a scaffold against which integrated learning could take

place. By learning clinical skills (from an early stage of the course) alongside the more traditional basic science learning, integration was facilitated through invitations and opportunities for students to see the connections between the two. Staff members adopted strategies and approaches that contributed to interconnections between parts of the course. Facilitators of integrated learning included how students helped and supported each other with the learning process. Peer help and support manifested itself during PBL and in other sessions. It was not limited to the members within the PBL group, as other peers and tutors also provided this valued help and support.

There were barriers to integration on the Manchester medical course. Subject compartmentalisation sometimes occurred within the PBL process and other sessions, and this suggested that students were not making connections between different subjects in their learning. Staff confirmed this tendency for compartmentalisation. Students received conflicting information due to discrepancies in the delivery of integrated teaching. This had the potential to cause a barrier due to confusion amongst students. There was also a barrier due to problems with staff liaison over teaching, and staff members themselves created a barrier to integration by lacking awareness of other course elements. Boundaries around certain course elements (PPD, lectures, EBM, consultation skills, anatomy, physiology-pharmacology practicals, and behavioural and social sciences) were another barrier to integration.

8.2 Integrated learning: key debates and challenges in the research literature

Several areas of research literature accord with the research findings presented in this thesis. These will now be discussed, starting with multi-subject discussions and integrated learning and then moving on to views of integration, ECE and motivation to learn, integrated assessment, assistance with learning, group bonding, barriers to integrated learning, and value placed on elements of learning.

8.2.a Integrated learning through discussions: a driver for integrated learning

The present research found that integrated learning included multi-subject discussion whereby students would discuss more than on subject together in an integration manner. In this respect, Mennin (2010, p. 23) described integration conceptually rather than by research, as “dynamic interconnectedness that emerges from recursive interactions at multiple levels”. He also postulated about the role of subject proximity, and the type and character of interactions that occur (Mennin, 2010). This concept relates to the present thesis in terms of integrated learning of subjects in parallel via interpersonal interaction. Vergel et al (2017) have described how multidisciplinary discussions demonstrated integration in a pre-clinical curriculum. As in the present study this points to integration as learning subjects in parallel.

Explicit links made during discussions verbalise and reinforce the integrated learning experience, as also noted by Dyrbye et al (2007) in their retrospective study at the Mayo Medical School in the USA. These authors noted evidence of students making explicit links by reinforcement and application of basic science learning in a clinical environment. This facilitated integration and in turn helped retain knowledge (Dyrbye et al., 2007). Explicit links are important for integrated learning and meeting related subject matter in different sessions. The interview data suggested that students had insight into the explicit links, as the participating students seemed to understand these interconnections. Similarly, Macaulay and Nagley (2008) at Monash University Medical School Australia, found, in the second year curriculum where special cases undertaken as group projects, that this case learning required links to be made explicitly between the basic and clinical sciences illustrating integrated learning.

Integration in the present thesis can be seen in how learning is backed up by different types of sessions, adding meaning to medical studies in terms of understanding the relevance and the aims of learning. Integration has similarly been noted by others to help with adding meaning to medical studies at the School of Medicine, University of California San Francisco (Muller et al., 2008). Integrated learning was viewed from different perspectives, including learning multiple subjects in parallel such as basic science alongside clinical skills.

8.2.b Views of integration presented in the literature

Understanding integrated learning is a difficult endeavour owing to the wide variety in what is viewed as integration, and which components of a curriculum are chosen for it. One integrated pre-clinical course aimed to teach community and social determinants of both health and diseases (Elford et al., 1985). Another programme viewed integration as communication skills with medical subject matter (van Weel-Baumgarten et al., 2013).

Further characterisation of integration came from Tresolini and Shugars (1994) who carried out a study in 17 American and Canadian medical schools. Tresolini and Shugars (1994, p. 234) defined integration as consisting of four components: a mix of basic and clinical science during a whole medical course; “mind-body integration” including impact on patients of placebo effect and maintaining hope; clinical teaching by generalists; and a background of multi-disciplinary team working. There are a number of parallels between the four components they identified and the findings in the present thesis. The first of these accords with the present research in terms of integrated learning of different subjects. The second accords with learning from different perspectives including the psychological. The third accords with an idea expressed from interview data in the present study: namely, that integration can only be delivered by those who have training in all the components of a programme. This implies integrated learning in terms of cross-component teaching delivery. The fourth to an extent accords with the idea of staff meetings about integration and the breakdown in the scaffolding of structural integration from lack of knowledge amongst staff about different course components.

The present research takes a holistic viewpoint, like that of Muller et al. (2008, p. 780) who viewed integration as “the interweaving of disciplines to teach a subject from multiple perspectives”. Another holistic view of integration has been proposed on a purely theoretical basis by Brauer and Ferguson (2015, p. 318) as “a fully synchronous, trans-disciplinary delivery of information between the foundational sciences and the applied sciences throughout all years of a medical school curriculum” (Brauer and Ferguson, 2015). This latter view was

grounded in the ideas of Harden (Harden, 2000, Harden and Stamper, 1999), whose concept was of a ladder, whereby an upwards progression towards more integration eventually resulted in individual subjects losing their identity. This 'integration ladder' is a key theoretical framework as considered earlier in Chapters 1 and 7.

8.2.c Motivation to learn

Early clinical experience on the Manchester medical course was a particularly important and valued process by the majority of participating students who took part in it. ECE as required by the General Medical Council (GMC, 2016; GMC, 2009) is important in terms of comprehensive integration, in that it should occur throughout a programme of study. A focus group study in year 1 of the University of Birmingham medical course showed that clinical experience contributed to PBL learning, providing context such as the effect of illness on a patient (Orsmond and Zvauya, 2015).

In the present thesis, student feedback demonstrated the value placed on seeing a patient in real life that had a condition, which a PBL case was based around. Similar observations were noted by O'Brien-Gonzales et al. (2001) in a retrospective analysis of student feedback, with data including a student who valued ECE as it was why they were studying medicine, and another student who valued the experience of clinical medicine contemporaneous to the basic science they were learning. Another study related to my ECE findings presented evidence of integration between learning basic and clinical science from ECE, with patients in hospital (Dyrbye et al., 2007). Also a motivational aspect of the ECE as observed in this thesis, was further evidenced via agreement rating a statement about motivation for studying the basic sciences in parallel (von Below et al., 2008). These latter authors also viewed ECE alongside pre-clinical basic science education in terms of integration, which falls short of the integration observed on the Manchester medical course as I observed explicit links between these elements.

As several studies have shown, ECE is motivational and good preparation for the clinical years, helping the students feel they are studying medicine (O'Brien-Gonzales et al., 2001,

Dyrbye et al., 2007, von Below et al., 2008). In a study of ECE published in 1998 at the Medical School, Queen's Medical Centre, Nottingham, students and tutors were interviewed after year 1, and then again after year 2 (Hampshire, 1998). The authors took a view that GP and hospital visits made the course more integrated. An observation that students encountered patients who related to their basic science learning was in accord with the present research, where students encountered related subject matter in different sessions, and gained motivation.

Yardley et al (2013b) have found that students view ECE as something that occurs alongside to the rest of the course. This observation is contrary to the observations in the present study, and indeed studies by other authors described above, which suggest that ECE had an integrated function on the course in that interconnections between course areas were visible (Hampshire, 1998, O'Brien-Gonzales et al., 2001, Dyrbye et al., 2007, von Below et al., 2008).

8.2.d Integrated assessment

The idea of integrated assessment in years 1 and 2 is not new. For example, in a medical school in Israel, a system of integrated assessments has been in place for decades, including patient histories as a base for multi-disciplinary testing, consultation skills and laboratory science, and multiple choice assessment (Benor, 1982). With regards to medical school assessment, evidence is presented by Furmedge et al. (2016, p. 3) that an OSCE “exam balanced integration of clinical skills with basic science” (Furmedge et al., 2016): another example of integration as learning subjects in parallel. It was certainly an opinion expressed in the present research that this type of assessment encouraged a scaffolding role of integration in that it contributed to a course structure that allowed integrated learning to take place.

8.2.e Assistance with learning

A number of studies have described help and support between medical students as an example of peer assisted learning. A study of medical students' use of Twitter found a similar use of peers in integrating learning to the peer support described in the present thesis and emphasised the value of building a community when studying for assessments, sharing the medical school experience, and information sharing (Chretien et al., 2015). A video ethnographic study looked at feedback at Ninewells Hospital, Dundee medical school and found that most instances of feedback were from tutors and a small number from fellow students and patients (Urquhart et al., 2018). Additionally a systematic review of intra-year group peer assisted learning in undergraduate medicine, found improved confidence in subject matter knowledge and responsibility for the ongoing development of fellow students (Tai et al., 2016), with peer supported learning also resulting in a support network and increased levels of rapport amongst clinical students. It is likely these observations are generalisable to the earlier years of study as in this thesis. Other studies have reported beneficial effects of peer assisted learning among medical students (Field et al., 2007, Silbert and Lake, 2012, Pelloux et al., 2017, Bennett et al., 2018, Cushing et al., 2011). The present thesis adds more understanding about the concept of facilitators of integrated learning.

Facets of group interaction such as humour and professionalism are features of any effective learning environment. In the present thesis, these were observed to happen in any of the group's timetabled sessions irrespective of the subject matter. Fox (1957, p. 220) described how medical students would deal with their uncertainty by interactions that included "casual joking, asking around and talking to others". Gruppen et al. (2018) carried out a literature review with the purpose of establishing how, and in what manner, learning environments can be influenced by intervention, and identified further studies that are needed. Gruppen et al. (2018) identified four key features of learning environments. These are: the way students engage with them, the way student relationships helped build them, the way they were organized, and the types of place where students learnt. The second of these relates to the group rapport seen on the Manchester medical course that helped student engagement. Factors such as group discussion, humour and peer support had the potential to promote student integrated learning.

