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**INTRODUCING TEAM-BASED LEARNING IN A
PHARMACY CURRICULUM: A QUALITATIVE STUDY OF
STAFF AND STUDENT EXPERIENCES**

SIMON JONATHAN TWEDDELL

A thesis submitted to the University of Huddersfield
in partial fulfilment of the requirements for
the degree of Doctor of Education

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Abstract

There is an increasing move towards an outcomes-based approach to educating healthcare professionals including the development of key skills such as problem-solving and critical thinking. Some healthcare regulators have changed accreditation criteria to ensure that graduates can apply knowledge and skills, analyse complex situations, and develop the skills to learn independently. There is a move to ensure that curricula are designed to take into account modern educational theory and research and promote active and deep approaches to learning. Accordingly, educators have redesigned curricula to be delivered by more learner-centred approaches involving active problem solving and peer and collaborative learning. These approaches require educators to adapt from the role of content deliverer to that of learning architect and facilitator of learning. This qualitative research study takes a phenomenological approach to consider the experiences of pharmacy educators and students in a pharmacy school that has designed its curriculum to be delivered predominantly by team-based learning (TBL). The findings of the study include: a dissatisfaction with traditional methods in engaging and motivating students; mixed feelings about the initial idea of TBL; the need for substantial resources for planning, staff training, designing and quality assuring resources when transitioning to TBL; improved student engagement and student preparation with TBL; staff benefits in working more collaboratively and enhanced enjoyment of teaching using TBL; perceived benefits of peer learning and transferable skills development; substantially higher staff workload during transition; challenges in writing effective application exercises, and developing the facilitation skills needed for a learner-centred classroom. In addition there is the need for substantial planning around timetabling, sourcing suitable rooms, ensuring consistency of approach across educators, and the development of bespoke quality assurance processes. Overall this research suggests that the majority of participants supported the implementation of TBL in the curriculum and that the benefits outweighed the challenges.

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Glossary

'4S' Framework	Framework for the design of application exercises in TBL, where problems should be significant , teams work on the same problem, making a specific choice, and then simultaneously reveal that choice.
ACCP	Accreditation Council for Pharmacy Education (US)
BERA	British Education Research Association
CINAHL	Cumulative Index to Nursing and Allied Health Literature
ERIC	Education Resources Information Centre
GMC	General Medical Council
GPhC	General Pharmaceutical Council
HE	Higher Education
HEI	Higher Education Institution
HEFCE	Higher Education Funding Council for England
IF-AT	Immediate Feedback Assessment Technique
iRAT	Individual Readiness Assurance Test
MCQ	Multiple Choice Question
MPharm	Master of Pharmacy Degree (UK)
OBE	Outcomes Based Education
QAA	Quality Assurance Agency
PBL	Problem Based Learning
PharmD	Doctor of Pharmacy Degree (US)
RAP	Readiness Assurance Process
TBL	Team-Based Learning
tRAT	Team Readiness Assurance Test
UK	United Kingdom
US	United States

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Chapter 1 - Introduction

In this chapter I will explain the background to this study, the recent history of pharmacy education at Bradford School of Pharmacy, and why a change to the learning and teaching strategy was deemed necessary. This chapter also provides an introduction to team-based learning and concludes with my research questions.

1.1 Background to the Study

Bradford School of Pharmacy has offered an undergraduate pharmacy programme for many years. Up until the mid-1990's student numbers averaged 70-80 per year, with the vast majority being school leavers with high 'A-Level' grades. The pharmacy programme became a modular structure in 1992, with each module situated within one of the four different pharmacy disciplines (Pharmaceutical Chemistry, Pharmaceutics, Pharmacology, Pharmacy Practice), and taught by academics located within one of these disciplines. Over the next few years demand for pharmacists grew substantially as government policy recognised the need for new clinical roles and for pharmacies to open longer hours (National Health Service Executive, 2000). Applications to study pharmacy grew significantly and universities responded by increasing student numbers and opening new provision. This resulted in a substantial growth in national pharmacy undergraduate places from 4200 in 1999 to 9800 in 2009 (Smith and Darracott, 2011). However, there was concern that a large increase in student numbers could threaten academic standards as market forces could lead to the enrolment of less academically able students (Taylor, Bates and Harding, 2004). In the early 1960s only 1 in 18 young people entered higher education (HE); by 1997 this figure was 1 in 3 (Dearing, 1997). Over time, the student population evolved from a small, elite group of entrants into a system of mass participation (Elias and Purcell, 2004). There have been successive attempts to widen participation, initially to include 'bright' students from lower-income families and then to improve access to women. Subsequently the aim was to provide access to people who may have underachieved due to poor schooling, and who may still benefit from higher education (Vignoles and

Murray, 2016). A university system that worked for the few may not, however, be appropriate for larger numbers of students with diverse backgrounds and disparate needs. As early as 2004 pharmacy academics identified that pharmacy schools would need to modify their courses and assessments to maintain the quality of the learning experience in this changing landscape (Taylor, Bates and Harding, 2004).

I started my academic career in 1997, initially part-time and then joining the school full-time in 2001. I became programme leader for the MPharm programme in 2002 and over a 6-year period thereafter the student intake increased to 200. In 2002 the programme comprised a large number of modules 'owned' and delivered by module leaders, mostly in isolation from one another. Knowledge continues to grow exponentially and I could see that my colleagues continued to add to the syllabus, in what were already content-heavy modules.