8.2.f Barriers to integrated learning

Just as helping peers was a facilitator of integrated learning, not helping peers was a barrier. In the present thesis, this appeared to stem from the characteristics of the learners as opposed to the course itself. Withholding information from discussions was a personal decision, made either because students didn't know, or didn't want to help. By contrast, however, Fox (1957, p. 220) has described that medical students would find themselves "reproached" by peers for demonstrating knowledge, whereas admitting not knowing something "may evoke their approval" (Fox, 1957). This has the potential to be studied further with an interview study to evaluate if such behaviours exist today and to what extent. An interview format would allow in depth exploration of any behaviours of this type.

Another barrier to integrated learning observed in the present thesis is competition between students. It is possible that participating students used the words 'I read' as seen in my findings during PBL discussions in order to guard against any criticism from peers who saw the information they presented to be factually incorrect, though the present research can't give a definitive answer to this. The deleterious effects of competition on medical students' learning was recognised in an early ethnographic study, with an American institution not grading students except to privately tell them their quartile once a year (Fox, 1957).

In the present thesis, during anatomy sessions the PBL groups were split up into separate anatomy groups. Some anatomy groups would only contain one or two of the participants from each PBL group. There was evidence that different tutors, known as demonstrators in anatomy sessions, taught topics in different ways. This could lead to clashes of information. Differences in parallel subject content (e.g. physiology skills sessions versus physical examination skills sessions) can trigger a student to recognise this and look it up for themselves. However, the tension created risks compromising the trust of students in faculty to facilitate their learning. This facilitated learning powers multi-subject learning agendas and so trust is a key structural factor in integration. The tension created is that of uncertainty, an

issue that medical students must learn to deal with (Fox, 1957). However inconsistency of teaching delivery implies that staff members are not liaising as they should be.

Compartmentalisation is one particular barrier to a theoretically fully integrated course. In this theoretical situation individual subjects would not be identifiable (Harden, 2000). However this assumes that a fully integrated course is even possible. If one considers that it may not be possible to achieve a fully integrated course then compartmentalisation becomes part of the integrated experience. At any time a student may need to focus on a particular subject area in order to understand it. The learning would still be contemporaneously in parallel to other subjects, but at that point in time a barrier to integrated thinking must exist. However having building blocks of subject matter enables students to bring these different elements together into a holistic understanding of situations, such as within a PBL case.

The removal of boundaries between subjects is a condition that Harden (2000) argues is the basis of full integration. This might result in disabling the students' understanding of the various elements needed at this early stage in their education. If no boundaries exist between subject areas then two or more subjects couldn't become interconnected to begin with. However, the existence of boundaries can impede integration. This becomes a circle argument. The question for curriculum planners is how much integrated teaching or facilitated learning activities are appropriate in a curriculum. This question is beyond the scope of the present research. It may not be possible to answer in any case. This is because of the wide variety of personality types in any student population. Some students may value less integrated teaching delivery and some may value more integrated teaching delivery. It would be better to find a compromise position. What is clear is that a new model of integration that is informed by research evidence is required, as I have proposed in Chapter 7. This model separates what is theoretically possible from realistic.

In common with barriers to integration on the Manchester medical course, a study by Muller et al. (2008) observed that anatomy/histology and behavioural/social sciences were not well integrated in their medical course. These authors also reported lectures being subject-specific therefore lacking integration, and difficulty in getting basic scientists to cooperate initially.

Ultimately though, multi-subject teams formed to lead learning blocks. At Aalborg University, Denmark, in the pre-clinical course, lectures were observed to be of dubious value, as they didn't meet expectations due to focus on certain areas (Vergel et al., 2017).

8.2.g Value placed on elements of learning

In the present thesis some of the processes of integration were valued by students and some were not. PBL on the Manchester medical course was valued as a horizontally integrated learning process i.e. within a year of study. It encouraged interconnected thinking, as witnessed in discussions among students in their timetabled sessions, that contributed to integrated learning. In this vein, a questionnaire study has demonstrated a general value placed by students on horizontal integration and vertical integration between year groups (Brynhildsen et al., 2002). However, one weakness of the Brynhildsen et al. study lay in not gaining an understanding of why this was valued.

Reflection is an important part of integrated learning and forms the basis for continuing professional development after graduation. Reflection drives integration via putting medical learning in context with medical experience (Chaffey et al., 2012, Grant et al., 2006). However as seen in the present research and in other studies, medical students don't necessarily value reflection. Not all students think that reflection is an appropriate way of learning for them (Grant et al., 2006, Sargeant et al., 2011). Some view it as something unbeneficial that is done simply because it is a requirement (Sargeant et al., 2011). Davis et al. (2001) found that a large number of students didn't like their portfolio activity, particularly the amount of paperwork, although some valued the presentation of patient cases aspect. A follow up study also suggested that although it was a positive experience, a portfolio got in the way of learning. It was seen by a significant proportion of students as time consuming, unfair, and subjective in its assessment (Davis et al., 2009). If reflection is not valued then an important part of integrated learning is at risk of not being taken seriously.

Some research shows a gulf between the student perceived and faculty expressed need of medical undergraduates. This gulf has the potential to adversely affect integration. Medical

students have been shown to value patient-centred behaviours more than clinicians, who prioritised behaviours in the area of the clinical management of patients (Furstenberg and Harendza, 2017). Medical students may not have a clear understanding of the role of reflective portfolios. They may not want to do it, but curriculum planners likely understand the educational value of reflection at a level the students would not appreciate. This has been shown to be the case with recently qualified doctors and their educational supervisors (Hrisos et al., 2008). Lack of time for doctors is also an issue (Kjaer et al., 2006). These authors also found scepticism regarding any beneficial aspect of a portfolio amongst some trainee doctors, when compared with traditional approaches. Another study found that 1 in 5 trainee doctors (n=71) viewed portfolio as not helpful to training (Pearson and Heywood, 2004). Such views put the usefulness of reflective learning at risk and are in line with a comment expressed by a staff member herein. The persistence of this attitude in newly qualified doctors shows a long-term impact of views held as students. Students not understanding the educational value of reflection is likely to compromise the important role of reflection in integrating learning in both the short and long term.

In the present thesis, wrap-up lectures were perceived by students to bring learning together and therefore contributed to facilitating integration. Findings from a focus group study have similarly shown the value placed on lectures generally in terms of helping with learning towards the start of Year 1 of graduate entry medicine. This study found, however, as the year went on, that the lectures became less about learning and more about validation of students' understanding of a subject (Orsmond and Zvauya, 2015). This didn't seem to be the case at MMS.

8.3 Strengths and limitations of the research

My expertise and background

There are inherent strengths in being a qualitative medical education researcher with a bioscience and medicine background. I am both a graduate of the Manchester medical course

and more recently a tutor in consultation skills. I have also been involved in OSCEs as an examiner. I understand and have familiarity with the material covered by the course and therefore my observations about subject discussions have more insight in relation to content than a social scientist may have. For example, someone who had not studied on the Manchester medical course may not be able to distinguish between different biosciences content in the same way. However, my familiarity also meant that I had experience of the course that would risk biasing the observations being made. A further potential limitation was whether or not my ideals about integration influenced the course of interviews and the nature of my observations. In order to mitigate this, I attempted to take a naïve stance to the research in that I made observations based on what I saw, and continually sought clarification even when I felt or anticipated that I might know the answer.

There are other limitations in my background. Although I have done a little psychology and sociology as part of my medical studies, I am not fully conversant with these subjects. The methodology used in the present research belongs to the fields of psychology and sociology and I had no prior hands-on experience of ethnography. The implications of this, combined with my insider knowledge of studying medicine, are that I may have observed in a different way to someone trained in the social sciences. The observations of human interaction that a social scientist might make, compared with my inclination to focus on content, would be one example – though content is of great importance for integration. I tried to mitigate any limitations in this respect through extensive reading of literature relating to ethnography, both of methodology and research studies.

Doing the research part-time

As a part-time postgraduate student, I was not able to observe the participating students for every session that they experienced. The limitation that stems from this was a reliance on observing half of the timetable in any given week, from which I sought to make observations which are generalisable. The activities of the participating students being defined by the faculty in the interviews with staff members helped to substantiate findings.

Recruitment

Recruitment of PBL groups was relatively easy and this helped me to get into the field at an early stage in the observed semesters, allowing a lot of data to be collected. It was a strength that half of the total number of student participants agreed to take part in an interview, as this gave good coverage of the participants. However, it would have been ideal if all of them had agreed. Ultimately a good balance of staff roles were also included in the interviews. Focusing on two PBL groups each in a different year of study meant that it wasn't possible to observe the interplay of students across different groups. This was an issue in the field, as I couldn't observe non-consented students in sessions where multiple groups were present. It was also an issue of study design, as I wasn't able to see how my participants behaved in different PBL groups across Years 1 and 2. There was some mitigation to this in that I gleaned how peers supported each other's learning even when the students were in different groups.

The case study approach

I gained copious amounts of rich data from focusing on a single medical school: Manchester Medical School. This was due to not dividing my time between different locations, allowing for an in-depth exposure to the Manchester medical course in Years 1 and 2. It also allowed me to build a good relationship with the participants, which helped both with them being forthcoming in the interviews, and in them letting me observe their study-related activities outside of the timetable. Being an observer had potential effects on the data I collected during the research. The so-called Hawthorne effect was mitigated in part by spending a long time in the field (Cohen et al., 2011). A single institution as a case study made this possible. MMS was a good school to study integration because it was trying to achieve it. There were new curriculum projects being implemented and evaluated at the time of the research, including recent new content for consultation skills, and the integrated OSCE assessment.