The pharmacy programme was delivered by a combination of large lectures (approximately 50% of class time) and small-group practical classes and workshops. The idea was that subject content would be delivered by large lectures and applied in the small-group classes. As programme leader I continually encountered complaints from staff and students about disruptive behaviour in lectures. The students seemed to have variable levels of commitment and motivation, which manifested as variable attendance and effort in preparing for workshops. A good proportion of students didn't seem to be motivated to attend or to study the content after lectures, they were ill prepared for, and unable to apply this knowledge in workshops, which were then repeatedly used to deliver content again. Lectures also seemed to have become a social gathering, a chance for students to talk and socialise, possibly due to a cultural shift as more students were living at home and had less opportunity to socialise together. Part of the problem seemed to stem from the way in which lectures were delivered, students were predominately passively listening and sometimes taking notes. If the subject content wasn't engaging, perceived to be of interest or relevant, then some of them became less engaged in learning and more likely to engage in side conversations with their peers. Arguably, University policy to provide students with copies of lecture

notes compounded the problem. Part of the problem was the *size* of the cohort; it's easy to be anonymous in a crowd of 200 students. The final problem was the way in which content was used. Subject knowledge was often taught in isolation, content was chosen by the individual lecturer and often without enough application to pharmacy. In effect we were failing to motivate a considerable proportion of students to engage in their studies.

1.2 Student Engagement

What do I mean by motivation and engagement and how do we know when students are motivated and engaged? The motivated student has been described as one who completes high-quality work and can act autonomously; however, engagement is more than motivation, it involves a personal connection or attachment to the tasks in hand (Oyler *et al.*, 2016). A motivated student may attend class regularly, complete pre-class and post-class assignments, and hence be more likely to succeed on their programme of study. Are they engaged in learning or just going through the motions? Is this student intrinsically motivated to learn because they are interested in the subject or extrinsically motivated by grades, parental pressure, or other external factors? Research on school children has shown that when learning activities are embedded in meaningful contexts, personalised, or when they are offered a choice of aspects of their learning contexts; then dramatic increases in their motivation, depth of engagement in their learning, and the amount they learned was achieved (Cordova and Lepper, 1996).

Student engagement in academic work has been defined as:

‘the student’s psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote.’ (Lamborn, Newmann and Wehlage, 1992. p12)

So an engaged student is likely to be motivated to learn and to commit a degree of psychological investment to their learning. What then does a disengaged student look like? Krause uses the term inertia rather than disengaged, arguing that this term depicts students who do not see the need to actively seek out

learning opportunities, take responsibility for their learning, and perhaps are apathetic or even disillusioned (Krause, 2005). Trowler describes her understanding of the term student engagement as:

‘concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution.’ (Trowler, 2010, p3)

This wider definition involves the investment of time, effort and resources, not just in terms of the student’s time but also that of the higher education institution. It also includes not only the development of students but also the student experience and the performance and reputation of the institution. So to optimise student engagement requires a partnership between students and their institution. Trowler goes on to argue that engagement is more than participation; it requires feelings and actions. Fredricks, Blumenfeld and Paris (2004), identify three dimensions of student engagement, albeit in school children:

1. Behavioural engagement: where students comply with behavioural norms, attend classes, follow the rules, and are not disruptive. Students contribute towards class discussions and participate in learning and academic activities.
2. Emotional engagement: this involves affective reactions such as demonstrating interest, happiness, enjoyment, or a sense of belonging.
3. Cognitive engagement: where students are invested in their learning, go the extra mile, and who seek out and enjoy challenges.

Trowler (2010) suggests that engagement is a continuum, with positive behaviours that are productive or constructive at one end, and negative behaviours that can be disruptive, obstructive or counter-productive at the other. Trowler argues that between these poles could be a range or gulf of non-engagement such as withdrawal or apathy. She goes onto provide examples of positive, negative and non-engagement in HE (see table 1.1 below).

Table 1.1 Examples of Positive, Negative and Non-Engagement in Students (Trower, 2010, p6)			
	Positive engagement	Non-engagement	Negative engagement
Behavioural	Attends classes and participates with enthusiasm	Skips classes with no good reason or excuses	Boycotts or actively disrupts classes
Emotional	Interest	Boredom	Rejection
Cognitive	Meets or exceeds assignment requirements	Assignments late, rushed or absent	Redefines parameters for assignments

Students can demonstrate all of these behaviours and characteristics depending on the class, the subject, their teacher, their workload, their mood, and of course these can be influenced by external factors. My experience is such that students have certainly demonstrated many of the above characteristics at different times. However, what we were encountering was a perceived association between a rapid growth in student numbers (and consequently large lectures) and increased characteristics of negative engagement or non-engagement. These negative behaviours weren't only related to increased numbers, there seemed to be a lack of attendance at, and more negative engagement in, subjects that students deemed to be less relevant to their future careers. The MPharm programme team felt that we needed to optimise positive engagement characteristics through curriculum design. Our aim was to motivate students to study by using subject content that inspired them, captivated their interest, and by ensuring they understood how this learning was important to subsequent stages of the programme and their future careers.

Definitions of student engagement across the HE sector vary and there are differing opinions as to who is responsible for student engagement. The Higher

Education Funding Council for England's (HEFCE) definition suggests that the responsibility lies with HE providers as

'the process whereby institutions and sector bodies make deliberate attempts to involve and empower students in the process of shaping the learning experience' (HEFCE, 2008, p2).

This could occur at different levels in the same institution. For example at an institutional level the HEI may engage students to enhance the collective learning experiences; these could include student representation, student feedback, student partnerships. At programme level, academics design specific learning, teaching and assessment activities to enhance the engagement of individual students in their own learning (Little *et al.*, 2009). However Hu and Kuh place the onus of individual students, defining engagement as 'the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes' (Hu and Kuh, 2002, p. 555). Kuh, however, later refines this view by arguing that it is responsibility of the student and the HEI to engage students, defining engagement as:

'the time and effort students devote to activities that are empirically linked to desired outcomes of college and what institutions do to induce students to participate in these activities.' (Kuh, 2009, p. 683)

Coates bases the concept of student engagement on the constructivist assumption that learning is influenced by how an individual participates in "educational purposeful activities" but also relies on institutions providing the "conditions, opportunities and expectations" to engage. However, Coates states that ultimately it is the learner that is the agent in engagement (Coates, 2005, p. 26).