Nonetheless it was not ideal using a single medical course for the observations, because not all medical schools have the same course structure. This limited the scope for comparison.

However, the logistics of broadening out to other institutions would not have been feasible in the context of this research project. There are aspects of integration related to PBL that would be potentially generalisable to other courses using this form of teaching delivery. For institutions using a lecture-based course the findings would be less useful for integration, although they do show the value of facilitation of integrated learning via discussion. An issue in the present study was changes being introduced to the Manchester medical course during the time I was carrying out the research; namely the integrated OSCE. It is unknowable whether observations would have been different following such a change. Although I was able to garner insight into this assessment and its impact on the ground in real time which was an advantage.

The use of qualitative rather than quantitative methods

There were strengths and limitations in choosing qualitative methods. The present thesis relied on observations from small participant numbers to gain an impression of the Manchester medical course. Whilst a quantitative methodology can potentially survey the opinion of large numbers of participants, such an approach would risk capturing opinions on pre-defined areas and may miss what was actually happening on the ground. Without qualitative observation, quantitative methods would be necessarily based on faculty defined course structures. An alternative, or complementary, methodology to understand the participant point of view could have been, asking participants to keep a record of their thoughts and experiences about integration, either on paper or online. If used on its own, this method wouldn't have allowed any exploration of views expressed or the opportunity to pick up on any points that arose during the interviews and therefore would not have had the same academic rigor, but a record of student thoughts and experiences could be a useful complement to observation and interviews. By using a design that combined the methods of ethnography and interview I was able to triangulate the data. This helped with correlation of findings. The sheer volume of data, however, did present an analytical challenge as it took a lot of time and intense concentration to go through and triangulate. Not all the data obtained during the course of the research fitted into themes that related to integration. The reason that this data didn't fit was because it related to facets of the medical course that were issues in all learning environments. An example of this was the issue of depth of learning.

Making detailed observations in real-time

Whilst making observations, I wrote down as much of what happened as possible. I decided that this approach would be the best guarantee against missing something important. It was not feasible to type observations in real-time as that would have taken me longer than writing them down. Recording was also not feasible, as this would have meant capturing dialogue from non-consented people. However, there was a limitation in the fieldnotes approach, as whilst writing an observation, I risked missing what was going forward in the room at that instant in time. The mitigation I applied to this was to write-up the field notes as close to the observations as possible, in order that I could plug gaps from memory and make sure I was making full sense of the observations made in the field. It was difficult to write fast enough to capture everything said in an utterance by a student. I used a series of dots to represent any gaps whilst writing a student quotation down in order that the key parts were recorded to convey the meaning of the utterance from my point of view at the time. There is an inherent weakness in identifying what a participant is thinking about integration. This may have been different from my impression as an observer in that I couldn't know they were talking about integration in the same sense that I was thinking about it. No-one would be able to know for sure what others are thinking, and what learning they take away.

Because of the need to preserve individual participants' identity, it was not possible to link various demographic characteristics to observations. I had to leave out anything that could identify a participant. This was an issue where certain opinions expressed by any one individual could make it obvious who had been speaking. In hindsight I would have found a way to gather more information on student demographics in the PBL groups. However, presenting this data would have been difficult in terms of protecting student identity. Ultimately, with groups being set up by the medical school to be demographically balanced, not having this information shouldn't have affected the conclusions. I would have found such information useful, as it would have helped assess whether the demographics of the groups did have an impact on integrated learning.

There were occasions where a discussion touched on subject matter that overlapped with material seen in other sessions. A recurrent source of overlap was between PBL discussion and lecture material. There were a number of instances where it was noticed that a subject that had surfaced in a review of lecture notes was discussed in PBL, without anything explicitly being said. These links were therefore implicit due to the absence of the student mentioning the link. The issue with such observations was that the students weren't observed all the time.

There was a particular issue, in that there was patchy lecture attendance by the participating students during the time in the field. This was confirmed by student comments from the interviews. As such it couldn't be certain that they had attended the pertinent session in order to make links between subject content.

Observing across different learning settings with different group formations

One specific limitation of the ethnographic study was seen particularly in the dissection room and to an extent, in some of the consultation skills sessions, when the participating students were mixed up with non-consented students. It wasn't possible to observe all the participants together. I had to ignore any contribution from the non-consented students and therefore there was an implicit gap in the observations. This was because any aspects of integration that may have stemmed from the non-consented students could not be recorded and therefore may have been missed. I can't judge to what extent this was or wasn't an issue as I don't have any data from non-consented students to interrogate. It was not possible to mitigate this, as it was a design feature of the study. It can be speculated that the influence of integrated learning in PBL may have an effect on discussions that occur in other session types. I can't be certain however that this was a generalisable observation, because of limited time spent observing participants outside the timetabled programme. It wasn't possible to evidence whether the integrated experience changed appreciably over the first two years at Manchester from the data in the present research. The research methodology wasn't longitudinal and this sort of design would have given insight into evolution of the integrated experience.

My interview skills as a doctor

A particular strength of my medical background came to the fore in the interviews. Though I had never carried out a research interview specifically, the medical interview is the stock in trade of a doctor, and therefore it was fairly simple to adapt the interview skills that I had learnt over the years to a research interview. My preferred strategy has always been to let the interviewee talk as much as possible, only interjecting to ask a scheduled question or for clarification of what had been said. These skills are required for both interview types, although medical encounters require a greater degree of focus and structure from the interviewer to maintain direction in order to reach a diagnosis in a short time. The major adaptation in the research interviews was fewer directives in order not to shut down any potentially interesting lines of enquiry. The benefit of this strategy was to generate a large volume and depth of data and reduce the risk of leading the interviewee into a certain response. This approach broadened the focus of the interviews.

8.4 Key conclusions

Integration on the Manchester medical course was observed to be learning of subjects in parallel to each other, experiencing related subject matter in different sessions that in turn backed up learning. However, some key aspects of the medical course were not integrated, with a lack of liaison between some staff detracting from integration. The way the students experienced integrated learning on the ground was seen in multi-subject discussions facilitated by the mutual help and support with the learning process that often resulted from these. Some single-subject discussions had the potential to detract from integrated learning, even though they occurred in the context of multi-subject learning. Explicit links to common subject matter in other sessions provided reinforcement of learning and were key to the nature of the integrated experience. Integrated learning undertaken by the students was pre-defined by the faculty. PBL, wrap up lectures, ECE and consultation skills were important learning processes that provided the structure upon which integration could be built and allowed it to flourish. There was therefore evidence of an integrated experience on the Manchester medical course; however, this fell short of what would be considered as a fully integrated course of study. My

thesis addresses how to understand the level of integrated learning in a new model of integration.

8.4.a Recommendations for curriculum design and delivery to enable integrated learning

The PBL tutors could have an enhanced role to promote integration. The role of the PBL tutor is currently to facilitate the learning of their group. The chair of the group comes from the students themselves. If the tutor were to take on the chairing role then that would give more opportunity for them to facilitate integration. On the surface this may be tricky, as tutors tend to be academic staff in the basic and social sciences. To help them facilitate integrated learning more effectively, a series of questions for them to ask the group could be provided in order to prompt integrated discussions. Alternatively, a weekly podcast could be prepared for tutors so that they understand where and how to facilitate integration. Another adaptation of the tutor role could be for them to interject when they see a compartmentalised discussion occurring with a prompt to bring in a related subject area. The BSS aspects of the course may be used in such situations, with the dual aim of encouraging students to talk about this less favoured subject area. The tutor should have a role in making sure no single subject area is prioritised. This could create a tricky balance as for example encouraging students to talk about BSS at the start runs the risk of marginalising other subject matter. The best way to ensure subjects aren't marginalised is to promote integrated discussions. The tutor could have a more proactive role in identifying non-contribution and bringing in these students, particularly when a student is becoming detached from the group for example due to a preference for unpopular subject matter. More broadly speaking, individual staff members could be made representatives for integration on the course such as formally situating the promotion of integration in the role of year and course leads.

There is another form of compartmentalisation at the curriculum planner level, seen in cadaveric dissection. The presence of a human body would likely focus minds on anatomy to the exclusion of all else. The question then becomes is that desirable? Whilst students may need to focus on a subject at times, the delivery of teaching sessions could be planned in order to mitigate against curriculum level compartmentalisation. Students compartmentalising

subject matter could have a useful role but this would achieve different objectives to where the compartmentalisation has been put in place by curriculum planners. Why can't anatomy and physiology be linked at a curriculum planning level? It would be entirely possible for example to interconnect pulmonary anatomy and physiology in the same learning environment by facilitating learning of lung anatomy alongside spirometry and drug delivery to the lungs. Staff should be able to recognise where there are boundaries between subject areas and if there is co-dependence of these. In order to facilitate such a development, a teaching guidelines document could be produced with the aim of promoting integrated learning. Additionally, organisational and cultural changes could help faculty to embed a more integrated and holistic outlook. This could be assisted by the development of a specific network, that could facilitate the sharing of ideas for integrating learning across medical schools.

Curriculum planners should consider how they situate PPD in the curriculum in order to help students understand why it is needed. There is clear evidence that students do not value it or note its contribution. This is despite the central importance of reflection to integration. This is not conducive to students carrying out meaningful reflective learning and integrating. It was not possible to establish if the responsibility for the lack of positivity lay with the attitude of students or the ability of staff to explain the value of PPD. Not all parts of the integrated learning process were valued and it should not be assumed that they are. There is a need for curriculum planners to address this PPD issue in order that students understand the importance of this driver to integrated learning. It is important that curriculum planners persist with reflective portfolios given the future requirements in this area for doctors. However the question must be asked at a higher national UK level regarding the requirement of reflective learning for all learning styles.

It can be hypothesised that academic grading of medical students is long overdue a re-think and a recommendation that UK medical schools consider this aforementioned approach would be worth considering. This would go some way towards diffusing a competitive culture unhelpful for group learning. A further way of achieving this may be to empower the students by introducing integrated learning content into the course specifically for students to critique

and discuss the value of. The students could also discuss how they can make this effective and have a positive impact on their own learning, individually and in their student groups.

8.4.b Addressing the lack of clarity around the term integration

This thesis has helped to address the lack of clarity around the term integration by exploring experiences, facilitators and barriers to integration in the real-time/day-to-day practices of a medical school curriculum. Integration is primarily parallel learning of related subject matter, facilitated by more general features of a medical course and compromised by obstructive behaviours. However, it is clear that integration is more than simply blurring boundaries between subject areas. Whilst such blurring is theoretically desirable according to Harden (2000), it is clear from this research that some barriers may necessarily exist between subjects. This has been reflected in the new integration model proposed above in figure 9. Students may need to consider subjects on their own at any point to help them understand them. They may also need to build up separate subjects to make an integrated whole. Some barriers to what theoretical full integration would be are not necessarily an issue on an integrated course. It is not clear from this work to what extent this matters. What is clear from this research is that multi-subject learning is important to integration, whether or not the boundaries between those subjects are blurred. This learning can be achieved either within a particular educational session or in parallel to it.

As a result of this research a new model of integration has been proposed. This model retains the idea of a fully integrated course where boundaries are blurred between subject areas. However, this is separated from the main part of the model to reflect the difficulty in achieving this. The model has been developed from the findings presented herein and designed with approachability in mind. The categories of integration are self-explanatory, ranging from none through to a high level of integration. The highest level of integration acknowledges that some consideration of subjects in isolation may be necessary in order to integrate learning overall – an important distinction from Harden's integration ladder (2000).

8.5 Suggestions for further work

The following suggestions for further work developed out of the research process. The first is investigation into whether the idea of missing implicit links was an educational issue. The second is development of a large questionnaire study, based on a small pilot questionnaire conducted in the early stages of the present research and adapted to use my new model of integration shown in figure 9. The third is a longitudinal study to assess the changing views of students at different stages of medical education to assess what they like and what they need from a course of medical study. The fourth is a comparison of UK medical schools.

8.5.a Implicit links to other areas of the course

A specific study to look into whether or not students miss implicit links and what impact this has on their learning would be a valuable follow up to the present research.

A potential research design could use a case discussion with two learning outcomes of equal complexity. This could be presented to two groups of undergraduate volunteers separately. A few days later the participants could be taken through a different modality session that reinforced one of the learning objectives in a very obvious way to prompt explicit links and the other in an unclear way to prompt implicit links. There could then be a second discussion session to see if anyone articulated the links. A facilitator would be instructed to prompt the students if they don't articulate the explicit links. A few weeks after the case a brief assessment could be carried out. This could give evidence to answer a research question: Does it matter for knowledge retention and acquisition to articulate explicit links or are implicit links sufficient. Follow up interviews could be used to see if implicit links were made. Stimulated recall interviews are a potential methodology (Shubert and Meredith, 2015). This would allow the students to talk about their perspective about what happened in a learning environment, and what and how the students are thinking about their learning.

8.5.b Questionnaire study

In the early stages of this research, a questionnaire survey was conducted, based on the theoretical integration ladder Harden (2000). The aim of the questionnaire was to see where on the ladder Year 1/Year 2 students and staff members placed the global parts of the Manchester medical course. The questionnaires can be found in appendix 2 and the participant information sheet in appendix 9. A 5 point Likert style questionnaire was introduced alongside to evaluate the individual course components (Cohen et al., 2011). The rationale behind this was to look at integration from a different angle to the other studies that were carried out. The 5-point rating was used as the concept of integration is very much a spectrum (adding more rating points could lead to indecision from respondents). The poor rate of response from the students made this more useful as a pilot study, which could inform the design of future research. For example, the questions could be modified along the lines of my model presented in this thesis in chapter 7, figure 9; I will return to this below. My model may prove useful as a monitoring tool for the progress of a medical course.

Three Year 1 medical students were recruited to complete the questionnaire out of an approximate total of 350. These pilot results are shown in appendix 3. It was unclear why recruitment was so poor but reasons could include students already feeling overloaded with coursework and evaluation, or it not being an activity embedded into a timetabled session. The number of participant responses to the question, the minimum/maximum score and mean score are included. Given that the course was PBL based it was interesting to note that the mean level on the ladder out of 11 was 5.67 for semester 1, 8.00 for semester 2 and 6.33 for year 1 overall. A PBL style course should achieve a level of at least 9 out of 11 (Harden, 2000). The PPD portfolio reviews only achieved a mean level of 3.00. This suggests a flaw in the questionnaire, which could be reworked to make it simpler for a future questionnaire study. Looking at the means for the Likert questionnaire EBM, microbiology practical, GP visits, ethics and law, PEP, group PPD and individual PPD scored less than 3 out of 5. The pilot data are difficult to interpret from such a small sample but if they were generalisable, it would suggest that there is some way to go with regards integration on the Manchester medical course.

The pilot questionnaire in appendix 2 should be modified so that the integration model defined above in figure 9 replaces the integration ladder of Harden (2000). The research questions would be: What is the effectiveness and impact of integration in an undergraduate medical education curriculum? How can we measure and evaluate it using this model? What are the strengths and limitations of this model as a tool for design and implementation of integrated teaching?

8.5.c Longitudinal study to define changing student views

An interview and focus group study could be carried out with medical students from each of Years 1-5 and with foundation doctors. This study could be used to assess the changing views of students as they gain seniority regarding what they like and what they need on a medical course at different stages. The research would evaluate both the present year of study and previous years of study retrospectively as applicable. Similar work has been previously carried out as a ranking type study (Furstenberg and Harendza, 2017). Interviews could be carried out to allow in-depth exploration of student views. The findings from the interviews could then be put to a focus group as points for discussion in order to gain a consensus on the topics.

8.5.d Comparison of UK medical schools

A cross UK comparative study using a representative sample of different types of medical course could be carried out. This would use a combination of observation and interviews, across year groups with both students and staff. This study could then go on to explore the ideologies and principles behind course design with interviews, involving leaders in the medical schools selected for study. The data could then be triangulated with the findings from the fieldwork with students and staff in order to assess how well ideology translates into practice.

Chapter 9: Conclusions

As shown by the research in this field, integrated learning is a difficult concept to understand and this is made more difficult by the lack of an accessible way of modelling it. The complexity of the findings presented herein made it difficult to identify the level achieved on Harden's integration ladder (Harden, 2000). Whilst from a high level it looked like the course approached the top levels of integration, digging deeper put certain parts of the course towards the bottom of the ladder and poor integration. I have considered how the present research fits in with the theoretical standpoint and presented a new model. This model, informed by the findings from this thesis, has the aim of simplifying integration as a concept. The model uses three domains: none, low, medium or high integration. It separates out full integration as conceptualised by Harden as something apart, unlikely to be achievable.

I have shown that integration is principally experienced as multi-subject learning via PBL at MMS. Integrated learning needs to be actively encouraged and planned and among the various facilitators, ECE is noted to play an important role. This reinforces that ECE has beneficial effects in a number of other institutions. It is apparent that integrated assessment has the potential to facilitate fuller integration in a curriculum, as it necessitates consistency in teaching delivery across all assessed subjects. Peer assisted learning is not a formal part of the Manchester medical course but there was informal assistance noted. The assistance given by peers in learning that took place on the Manchester medical course is shown to be an important facilitator of integrated learning that had wide parallels in medical education. The barriers to integrated learning identified at MMS are important findings, often pertaining to specific subject areas, adding to the literature. Whilst PBL provided a framework for experiencing integration via multi-subject discussion, on the Manchester medical course it was not certain that boundaries between subjects were blurred in such a way as to promote integrated learning. Staff made efforts to deliver an integrated experience by referring to other sessions; however liaison between them was not universal and there was evidence that integration was lacking in certain parts of the course.

Integration is an important concept for medical education. When medical students have qualified and become practicing doctors they will solve clinical problems all the time. In order to do this effectively they will have to consider all the background to the case. This will include clinical aspects, test interpretation informed by basic science in context of the clinical picture, pharmacology aspects, and psychosocial factors at play. As doctors, they will need to consider all these factors together in an integrated manner. It is therefore essential that medical students be enabled to learn in an integrated way.

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Appendix 1

Key for interview transcriptions

(.)	Pause of <1 second
(1.0)	Pause and duration
?	Pitch of word becomes higher
:	Extension of part of a word
-	Contracted word
// //	Words that overlap
(Word)	Uncertain of a particular item of talk
(xxxx)	Unintelligible talk
<u>Word</u>	Louder or higher item of talk
[Word]	Comment relating to an item of talk

Adapted from examples in the textbook of linguistic ethnography of Copland et al. (2015).

Appendix 2

Questionnaire for Year 1

This was based on the integration ladder (Harden, 2000).