Students can 'engage' at many levels. In class, individual teachers may try and enhance engagement in specific learning environments, for example using technology such as audience response systems to make lectures more interactive. Out of class, students might be encouraged to engage with extra-curricula activities to enrich their educational experiences. Examples include service learning, work experience, leading student societies. Institutions may

wish to engage with students as part of their institutional governance policies, for example to serve on committees to quality assure provision, appoint staff, or to seek feedback.

Engagement is a term that can be used for multiple reasons. Students can engage to improve their learning. There is little doubt that positive engagement with educationally purposeful activities, whether this is in-class or self-directed out-of-class, has been shown to lead to learning (Coates, 2005). In pharmacy, educational research shows a negative correlation between the numbers of hours of missed classes and student performance, with low performers significantly more likely to believe that classes did not benefit them and therefore suggesting disengaged students (Hidayat *et al.*, 2012).

Trowler, (2010) suggests that there is a continuum for individual student engagement in learning that commences with '*student attention*' that is that they are focused on the teacher or the task in hand. This moves to '*student interest in learning*', this suggests more than attention, they are now curious and connected with the subject. '*Student involvement in learning*' is next along the continuum where students choose to become actively involved, perhaps through writing notes, or through discussion with peers. This suggests a degree of ownership of their learning. The penultimate point on the continuum is '*student active participation in learning*' which could manifest itself as asking or answering questions, seeking further information or clarification, or constructing links with previous learning. Finally, '*student-centredness*' may involve students in the design, delivery, and assessment of their learning, for example co-creating learning resources or assessment criteria. It may also involve giving students a choice of what or how to learn, for example providing electives or a choice in how they might prefer to be assessed. Trowler isn't advocating that all programmes should aim to be completely student-centred across the board, only that this approach might be beneficial in better engaging or empowering some students in some parts of the curriculum.

Some authors argue that students need to actively engage for learning to be effective. Graham *et al.*, (2007) suggest that diverse educational research studies have shown that students who actively engage in the learning process

enhance their academic achievements. Graham *et al.* go on to suggest that the roots for active learning go back to John Dewey who argues that learning is an active process and students learn by doing (Dewey, 1916). So what is '*active engagement*'? Pratton and Hales, (1986, p.211) define active participation as 'the result of a deliberate and conscious attempt on the part of a teacher to cause students to participate overtly in a lesson.'

The term '*student engagement*' has also been used in others contexts, for example engaging with students through support systems and targeting assistance or providing advice to improve the student experience and enhance retention rates. Universities may engage with students as part of their quality management processes to improve curricula, reputation, and marketing.

In this thesis the term student engagement will focus on *engagement in academic study in-class and out-of-class to improve learning*. If one can motivate students to engage with course content out-of-class, and attend and actively participate in-class, then it seems the better their outcomes will be. Students do have a responsibility to their own learning and ultimately they must decide the degree to which they engage. However, the HE institution also has a responsibility to try and promote and optimise positive engagement characteristics through curriculum design. It was to this end that the MPharm programme team decided to redesign the programme in an attempt to better stimulate interest, involvement, and active participation from students and encourage them to take more responsibility for their learning.

1.3 What to Reform?

The previous MPharm programme at Bradford School of Pharmacy was implemented in 2003 at a time when pharmacy curricula were more focused on covering content prescribed in a syllabus supplied by the pharmacy regulator. The majority of modules were 'stand alone' with little integration or contextualisation of the different science and practice subjects. Students were left to make their own links across subjects and modules. The lecture was the predominant means of teaching and the focus was on content coverage rather than application. A focus on content with little application of knowledge can reinforce surface approaches to learning with students focusing on memorising, regurgitating and forgetting facts (Weimer, 2002).

In designing our programme we sought out scholarly work and research publications of medical educators. Medical education is more of an established academic discipline than pharmacy education, with most medical schools having academic departments of medical education. We designed the new MPharm Programme to take a thematic approach, with themes that would spiral (Bruner, 1960; Harden 1999), with each one being revisited at subsequent stages with increasing depth, breadth and complexity. Previous stand-alone subjects would be integrated to prevent compartmentalisation and help students see the relevance of the sciences to solving practice-related problems (Harden, 2000).

Harden proposed the SPICES model for curriculum strategy analysis identifying six education strategies, each represented as a continuum. The model was to be used by medical schools to assess where they are currently on each of the continua and, based on problems in their curricula, provide guidance for moving along the continua to help solve these problems (Harden, Sowden and Dunn, 1984). See table 1.2.

Table 1.2 Educational strategies in curriculum development: the SPICES model

S	Student-centred learning	←→	Teacher-centred teaching
P	Problem-based learning	←→	Information-based learning
I	Integrated curricula	←→	Discipline-based curricula
C	Community focused	←→	Hospital focused
E	Electives with a core	←→	Uniform/Standardised
S	Systematic curricula	←→	Apprenticeship approach

In designing our new curriculum we took the decision to move each of these educational strategies further towards the left of each continua with a view to better engage students in their learning. For example, we felt that having a degree of choice in what to study (Electives with a core) would better empower and motivate students. If we could create authentic problems for students to solve that integrated the pharmacy disciplines this would, it was thought, better motivate and engage students in their learning. By identifying a 'core curriculum' of common drugs and diseases for the students to master then we hoped to overcome content overload, fragmentation, and irrelevancy in the curriculum.

One of the aims of the new curriculum was to develop students from being supported learners on enrolment to becoming autonomous and self-directed learners when they graduate. Year 1 was designed to take a more pedagogical approach and over the four stages the approach became more andragogical and more congruent with the principles of adult learning theories (Knowles, 1988) (see table 1.3), to provide students the ability to direct their own learning in their careers and in postgraduate study.