Year 1 Integration Ladder Questionnaire	11	Interconnected "multi-disciplinary" subject content linked up with other types of learning by experience.	Please write a number in the below boxes from 1-11 corresponding to which of the integration ladder steps (shown to the left) you feel best describe the below elements making up phase 1 of the course at Manchester medical school:	
	10	A "multi-disciplinary" course in which the subjects had lost any measure of their individuality and are therefore interconnected.	The Course	
	9	A "multi-disciplinary" PBL style system based course or a clinical skills style course. The subject disciplines still have some measure of individuality within this framework.	Semester 1 <input type="text"/>	Semester 2 <input type="text"/>
	8	The interconnected components dominate over individual subject teaching. This element also requires more integrated assessment procedures.	Year 1 <input type="text"/>	
	7	Though still subject orientated, there is an interconnected component that acts as a point of consensus, joining together the subjects.	The Assessments	
	6	Collaboration between subjects that have related content in the delivery of their teaching. Generally however, this is the exception rather than the rule.	Progress Tests <input type="text"/>	Semester Tests <input type="text"/>
	5	Though overall individual subjects are still isolated, there is simultaneous timetabling of subject teaching when there is related content.	OSCEs <input type="text"/>	PEP <input type="text"/>
	4	Attainment of the overall goal of the course by acknowledging / including other subject content in the teaching of a different subject however the subjects themselves are still isolated.	PPD Portfolio Reviews <input type="text"/>	
	3	Formal or informal communication between subjects and someone is in charge of this communication process. Subject teaching is still isolated but there is a greater ideal of attaining the overall goal of the course.		
	2	Other subjects are known about in different parts of the course but otherwise each subject is still isolated.		
	1	Each component subject is isolated from the others in terms of content, timetabling and assessment. Any overlap is merely accidently.		

Integration Ladder Questionnaire

Please circle a number from 1-5 corresponding to how you feel best reflects the degree of integration of the below elements of phase 1 at Manchester medical school with other elements of the medical course:
1 being not integrated and 5 being fully integrated

PBL	1	2	3	4	5
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Anatomy	1	2	3	4	5
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Phys-Pharm	1	2	3	4	5
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EBM	1	2	3	4	5
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Lectures	1	2	3	4	5
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Microbiology Practical	1	2	3	4	5
------------------------	---	---	---	---	---

Hospital Visits	1	2	3	4	5
-----------------	---	---	---	---	---

GP Visits	1	2	3	4	5
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Consultation Skills	1	2	3	4	5
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Ethics and Law	1	2	3	4	5
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PEP	1	2	3	4	5
-----	---	---	---	---	---

Group PPD	1	2	3	4	5
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Individual PPD	1	2	3	4	5
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Questionnaire for Year 2

This was based on the integration ladder (Harden, 2000).

Year 2

Integration Ladder Questionnaire

11	Interconnected "multi-disciplinary" subject content linked up with other types of learning by experience.
10	A "multi-disciplinary" course in which the subjects had lost any measure of their individuality and are therefore interconnected.
9	A "multi-disciplinary" PBL style system based course or a clinical skills style course. The subject disciplines still have some measure of individuality within this framework.
8	The interconnected components dominate over individual subject teaching. This element also requires more integrated assessment procedures.
7	Though still subject orientated, there is an interconnected component that acts as a point of consensus, joining together the subjects.
6	Collaboration between subjects that have related content in the delivery of their teaching. Generally however, this is the exception rather than the rule.
5	Though overall individual subjects are still isolated, there is simultaneous timetabling of subject teaching when there is related content.
4	Attainment of the overall goal of the course by acknowledging / including other subject content in the teaching of a different subject however the subjects themselves are still isolated.
3	Formal or informal communication between subjects and someone is in charge of this communication process. Subject teaching is still isolated but there is a greater ideal of attaining the overall goal of the course.
2	Other subjects are known about in different parts of the course but otherwise each subject is still isolated.
1	Each component subject is isolated from the others in terms of content, timetabling and assessment. Any overlap is merely accidently.

Please write a number in the below boxes from 1-11 corresponding to which of the integration ladder steps (shown to the left) you feel best describe the below elements making up phase 1 of the course at Manchester medical school:

The Course

Semester 1 <input style="width: 40px;" type="text"/>	Semester 2 <input style="width: 40px;" type="text"/>
Semester 3 <input style="width: 40px;" type="text"/>	Semester 4 <input style="width: 40px;" type="text"/>
Years 1 and 2 <input style="width: 40px;" type="text"/>	

The Assessments

Progress Tests <input style="width: 40px;" type="text"/>	Semester Tests <input style="width: 40px;" type="text"/>
OSCEs <input style="width: 40px;" type="text"/>	PEP <input style="width: 40px;" type="text"/>
PPD Portfolio Reviews <input style="width: 40px;" type="text"/>	

Please circle a number from 1-5 corresponding to how you feel best reflects the degree of integration of the below elements of phase 1 at Manchester medical school with other elements of the medical course:

1 being not integrated and 5 being fully integrated

Integration Ladder Questionnaire

PBL	1	2	3	4	5
-----	---	---	---	---	---

Anatomy	1	2	3	4	5
---------	---	---	---	---	---

Phys-Pharm	1	2	3	4	5
------------	---	---	---	---	---

EBM	1	2	3	4	5
-----	---	---	---	---	---

Lectures	1	2	3	4	5
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Microbiology Practical	1	2	3	4	5
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Hospital Visits	1	2	3	4	5
-----------------	---	---	---	---	---

GP Visits	1	2	3	4	5
-----------	---	---	---	---	---

Consultation Skills	1	2	3	4	5
---------------------	---	---	---	---	---

Ethics and Law	1	2	3	4	5
----------------	---	---	---	---	---

PEP	1	2	3	4	5
-----	---	---	---	---	---

Group PPD	1	2	3	4	5
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Individual PPD	1	2	3	4	5
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Questionnaire for staff

This was based on the integration ladder (Harden, 2000).

Staff

Integration Ladder Questionnaire

11	Interconnected "multi-disciplinary" subject content linked up with other types of learning by experience.
10	A "multi-disciplinary" course in which the subjects had lost any measure of their individuality and are therefore interconnected.
9	A "multi-disciplinary" PBL style system based course or a clinical skills style course. The subject disciplines still have some measure of individuality within this framework.
8	The interconnected components dominate over individual subject teaching. This element also requires more integrated assessment procedures.
7	Though still subject orientated, there is an interconnected component that acts as a point of consensus, joining together the subjects.
6	Collaboration between subjects that have related content in the delivery of their teaching. Generally however, this is the exception rather than the rule.
5	Though overall individual subjects are still isolated, there is simultaneous timetabling of subject teaching when there is related content.
4	Attainment of the overall goal of the course by acknowledging / including other subject content in the teaching of a different subject however the subjects themselves are still isolated.
3	Formal or informal communication between subjects and someone is in charge of this communication process. Subject teaching is still isolated but there is a greater ideal of attaining the overall goal of the course.
2	Other subjects are known about in different parts of the course but otherwise each subject is still isolated.
1	Each component subject is isolated from the others in terms of content, timetabling and assessment. Any overlap is merely accidently.

Please write a number in the below boxes from 1-11 corresponding to which of the integration ladder steps (shown to the left) you feel best describe the below elements making up phase 1 of the course at Manchester medical school:

The Course

Semester 1 <input style="width: 40px;" type="text"/>	Semester 2 <input style="width: 40px;" type="text"/>
Semester 3 <input style="width: 40px;" type="text"/>	Semester 4 <input style="width: 40px;" type="text"/>
Years 1 and 2 <input style="width: 40px;" type="text"/>	

The Assessments

Progress Tests <input style="width: 40px;" type="text"/>	Semester Tests <input style="width: 40px;" type="text"/>
OSCEs <input style="width: 40px;" type="text"/>	PEP <input style="width: 40px;" type="text"/>
PPD Portfolio Reviews <input style="width: 40px;" type="text"/>	

Integration Ladder Questionnaire

Please circle a number from 1-5 corresponding to how you feel best reflects the degree of integration of the below elements of phase 1 at Manchester medical school with other elements of the medical course:

1 being not integrated and 5 being fully integrated

PBL	1	2	3	4	5
-----	---	---	---	---	---

Anatomy	1	2	3	4	5
---------	---	---	---	---	---

Phys-Pharm	1	2	3	4	5
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EBM	1	2	3	4	5
-----	---	---	---	---	---

Lectures	1	2	3	4	5
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Microbiology Practical	1	2	3	4	5
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Hospital Visits	1	2	3	4	5
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GP Visits	1	2	3	4	5
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Consultation Skills	1	2	3	4	5
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Ethics and Law	1	2	3	4	5
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PEP	1	2	3	4	5
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Group PPD	1	2	3	4	5
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Individual PPD	1	2	3	4	5
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Appendix 3

Pilot integration ladder questionnaire results

Integration Ladder Steps					
		Number	Minimum	Maximum	Mean
The Course	Semester 1	3	4	8	5.67
	Semester 2	3	7	9	8.00
	Year 1	3	6	7	6.33
The Assessment	Progress Tests	3	3	9	6.67
	Semester Tests	3	6	7	6.67
	OSCEs	1	8	8	8.00
	PEP	3	3	7	4.67
	PPD Portfolio Reviews	3	1	5	3.00
Degree of Integration					
		Number	Minimum	Maximum	Mean
PBL		3	5	5	5.00
Anatomy		3	4	5	4.67
Phys-Pharm		3	4	4	4.00
EBM		3	2	3	2.33
Lectures		3	3	4	3.33
Microbiology Practical		3	1	2	1.33
Hospital Visits		3	3	4	3.33
GP Visits		3	2	3	2.67
Consultation Skills		3	4	4	4.00
Ethics and Law		3	1	3	2.33
PEP		3	2	3	2.67
Group PPD		3	1	2	1.67
Individual PPD		3	2	3	2.33

Appendix 4

Semi-Structured Interview Schedule: Semester 1

1. This question is to develop an understanding of how the students see integration:
 - a. Ask about “what makes your learning joined up”?
 - i. If not much comes forth then ask “how do you see the various parts of your learning as interconnected?”
 - ii. Then ask “how do you see the various parts of your learning as not interconnected?”
 - b. If needed due to not much response to point 1a ask student to “tell me about how you learn on the medical course.”
 - i. If not mentioned ask “how do feel about how your fellow medical students help with your learning?”
 - ii. If not mentioned ask “how have you coped with the depth of learning required?”
 - iii. If not mentioned ask “how do you feel about learning the new terminology you are coming across?”
 - iv. If not mentioned ask “how do you feel about any situations you have experienced that make you feel uncomfortable or embarrassed?”

2. This question is to develop an understanding of what the students value and / or don't value about the medical course:
 - a. Ask student to "tell me about what you value about the medical course."
 - b. If not mentioned ask student to "tell me about anything you don't find valuable about the medical course."
3. Offer the opportunity for the student to talk "is there anything else you would like to bring up about your experience of the medical course so far?"

Appendix 5

Semi-Structured Interview Schedule: Semester 3

1. Tell me about how you came to be at medical school; example topics may be:
 - a. Background
 - b. Schooling
 - c. Motivation

2. This question is to develop an understanding of how the students see integration:
 - a. Ask about “what makes your learning joined up”?
 - i. If not much comes forth then ask “how do you see the various parts of your learning as interconnected?”
 - ii. Then ask “how do you see the various parts of your learning as not interconnected?”

 - b. If needed due to not much response to point 1a ask student to “tell me about how you learn on the medical course.”
 - i. If not mentioned ask “how do feel about how your fellow medical students help with your learning?”
 - ii. If not mentioned ask “how have you coped with the depth of learning required?”
 - iii. If not mentioned ask “how do you feel about learning the new terminology you are coming across?”

- iv. If not mentioned ask “how do you feel about any situations you have experienced that make you feel uncomfortable or embarrassed?”
 - c. If not covered, explore how the group integrates:
 - i. Did the group in semester 3 feel (integrated) joined / work together well?
 - ii. How does the group work well together?
 - iii. In what ways does the group not work together?
 - iv. Have you always felt the PBL group you were in was joined / work together well?
- 3. This question is to develop an understanding of what the students value and / or don't value about the medical course:
 - a. Ask student to “tell me about what you value about the medical course.”
 - b. If not mentioned ask student to “tell me about anything you don't find valuable about the medical course.”
- 4. Offer the opportunity for the student to talk “is there anything else you would like to bring up about your experience of the medical course so far?”

Appendix 6

Staff Interview Schedule

1. Background relating to how came to be involved with delivering the phase 1 course.
2. How they see integration and what they see as not integrated in phase 1.
3. Their view on how the students would see integration or not within the various parts of the course.
4. Are students working together
5. Attempts to liaise with other staff
6. How do they know what goes on in the rest of the course e.g. contemporaneous to a lecture.
7. Knowledge about Integrated OSCE.
8. Knowledge about PPD.
9. Opportunities for further integration in phase 1.
10. Personal philosophy on curriculum.
11. Strengths and Weaknesses of the phase 1 course.
12. Threats from increased Integration.

13. Any reflections on teaching on the course.

N.B. Points 1, 2, 3, 9, 10, 11, 13 were the questions on the original interview schedule. The other points were added following reflection during the fieldwork.

Appendix 7

Ethnography/Student Interview Participant Information Sheet and Consent Form

MANCHESTER
1824

The University
of Manchester

Understanding Current Integrated Medical Education

Participant Information Sheet

You are being invited to take part in a research study, which will form part of a PhD thesis. The aim of the research is to understand the nature of integrated medical education as it is currently using Manchester Medical School as a case study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Tim Morris, Manchester Medical School, Stopford Building, Oxford Road Manchester.

Title of the Research

Understanding Current Integrated Medical Education.

What is the aim of the research?

The aim is to undertake observations of the activities of medical students in year 1 and 2 of the degree course in order to aid understanding of the nature of integration as applied to medical education.

Why have I been chosen?

You have been chosen as an example for a case study undertaking activities that all students are involved in at times during the week. You and your PBL group will be involved.

What would I be asked to do if I took part?

During all your timetabled teaching, you don't have to do anything other than what you would normally do during your day as a student. The researcher will simply observe your activities, listen to your opinions and make notes.

There will be 2 additional parts of the study over and above your normal teaching timetable. These are: a 2 weekly structured survey during the semester you are being observed, which should take no more than 10 minutes to complete and which you then email to the researcher (a copy can go in your portfolio); a single interview at the end of the academic year which will take up to 60 minutes.

The ethnographic observational part of the study will be "overt, non-participant observation".

The ground rules of this will be as follows: The researcher will not act in a capacity as teacher or examiner at any time with the 2014 medical student intake before, during or after the period of research. The researcher will not express opinion or agree/disagree with the opinions and feelings expressed by the participants. The researcher will simply observe your PBL groups' various sessions during the semester for 2 days a week such as lectures, tutorials, practical classes and skills sessions. The researcher will also attend non-timetabled activities undertaken by the whole group or a part of the group including some break-times. The research participants can point things out to the researcher should they wish at any time. The researcher will not interrupt any timetabled activity. Detailed field notes will be taken during the study so you should expect the researcher to write whilst observing. If at any time you wish to withdraw from the study, you and your PBL group will no longer be expected to take part.

What happens to the data collected?

The data will be analysed to help understand the nature of integrated medical education. It will be kept for 10 years and may be used to inform future research in medical education.

How is confidentiality maintained?

Data will be stored in word documents on the university network for 10 years. Anonymous data will be stored on a password-protected laptop. No real names will appear on the anonymous data and a key to allow traceability of quotes will be kept on the university network. Field notes will be stored in a locked filing cabinet for 5 years.

What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself. To withdraw, simply email the researcher. Observation will cease. Your PBL group will not be informed who has withdrawn. Data collected up to that point will, with your permission, be retained and used for the PhD thesis/academic publications which are intended to stem from the research.

Will I be paid for participating in the research?

No.

What is the duration of the research?

The research will take place for 2 days a week over the course of a semester.

Where will the research be conducted?

The research will be conducted primarily at the Stopford Building UoM and at other locations where you are learning as a student.

Will the outcomes of the research be published?

Publication will be in a thesis by 2019. Papers may result from the research.

Criminal Records Check (if applicable)

N/A

Who has reviewed the research project?

The project has been reviewed by the University of Manchester Research Ethics Committee 3.

Contact for further information

Tim Morris C/O Sarah Collins UoM, Stopford Building, Oxford Road, Manchester.

Timothy.Morris@postgrad.manchester.ac.uk

Sarah.Collins@manchester.ac.uk

Jo.Hart@manchester.ac.uk

What if something goes wrong?

If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Governance and Integrity Team by either writing to 'The Research Governance and Integrity Manager, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL', by emailing:

Research.Complaints@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093.

Understanding Current Integrated Medical Education (Ethnography).

CONSENT FORM

1.	I confirm that I have read the attached information sheet on the above project and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	
2.	I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment.	
4.	I agree to the use of anonymous quotes.	
5.	I agree that any data collected may be passed as anonymous data to other researchers.	

If you are happy to participate please complete and sign the consent form below

Please initial

box

I agree to take part in the above project

Name of participant

Date

Signature

Name of person taking consent

Date

Signature

Appendix 8

Staff Interview Study Participant Information Sheet and Consent Form

MANCHESTER
1824

The University
of Manchester

Staff Interview Study: Current Integrated Medical Education

Participant Information Sheet

You are being invited to take part in a research study, which will form part of a PhD thesis. The aim of this research is to clarify the meaning of "integrated medical education", using Manchester Medical School as a case study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Tim Morris, PhD Student, Manchester Medical School, Stopford Building, Oxford Road, Manchester.

Title of the Research

Understanding Current Integrated Medical Education.

What is the aim of the research?

The aim is to use interviews in order to elucidate the faculty point of view regarding the current state of integrated medical education using Manchester Medical School as the case study.

Why have I been chosen?

You have been chosen as a Phase 1 member of staff, representative of those who are tutors and / or leaders on the medical Programme.

What would I be asked to do if I took part?

The researcher would interview you for 30 minutes. The interview would be recorded and transcribed without using staff names in order that it can add to the pool of data to be analysed.

What happens to the data collected?

The data will be used to help define integrated medical education.

How is confidentiality maintained?

Data will be stored on the university network for 10 years and also on an encrypted and password-protected laptop. No names will appear on the transcribed data.

What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself

Will I be paid for participating in the research?

No

What is the duration of the research?

One 30 minute interview per participant.

Where will the research be conducted?

Manchester Medical School.

Will the outcomes of the research be published?

Publication will be in a thesis by 2019. Papers may result from the research.

Who has reviewed the research project?

The project has been reviewed by the University of Manchester Research Ethics Committee 3.

Contact for further information

Tim Morris C/O Sarah Collins UoM, Stopford Building, Oxford Road, Manchester.

Timothy.Morris@postgrad.manchester.ac.uk

Sarah.Collins@manchester.ac.uk

Jo.Hart@manchester.ac.uk

What if something goes wrong?

If you want help or advice or wish to withdraw from the study subsequent to consenting to take part then please contact Tim Morris, Sarah Collins or Jo Hart on the above email addresses. If you feel that you don't want to continue during an interview for any reason then please inform the researcher who will pause the interview and give the option to carry on or withdraw from the study.