Table 1.3 Principles of adult learning (Knowles, 1988)

Adults are motivated by learning that:
<ul style="list-style-type: none">• Is perceived as relevant• Based on and builds on their previous experiences
<ul style="list-style-type: none">• Is participatory and actively involves them• Is focused on problems
<ul style="list-style-type: none">• Is designed so that they can take responsibility for their own learning• Can be immediately applied in practice
<ul style="list-style-type: none">• Involves cycles of action and reflection• Is based on mutual trust and respect

If we can engage our students through curriculum and task design to seek out and actively search for understanding, then this is more likely to lead to deep learning. This is in contrast to surface learning which encourages students to only reproduce what has been learned (Coles, 1998). Research suggests that a deep or surface approach is important in determining the quality of learning (Trigwell and Prosser, 1991). Surface approaches are more common when students have a heavy workload, excessive content, little choice of what they study or opportunity to study a topic in depth, and an assessment strategy that rewards the reproduction of knowledge. If we can design contexts where students are motivated by the need to know, are offered choice, and can actively explore and investigate knowledge for a wider purpose, then they are more likely to take a deeper approach to their learning (Spencer and Jordan, 1999).

So rather than focusing on large lectures and multiple repeated workshops, we sought a learning and teaching strategy that created order by engaging students in active learning in the classroom. We did consider using 'problem-based learning' (PBL) as this has been used with varying degrees of success in UK medical schools for many years; however, PBL requires a member of staff

to facilitate learning in each group and we believed we didn't have the resources to introduce an entire curriculum delivered by PBL. PBL is a process-driven learning strategy that relies on students finding and developing their own content after identifying a problem, we felt that this approach was too learner-centric and its lack of structure may be a step too far for our curriculum. We needed a strategy that possesses and retains the benefits of small-group teaching, but could be scaled for a large cohort of students and had some structure to it. It was during this search that we came across the literature on team-based learning (TBL).

This change, it soon became apparent, would require a shift in our thinking as academics from delivering 'teacher-centred content' to facilitating 'student centred-learning.' Weimer (2002, p.xi) sums up our belief at that time that learning was an 'inevitable outcome of good teaching, and so we focused on developing our teaching skills'. Staff development had tended to focus on skills for delivery rather than approaches to learning.

The lecture has been the cornerstone of undergraduate teaching methods in UK Higher Education Institutions for decades and we have used it extensively for teaching and content delivery on the pharmacy programme for many years. It has been argued that the lecture is a passive transfer of information from the lecturer's notes to the student's notes with little opportunity to check understanding or to develop higher critical thinking skills (Long & Lock, 2010). Cantillon discusses the advantages and disadvantages of the lecture

'Lecturing or large group teaching is one of the oldest forms of teaching. Whatever their reputation, lectures are an efficient means of transferring knowledge and concepts to large groups. They can be used to stimulate interest, explain concepts, provide core knowledge, and direct student learning. However, they should not be regarded as an effective way of teaching skills, changing attitudes, or encouraging higher order thinking. Large group formats tend to encourage passive learning. Students receive information but have little opportunity to process or critically appraise the new knowledge offered.' (Cantillon, 2003 pp. 437)

For the existing learning and teaching strategy to be effective on our pharmacy programme, students needed to assimilate the knowledge from lectures before it was applied in the proceeding practical or workshop. This is where the problem occurred because too many of our lectures were passive and content-heavy. Large classes meant that even small group teaching was upwards of 30 students so tutorials often became mini-lectures. Laurillard argues that for learning by lectures to be successful, the lecturer is required to know the capabilities of the students and that all of the students have similar capabilities and prior knowledge. Widening participation has, however, resulted in cohorts with more diverse backgrounds and with a range of capabilities that make lectures less likely to work as a principal teaching strategy (Laurillard, 2013).

In the past we've dealt with student and staff complaints and negative behaviours in large lectures by trying different methods of making lectures more interesting, for example by using audio-visual aids and technology. Others have used techniques such as 'Peer Instruction' to encourage and make use of peer-to-peer interactions during lectures. In this technique questions are embedded into lecture presentations for students to answer; this increases participation, dialogue and active involvement. Peer instruction has resulted in positive outcomes (Crouch and Mazur, 2001; Fagen, Crouch and Mazur, 2002; Lasry, Mazur and Watkins, 2008); however, it still requires students to attend class, be motivated to study content prior to the class, and actively engage in discussions with peers in the session. I've also had some success in engaging students in a lecture setting when I've presented them with problems to solve in the form of a capstone lecture at the end of the module and in preparation for assessments. Gauci *et al.* found that active participation increased students' motivation and engagement and that those who answered questions posed in class achieved better results than those who chose not to (Gauci *et al.*, 2009).

The problems seemed to be worse when students were in large groups and when the academic was delivering large amounts of didactic content. Ward *et al.* (1992) describe an ethnographic study of large group teaching within their institution, concluding that many students were unprepared and bewildered by large classes, felt they were anonymous and passive, often frustrated by their

experiences, and felt powerless to influence change. Equally staff felt they couldn't relate to students as individuals, establish a rapport with them or learn their names. Staff felt they were 'performing' rather than teaching and the demands of controlling large groups led to increased stress levels, reduced job satisfaction and even resignations. Gibbs and Jenkins (1992) suggest that the answer is not to adapt conventional methods of teaching, which they argue are not that effective anyway, but to adopt more radical change to prevent a decline in quality.

1.4 Focus on learning rather than teaching

Ramsden (2003, p41) describes learning as a qualitative change in the way people see, experience, understand and conceptualise subject content during a learning activity; 'it is about what and how they learn rather than 'how much' they remember'.