What if I want to make a complaint?

Minor complaints

If you have a minor complaint then you need to contact the researcher(s) using the **EMAIL ADDRESS** Timothy.Morris@postgrad.manchester.ac.uk

Formal Complaints

If you wish to make a formal complaint or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact the Research Governance and Integrity Manager, Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL, by emailing: research.complaints@manchester.ac.uk or by telephoning 0161 275 2674 or 275 2046.

What Do I Do Now?

If you have any queries about the study or if you are interested in taking part then please contact the researcher(s) using the **EMAIL ADDRESS** Timothy.Morris@postgrad.manchester.ac.uk

This Project Has Been Approved by the University of Manchester's Research Ethics Committee 3 reference number 14255.

Staff Interview Study: Current Integrated Medical Education

CONSENT FORM

1.	I confirm that I have read the attached information sheet on the above project and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	
2.	I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment.	
3.	I understand that the interviews will be audio-recorded	
4.	I agree to the use of unattributed quotes	
5.	I agree that any data collected may be passed as data (without using staff members' names) to other researchers	

If you are happy to participate please complete and sign the consent form below

Please initial box

I agree to take part in the above project

Name of participant

Date

Signature

Name of person taking consent

Date

Signature

Appendix 9

Questionnaire Study Participant Information Sheet and Consent Form

MANCHESTER
1824

The University
of Manchester

Questionnaire Study: Current Integrated Medical Education

Participant Information Sheet

You are being invited to take part in a research study, which will form part of a PhD thesis. The aim of this research is to clarify the meaning of "integrated medical education", using Manchester Medical School as a case study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Tim Morris, PhD Student, Manchester Medical School, Stopford Building, Oxford Road, Manchester.

Title of the Research

Understanding Current Integrated Medical Education.

What is the aim of the research?

The aim is to use a questionnaire in order to elucidate the student and faculty point of view regarding the current state of integrated medical education using Manchester Medical School as the case study.

Why have I been chosen?

You have been chosen as a year 1 / 2 student or member of staff, representative of your respective cohort.

What would I be asked to do if I took part?

You would fill out a questionnaire, which would take approximately 10 minutes to complete and covers the degree of integration of the various components of the year 1 / 2 part of the medical course.

What happens to the data collected?

The data will be used to help define integrated medical education.

How is confidentiality maintained?

Data will be stored on the university network for 10 years and also on an encrypted and password-protected laptop. No names or personal data will be required on the questionnaires.

What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to complete the questionnaire. Completion of the questionnaire will be taken as consent to take part in this study. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself

Will I be paid for participating in the research?

No

What is the duration of the research?

Approximately 10 minutes per participant.

Where will the research be conducted?

Manchester Medical School.

Will the outcomes of the research be published?

Publication will be in a thesis by 2019. Papers may result from the research.

Who has reviewed the research project?

The project has been reviewed by the University of Manchester Research Ethics Committee 3.

Contact for further information

Tim Morris C/O Sarah Collins UoM, Stopford Building, Oxford Road, Manchester.

Timothy.Morris@postgrad.manchester.ac.uk

Sarah.Collins@manchester.ac.uk

Jo.Hart@manchester.ac.uk

What if something goes wrong?

If you want help or advice or wish to withdraw from the study subsequent to consenting to take part then please contact Tim Morris, Sarah Collins or Jo Hart on the above email addresses. If you feel

that you don't want to continue during an interview for any reason then please inform the researcher who will pause the interview and give the option to carry on or withdraw from the study.

What if I want to make a complaint?

Minor complaints

If you have a minor complaint then you need to contact the researcher(s) using the **EMAIL ADDRESS** Timothy.Morris@postgrad.manchester.ac.uk

Formal Complaints

If you wish to make a formal complaint or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact the Research Governance and Integrity Manager, Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL, by emailing: research.complaints@manchester.ac.uk or by telephoning 0161 275 2674 or 275 2046.

What Do I Do Now?

If you have any queries about the study or if you are interested in taking part then please contact the researcher(s) using the **EMAIL ADDRESS** Timothy.Morris@postgrad.manchester.ac.uk

This Project Has Been Approved by the University of Manchester's Research Ethics Committee 3 reference number 14255.

Appendix 10

Example of Ethnography Field Notes and a section of Coding of them

Field Notes for 10/10/14 PBL Second Session for Second Case in Semester 1

The same rectangular room was used. Again the tutor sat at the short side of the table closest to the door, I sat in the same corner of the room. The students sat on the long sides of the rectangular table. There was a whiteboard on the right long wall as seen from entering the room.

P11 was the chair. He/she started the session with the topic of the abortion act and asked the group to “introduce it”. There were no volunteers so he/she started and P3, P9 and P5 contributed to describe the act. When they had finished describing it P4 said “the decision ultimately lies with the mother”.

P11 said the act is 11 pages. P8 said “that’s so much information”.

P6 said “if you’re under 16 you can have an abortion and don’t have to tell your parents, the doctor should encourage to tell the parents though”.

There followed a general discussion in the group about competence to make these sort of decisions.

P11 said “Gillic competence... based on a 1985 case... [described the case]”. P12 interjected “Fraser competence... same case, Fraser was the judge; it was in the back of my head”. P12 had looked it up on the computer and read out the ruling.

P5 brought up pro-choice. P6 added “in some respects it is an issue of geography... whose property is the body when it is inside the womb. The 26 week cut off is to do with if it can survive outside the womb.”

There followed a general discussion about religious belief and abortion.

P11 brought up conscientious objection of doctors to abortion and said “the doctor can refer to someone else.

P4 read out the GMC guidelines on conscientious objection.

P6 said “I thought if your GP practice was against it you had to make the patients aware?”

P4 said “what classes about participating in it [abortion]? There was a secretary who wouldn’t write a letter making a referral for it. There was a House of Lords ruling that you have to write the letter or if you are a doctor refer, despite beliefs. It is the procedure itself that is relevant”.

P11 said “I read the conscientious objection clause can be used by students to not watch an abortion”.

P4 brought up that there are “pills to take for an abortion”.

P11 said “lets move on to counselling... has anyone got anything on genetic counselling? Its not like other counselling, its giving information”.

P5 added “you need to give counselling before any genetic test, it has to be done by trained genetic counsellors, it can’t be done by other healthcare professionals”.

P4 said “there are crisis pregnancy centres that help people after an abortion”.

P8 said “you explain everything before a [genetic] test and a number for follow up as people are emotional and don’t take everything in”.

P6 said “I’ve read that you always have to put risk in context, its all relative. The national average is the way of contextualising the risk.

Some general discussion about risk followed including P6 making a point that percentage risk is easier to understand than fractions.

P6 then said “0.8% is a really high risk”.

P8 said “if it’s a 1 in 10 chance people think its really good but the nurse can say, its not”.

P5 said “its difficult for the patient to understand relative risk”.

There followed a debate between P5 and P6 whether percentage or fraction was a better way to show risk.

P11 added “its about the person you’re talking too, what they understand”.

P8 added “maybe have different ways in your head of presenting it?”

P7 made the point that “risks are independent for each baby”.

P3 said “there is a medical model and a social model of disability” and went on to define these reading from notes.

P5 pointed out that in Spain he/she had seen a bus driver help a disabled person onto a bus and was surprised, he/she said “it was sad that this was a surprise”. P11 concurred and agreed this was surprising in the context of experience living in Britain.

P11 asked if anyone wanted to add anything?

P6 added “the issue with genetic screening is that it can say if you have Down’s you’re going to have a lower quality of life”.

P8 said “screening is not just for Down’s though, it helps plan during the pregnancy”.

P6 said “I think this week has changed my opinion on screening, I was pro but now I don’t know”.

P11 said “shall we go on to age related risk of Down’s syndrome? The risk increases with age... so why does it increase with age?”

P1 read out some statistics on Down’s births and said “they think that when the meiotic spindle is abnormal then that causes chromosomal abnormalities”.

P11 added “the longer the egg is left in meiosis 1 the more the chance of abnormalities”.

P1 added the theory is that “the older the eggs are, the lower the pH”.

P4 added “yeh, and that causes the increased risk of non-disjunction, at least that’s what I read”.

P11 said “what is karyotype”.

P3 said “it shows the chromosomes size, shape and structure... it organises them”.

P4 explained the microscope protocol and dye.

P8 added the cell division is “suspended”.

P11 said “what are the other ways of diagnosing Down’s?”

P4 said “the biochemical and USS tests?” and went on to explain the hCG / PAPP A tests.

P11 said “there are 2 sets of markers, 1st and 2nd trimester. The 1st trimester includes nuchal screening”. He/she then explained the biochemical criteria.

P5 added “they use UE3 too”.

P12 read out the USS markers.

P9 added the percentage chance of USS findings in terms of positive diagnosis.

P12 brought up a non-invasive test and explained it.

P3 said “I read you still need an amniocentesis to confirm”.

P12 talked about the risk of miscarriage compared to the risk of an abnormality and whether it was worth going for it. P12 then explained how the procedure was carried out and P11 added what is tested biochemically.

P8 brought up doctors giving their personal risk rate for procedures and wondered if it was okay to do that?

P6 said “the RCOG say that you need to perform 10 a year at least to be able to keep doing them.”

P11 said “has anyone looked into the urine dipstick?”

P3 replied that “high sugar can mean gestational diabetes” carrying on with other parameters finishing with what parameter can mean infection.

P6 brought up [phenotypic] features of a Down’s baby. This was added to by P1, P9, P8 and P12.