Knowledge continues to expand at an exponential rate in many subject areas and pharmacy is no exception. It would be impossible for educators to cover, and for students to learn about, every drug for every conceivable condition. To only try to 'cover the content' limits students to 'simply learning facts without the ability to apply their knowledge to solve novel problems' (DiCarlo, 2009 p258). Focusing on content coverage without the ability to work with and apply it to problem-solve simply promotes what Marton & Säljö (1976) characterise as surface learning or, in other words, knowledge that is soon forgotten. There often seems to be a misconception amongst some HE educators that just because we have 'said it' then students must have 'learned it'. If education is predominantly about learning facts, students will focus on memorising and rote learning, a skill that DiCarlo (ibid) argues only teaches students how to take exams and prepares them for more education. Rote learning facts alone fails to develop problem solving, critical thinking, communication and interpersonal skills they will need when they graduate. For learning to be effective it must be meaningful, purposeful and contextualised or it will fail to make a significant impact upon the learner. To learn we must actively process and think about the relevance of the content to us, our future roles, and the world around us.

Learners need to know the importance of the content, how they will use it and what they will be able to 'do' with this new knowledge in order to foster 'deep learning' and optimise understanding (Marton and Säljö, 1976; Weimer, 2002; Ramsden, 2003). When new learning is related to what the students already know and have experienced, and actively work to organise and structure the content, then Marton and Saljo (ibid) characterise the approach to learning as 'deep'.

How learners engage with content has been researched in cognitive psychology, which led to constructivist educational theory. Stage *et al.* (1998, p 35) state that:

'Constructivist approaches emphasize learners' actively constructing their own knowledge rather than passively receiving information transmitted to them... From a constructivist perspective, knowledge cannot simply be given to students: Students must construct their own meanings'

It is through using constructivist approaches during group-work that led to the formation of the collaborative learning movement where students work together to construct their own solutions to problems (Weimer, 2002).

1.5 Balance of Power

The focus then should be on learning. Weimer, (2002) suggests that changing the balance of power incrementally in the classroom increasingly develops student capabilities as learners, preparing them to take more responsibility for their learning and ultimately equipping them with the skills to teach themselves. This is not without difficulty, many students will be happy taking a passive role, leaving it to the teacher to direct their learning. Indeed, because active learning requires active thinking, this is likely to require more effort on the learner's part. Conversely undergraduate students are no longer children and attempts to control the classroom and impose order may fuel and encourage resistance in some students (Kearney *et al.* 1992). Students will therefore need an explanation of why active and deep approaches to learning are likely to be better for their education in the long term.

Pharmacy graduates have a professional responsibility and regulatory requirement to keep their knowledge and skills up-to-date throughout their working life. Knowledge, understanding and working practices change over time; therefore developing autonomous learners should be a key goal of a pharmacy undergraduate programme. This is not without difficulty. Many teachers feel 'in-control' when they are talking and providing content; handing over power to enable students to question, argue or debate may leave them feeling vulnerable. Student-centred classes are likely to be less prescriptive and teachers may not be able to answer every question; this may challenge their authority as a teacher. It may be that giving students a voice in the classroom leads to a loss of control and status of the teacher. There may be positives and negatives for staff and students transitioning to more learner-centred approaches. If students are engaged, motivated and interested in learning this can have a positive effect on the teacher's motivation and job satisfaction. Conversely, the change might not be successful, students may resist, and it may require too much work and have a detrimental effect on the teacher and their job satisfaction. In a review of practice and research on problem-based learning (PBL), Dolmans *et al.*, (2005) argue that PBL has the potential to prepare students more effectively for future learning and that the problems that educators encounter usually stem from poor implementation rather than the method itself.

Weimer (2002) describes how the effectiveness of using active, collaborative and enquiry-based approaches depends on the ability of academics to be able to 'step aside and let students take the lead.' Higher education teachers who have only ever known and used teaching methods that place them at the centre in a teacher-controlled classroom may find this problematic. It may be one thing for an individual teacher to choose to try out new pedagogical approaches but to require others to reluctantly go down this path is more likely to lead to problems that may be much more challenging to overcome. In the learner-centred classroom the role of the teacher shifts significantly from the knowledge expert who talks from the front of the classroom to one who enables and encourages students to explore, discuss and engage with the subject content through well-designed exercises and assignments. It may be empowering for

the teacher to encourage discussion and debate, or disempowering for the teacher, as they are likely to have less control or autonomy, and they could perceive themselves as having potentially a lesser status.

In the learner-centred classroom the teacher is the 'guide on the side' who talks *with* students rather than *at* them. There is of course a didactic/dialogical continuum with many educators taking a blended approach when designing their learning and teaching strategies.

The teacher's role in the learner-centred classroom is to talk *less* and empower students to discover *more*, on their own or through collaborative discussion with peers. The learner-centred teacher must be able to design learning tasks that engage, enthuse, and motivate learners. But do teachers have the skills to design these tasks and even if they do how much extra work does this involve? Does a change such as this impinge on academic freedom? What is the view of the academic?

Learner-centred exercises ideally move students from their current level of knowledge, understanding and competence to a higher level, ideally in a phased sequence, and should be designed to be authentic tasks relevant to the work of the discipline (Weimer, 2002). One could argue that developing higher-level skills are a requirement of a Masters degree. Masters graduates are able to show initiative, demonstrate decision-making skills in complex and unpredictable situations, demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks (QAA, 2014). The QAA also define higher skills as:

'those which go beyond acquiring basic knowledge and understanding and being able to apply that understanding to straightforward situations. They include analysis and synthesis of a range of knowledge, which may be acquired by using research skills; critical reflection on different and potentially conflicting sources of knowledge; problem-solving by identifying a range of possible solutions, evaluating these and choosing the solution most appropriate to the situation; developing complex arguments, reaching sound judgements and communicating these effectively.' (QAA, 2008)

To develop these skills students must have the opportunity to regularly critically analyse information, evaluate a situation, make decisions and defend them. These cognitive skills are classified as higher-level complex skills in Bloom's Taxonomy of Educational Objectives (Bloom, 1956). One way of developing higher-level outcomes and engaging students in active learning could be through collaborative or cooperative learning.