P11 invited someone to talk about types of chromosome abnormalities in Down’s.

In reply to a suggestion P4 said “1% are caused by mosaics not 2%”

P12 said “so 1-2%”.

P11 said “what I found interesting about mosaicism is that some cells can lose the extra chromosome and become normal again”.

The group moved onto discussing translocations.

P6 said “isn’t it the Robertsonian translocation that causes Down Syndrome?”

P11 added “then there’s the complete trisomy 21 but I think we’re familiar with that?” There was general assent in the group to this statement.

The group moved on to discussion of miscarriage in the 1st trimester.

P3 said “chromosome abnormalities”.

P5 said “caffeine”.

There was then a discussion between P4 and P6 about whether tea or coffee had more caffeine. P12 got involved too.

Age, obesity, smoking were brought up by the group as risk factors.

P11 introduced a new topic of what is normal development of a foetus.

P9 explained the process of fertilisation.

P8 with help from P12 talked about how the sperm penetrates the egg.

P9 said “I read the entry of the sperm causes release of Calcium”.

P1 asked “where is the ampulla of the fallopian tubes?”

P6 started explaining where the ampulla was and P8 got up and drew a uterus/ovary on the whiteboard. Between P6, P8 and P12 they talked about the structures using the diagram. P12 then got it up on his computer, reading out a definition. P8 modified the drawing on the whiteboard in light of this information.

P11 said “okay its fertilised, so what’s the next bit?”

P1 explained the cell divisions that take place. P8 added “the cells get smaller and smaller as they develop”. P1 finished “when the morula is formed then differentiation occurs”.

P11 and P6 talked about the trophoblast. P12 interjected “no no, the trophoblast becomes the placenta”.

P11 said “so what is the next stage?”

P12 said “implantation” and went on to explain this.

P11 explained how the embryo developed.

P8 explained what gave rise to which cell types and added “if the neural tube doesn’t close properly you get spina bifida”.

P11 and P8 talked about how the different systems develop.

P11 said “shall we skip to fetal development?” and went on to talk about the intestine being on the outside the body when it goes wrong. P4 interjected “I know someone who had that, they just put it back in”.

P6 Started to talk about stress in relation to pregnancy.

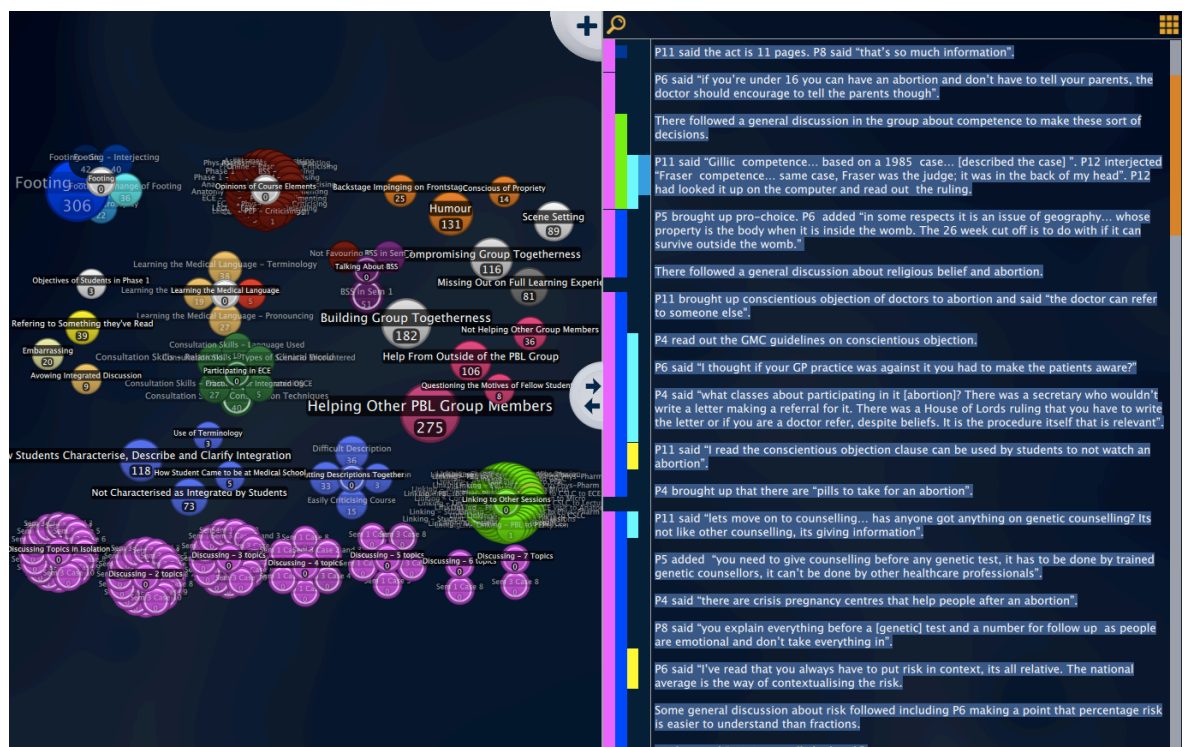
P12 said “there is a correlation between pregnancy problems and high stress... its not just the major life events, its how they cope with it”.

P11 brought up some studies with evidence for impact of stress.

P11 said “shall we quickly read through this [the case] to finish off?”

The group read through the case taking turns to read out the text. The tutor closed the session complementing the group and asking for volunteers to be chair and scribe for the next case.

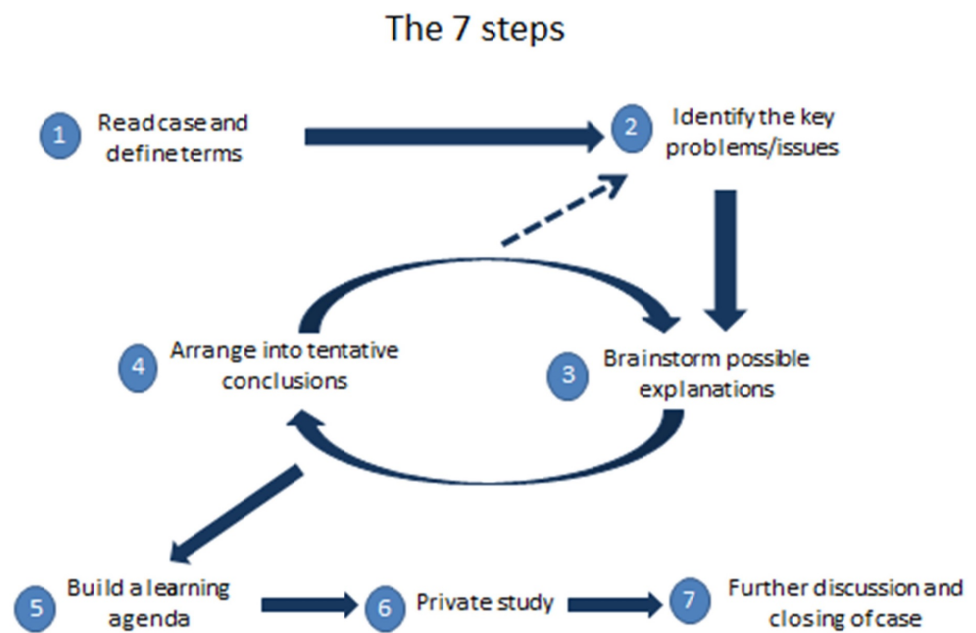
Quirkos Screen Shot Showing Coding for Field Notes: 10/10/14 PBL Second Session for Second Case in Semester 1



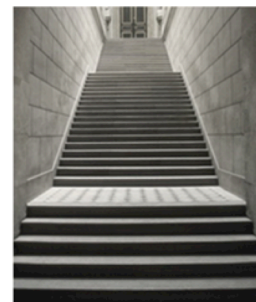
Appendix 11

The PBL Model Used on the Manchester Medical Course

The following depictions of the Manchester Medical School PBL model are taken from the Year 1 essential skills manual of the Manchester MBChB course.



PBL: The 7-steps



Step 1:

Identify and clarify the terms, words, and phrases in the problem description that are unknown to you.

Highlight unfamiliar terms before your first meeting and then as a group during the initial read-through of the case. Take special care with familiar words that are being used in a technical context.

Step 2:

Define the problem.

Look for the significant components (cues) and list the phenomena to be explained.

Step 3:

Using your cues brainstorm possible explanations.

Try to produce all the explanations that you can think of. Draw upon prior knowledge. If the area is unfamiliar to you don't be afraid to propose tentative explanations. **DO NOT RUSH THIS STEP!** Everyone should contribute.

Step 4:

Arrange explanations into tentative conclusions.

Try to produce a coherent description of the process that, according to what you think, underlies the phenomena. Use different **LEVELS OF EXPLANATION**.

Step 5:

Formulate a learning agenda based on the objectives needed to test the validity of your explanations.

Items on the agenda should be written as **questions**.

Step 6:

Attempt to fill the gaps in your knowledge during other learning events and with private study.

Use **ALL** sources of information available – lectures, practicals, books and electronic resources. Be discerning about information that you take from the internet - use reliable sites. Make a careful note of all the sources you use - your references. This information is crucial for sharing with other group members and when you come to revise.

Step 7:

Share the results of your private study with the rest of the group.

See how far your explanations are justified. Cite your resources.

Try to integrate all the knowledge into a comprehensive explanation for the phenomena. **Re-read the case as a group so that you feel confident you have covered everything you needed to.**

Note your personal knowledge gaps, record them and plan how you will address them – what materials you will use, who you will talk to, when and where you will do this. Give yourself a deadline for filling these gaps in your knowledge!