1.6 Collaborative/Cooperative Learning

Collaborative learning is an active learning methodology where two or more students learn with and from one another. Cooperative learning is essentially the same thing, although Myers (1991) argues that collaboration focuses more on the process of working together and cooperation on the product of such work. Whichever terminology is used, learners essentially depend on one another for the successful completion of the task but remain accountable for their own learning (Luzet, 2013).

Collaborative learning is based on constructivist theories where learners construct knowledge through a process of discovery, discussion and debate with others. Collaborative learning theories are associated with social interdependence theories. '*The one that does the talking does the learning*', this is the socio-cultural education theory originated with Vygotsky (1980) and developed further by Daniels (2014); it places less importance on the transmission of knowledge and more on dialogue and socially-constructed knowledge between learners and between teachers and learners. This theory places a strong emphasis on active learning, teacher-student interaction and collaboration between learners (Verenikina, 2008).

The modern collaborative learning movement began through the work of Bruffee (1984; 1993) who suggested that social construction of knowledge could offer a new model for education that is a more satisfying experience for both students and teachers. Arguably, cooperation is most effective when there is positive interdependence, for example when goals are shared and dependent on the success of the group. This promotes interaction, peer encouragement, peer support and peer feedback, with students challenging one another's reasoning and listening to the perspectives of others. This is expected to lead to

higher academic achievement. Negative results occur when negative interdependence exists, for example if a competitive learning environment is created and when students' goals are unrelated to, or in opposition to each others (Johnson, Johnson and Smith, 2007).

Cooperative learning requires positive interdependence and individual accountability (Slavin, 1996); the former being that members believe that the group's collective efforts are essential for each member to achieve their individual goals (Johnson, Johnson and Smith, 2007); the latter being that students must be assessed against the learning outcomes on an individual basis (Herrmann, 2013).

Meta-analyses, albeit mostly in children, show that cooperative learning leads to higher academic achievement than individual models (Slavin, 1996; Springer, Stanne and Donovan, 1999; Roseth, Johnson and Johnson, 2008). There have been a few studies on cooperative learning in higher education in recent years (Hillyard, Gillespie and Littig, 2010; Cavanagh, 2011; Herrmann, 2013) reporting mixed results. Positive outcomes include a stronger commitment to tasks, improved pre-class preparation, and the value placed on the social aspects of group work. The negative issues included the dependency of the efforts and commitment of others, the presence of 'free-riders', and the different values that students placed on active learning with peers over passive transmission of information from teachers.

My own experiences of students working in groups have also been mixed. In workshops of 25-30, students were given activities to prepare prior to coming to class and then discuss their answers in small groups of 4-6 students, with each group being called upon to provide feedback to the class. While students were engaged during the activities, which were followed by a facilitated discussion, many hadn't done the preparatory work which meant they weren't ready to move to the application stage and didn't benefit as much as those that had. There was discontent amongst students when group members either hadn't prepared for or didn't attend class.

When given group work out-of-class, students often struggled to meet to prepare their work and often resorted to dividing the task to work on different

sections individually. Whilst students can use deep approaches to learning when writing presentations, the danger of this is that students only learn about the content in the section they prepared themselves. Furthermore, my experiences of using class time for students to present to other students is effectively another passive activity for learners, who don't necessarily value learning from their peers via a one-sided presentation. Students moreover often fail to engage in critiquing each other's work for fear of being critiqued themselves.

1.7 Drivers for Change

The drivers for change in the Bradford MPharm curriculum therefore included motivating and better engaging students in positive learning behaviours, developing higher-level learning skills, integrating subject disciplines and making more appropriate use of subject content to show context and relevance.

Studies have shown a preference for more interaction in lectures, use of personal response devices, or the flipped classroom model (Sander *et al.*, 2000; Moffett *et al.*, 2014; Luscombe and Montgomery, 2016). However, other research reported discrepancies between staff and student opinion. Tsang and Harris (2016) report that students' perceive content coverage by lectures to be more effective while staff perceived that active and collaborative learning was more effective than passive methods. Van der Vleuten and Driessen, (2014) argue that educational practice and educational research are misaligned and current practice relies heavily on content transmission. They suggest that curriculum designers should consider adopting evidence-based learning strategies that include elaboration, cooperative learning, feedback, mentoring and the flipped classroom. Rather than comparing different strategies educationalists should be 'creatively designing educational strategies that make optimized translations from theory to education practice' (van der Vleuten and Driessen, 2014, p229). To deliver this new programme, we sought a learning and teaching strategy that was informed by constructivist and social interdependence learning theories. Advances in cognitive psychology suggest that learning is enhanced when the learner processes information, a phenomenon known as elaboration (van der Vleuten and Driessen, 2014).

Elaboration takes place when learners verbalise or summarise in their own words, or when they use their knowledge to discuss, debate or argue their case. In doing so learners construct meaning and make links between existing and new knowledge. There is a great deal of evidence that learning with others is more effective than learning alone (Johnson, Johnson and Smith, 2007). Social interdependence occurs when the achievement of individual goals depends on the abilities of others to work together. Positive interdependence or cooperation occurs when individuals perceive that the only way to reach their individual goals is to collaborate with others to achieve shared goals. Negative interdependence or competition occurs when individuals perceive that achieving individual success relies on the failure of others. No interdependence exists when individuals can achieve their goals regardless of others (Johnson, Johnson and Smith, 2007). However, for collaborative learning to be effective the conditions must be right, there must be equality, accountability, and tasks that promote positive interdependence and simultaneous interactions. Without these conditions group work can be ineffective and promote negative or at best no interdependence.

The programme development team selected team-based learning as it was designed around the constructivist learning theory (Hrynchak and Batty, 2012) and provided a motivational framework to both prepare for, and attend, classes. It also held students accountable for their actions, took a more learner-centred approach than our previous curriculum, and presented students with problems to solve in collaboration with others, which seemed to more closely reflect how they will work as a pharmacist. This was a decision taken by the school following debate about the perceived advantages and disadvantages of change or keeping the status quo; however, it would be pertinent to carry out research on the staff and student experiences of using team-based learning across the curriculum.

1.8 Introduction to Team-Based Learning (TBL)

Team-based learning (TBL) was developed in the US as an alternative to traditional methods of teaching by Larry Michaelsen. Faced with increased class sizes that prevented the use of small-group discussion, he found learners in large groups disengaged, passive, and much less willing to participate in debate. Learners were often placed in a learning environment where they were anonymous enough to come to class with little or no preparation (Sweet and Michaelsen, 2012). Others have reported similar difficulties with large group teaching (Ward *et al.*, 1992; Thomas *et al.*, 2011).

Team-based learning (TBL) has been described as:

‘a special form of collaborative learning using a special sequence of individual work, group work and immediate feedback to create a motivational framework in which students increasingly hold each other accountable for coming to class prepared and contributing to discussion.’
(Sibley *et al.*, 2014, p6)

TBL was designed to engage learners through a process of preparation, testing and application of knowledge. TBL shifts the focus of classroom time from conveying course concepts by the teacher to the application of course concepts by student learning teams (Michaelsen, Knight and Fink, 2002). TBL is made up of 4 sequential phases.

Team-Formation

At the start of the semester, students are allocated by teachers to teams of 5-7 students, creating teams from diverse backgrounds and with diverse resources, who will work together for the entire year. Bruffee (1993) suggests that the optimal group size for solving a group task by discussion is five or six. Fewer than five and the groups may not have the resources for the intellectual challenges of the task; more than seven and the group becomes too big to function coherently which may result in factions or sub-groups forming.

Group work can enhance learner development of skills needed in the clinical setting such as team-working skills, problem-solving skills, management skills, as well as developing confidence and shared understanding (Forehand *et al.*,

2016). Learning in groups can, however, be both a positive and a negative experience for students; some students find group work to be a powerful experience while for others it creates conflict, the group have difficulties in meeting up, and there is often disparity of work amongst the group (Fink, 2004). Slavin (1996), suggests that there is a motivational aspect to small group learning as group members realise that the only way to achieve their personal goals is for the group to be successful. Slavin goes on to postulate that group work can work well. The social cohesion of the group can support learning because as the group interact regularly they bond and consequently want both team and individuals to succeed. Furthermore, Slavin (1996, pp. 49) argues that learner interactions increase student achievement through cognitive processing.

‘Students will learn from one another because in their discussions of the content, cognitive conflicts will arise, inadequate reasoning will be exposed, disequilibrium will occur, and higher quality understandings will emerge.’

Cognitive psychology suggests that for knowledge to be retained and related to previous learning, it needs to be restructured or elaborated (Witrock, 1986). This theory is supported by Fosnot (1996, p29) who describes learning as requiring ‘invention and self-organisation on the part of the learner’. Slavin (1996, p50) goes on to suggest that ‘one of the most effective means of elaboration is explaining the material to someone else.’

There are, however, also poor student experiences of group work reported in the literature. These include procrastination, that is delaying a task in the hope that another group member does it instead, and social loafing, or free riding which is reduced or little individual contribution to the group in the expectation that others will do the work, but all will receive the same grade (Jassawalla, Sashittal and Sashittal, 2009; Dommeyer, 2012; Ferrari and Pychyl, 2012). Research has shown that strategies for overcoming these issues include small group sizes, performance monitoring, peer evaluation, and coaching to manage expectations; and that these have reportedly improved group work experiences for students (Forehand *et al.*, 2016).

Preparation Phase

Students prepare for class by studying content that would previously have been delivered as lectures. For each unit, teachers prepare bespoke student study guides; these may include learning resources and activities written by the teacher and signposting to other sources (for example textbooks, web-resources), and explanations of why this content is important to their learning. The preparation phase is an out-of-class individual activity. This method of learning has been referred to in the literature as the *inverted classroom* (Lage, Platt and Treglia, 2000) or the *flipped classroom* (Baker, 2000) where course content is provided prior to and outside class so students can “*engage [with] that content at a deeper level inside the classroom*” (Strayer, 2011). Studies have shown positive and negative feedback from students and teachers from this method of learning (Ullman, 2013; Butt, 2014; Findlay-Thompson and Mombourquette, 2014; Garrow *et al.*, 2013). Some students welcomed being able to access learning resources when they wanted, and liked being able to talk to or ask questions of their teacher in class during class discussions on the content; however, others felt it involved more work, while some preferred to listen to their teacher deliver the content in a lecture where they could ask questions in real time (Findlay-Thompson and Mombourquette, 2014). Teachers also found that it was more work initially to set up and prepare online resources (Garrow, Hotle and Mumbower, 2013).

Readiness Assurance Process Phase

The next phase is the *readiness assurance process (RAP)*. The incentive to prepare for a TBL class is two-fold; firstly, at the start of each unit students sit a short, graded individual readiness assurance test (iRAT) on the content; secondly, immediately following this test is an identical team readiness assurance test (tRAT). During the tRAT, students discuss the questions as a team, agree on an answer, and are provided with immediate feedback as to whether there are correct via a specially designed IF-AT scratch-card (Immediate Feedback Assessment Technique). Students are held accountable to their team for their pre-class preparation through an end of module peer-assessment. During the tRAT, teams are actively engaged in discussing the questions, often learning from each other, and sometimes competing with other

teams to score higher marks. Both test results are immediately available to instructors who can then facilitate an informed discussion of any concepts with which students may have struggled. Teams can also appeal a question or answer, and are encouraged to do so, with the aim of further developing their critical thinking skills.

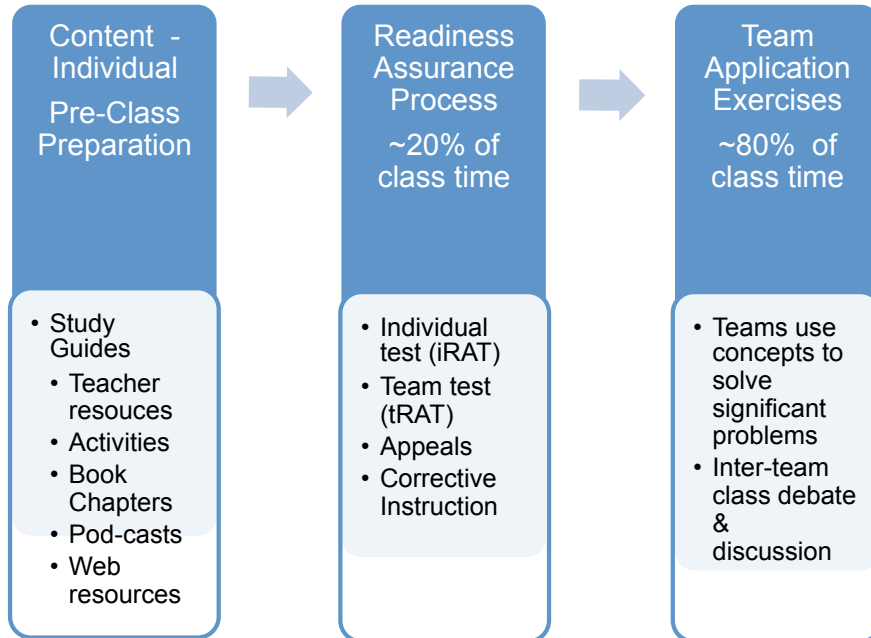
The principle behind the readiness assurance process is that assessment drives learning. Assessment should not just be used 'as a means to measure student learning' at the end of learning but to coach, guide and facilitate student learning throughout the learning process. Assessment-as-learning, as defined by Alverno College (1994), includes six essential criteria. Maddux (2000) suggests that using assessment-as-learning as a continuous process can be beneficial in pharmacy education by using these six criteria. These are the inclusion of clear learning outcomes; allowing multiple performances; having explicit criteria; use of expert judgment; providing productive feedback; use of self/peer assessment. The readiness assurance process in TBL includes these criteria.

Application Phase

The final and longest phase is the *application phase*. During the class, each team works on identical application exercises, applying new knowledge and concepts to solving a number of significant and challenging problems. Problems need to be authentic and relevant to the learner, with fellow learners and teachers providing guidance to scaffold learning (Davies, 2000). Applications are designed to create in-team discussion as teams generate and select their best answer to share with the class. Finally, an interactive, teacher-facilitated debate then follows as teams are asked to justify their answers to the class. Application exercises follow the '4S' design criteria (Sibley *et al.*, 2014). Learners work on '*significant*' and authentic challenging problems relevant to their discipline; all teams work on the '*same*' *problem* so go through the same learning experiences, which makes later class discussion richer. Teams are forced to make a '*specific choice*' or informed decision of some nature, which they later justify by presenting their argument and rationale. Finally all teams '*simultaneously*' reveal their decision at the same time to publically commit to

their decision; this further motivates task engagement and prevents answer drift. Learners engage in team and class discussions throughout, with the aim of enabling a deeper understanding of course content and promoting higher level and sustained learning. Actively processing information has been described as elaboration (Levin, 1988) and elaboration occurs when one discusses with others, summarises and verbalises in one's own words (van der Vleuten and Driessen, 2014).

Team-based Learning Unit Delivered over a 2-3 week period



Team-Based Learning is a new direction for a UK pharmacy school. It has been used more extensively in pharmacy schools in the US but not usually across an entire academic programme. It would be pertinent therefore to explore the experiences of educators who are implementing team-based learning as a programme-wide learning and teaching strategy and the experiences of students as learners.

1.9 Terms of study

As Chapter 2 shows, the literature on TBL in pharmacy is mostly limited to positivistic, quantitative studies that measure the impact of TBL on student learning outcomes, and the student experience using end of course surveys. TBL has been introduced as the predominant learning and teaching strategy in the MPharm programme at Bradford School of Pharmacy to deliver a highly-integrated curriculum (Harden, 2000). This offers the opportunity to study the experiences of pharmacy educators introducing TBL on a large scale in an integrated curricular environment and to see if this has any perceived effects on learner engagement in their studies. This study will investigate both the educator and student experiences of traditional methods of teaching and of their initial experiences of TBL. This will include their perceptions of the effects on student engagement and of any lessons learned. The primary focus of the study is predominantly researching the experiences of educators. Student data has been included where it adds to the discussion by providing additional confirmatory or contrasting viewpoints on key issues arising from the work. As I too have experienced a transition from teaching using traditional approaches to using TBL in my own teaching then I will integrate my own reflexivity and interpretation of the data into my writing style throughout the thesis.

1.10 My Previous Research

Prior to this research study I led a similar qualitative study exploring the experiences of students and faculty members at the Regis University School of Pharmacy in Denver, Colorado in the United States. This pharmacy school opened in 2009 offering a highly integrated PharmD programme, also delivered predominantly by TBL. Findings from this study have been published in *Currents in Pharmacy Teaching and Learning* (Tweddell, Clark and Nelson, 2016); the results from this study will be compared to my Bradford study where appropriate and relevant.

1.11 Research Questions

1. What are pharmacy educators' experiences of using more traditional methods of learning and teaching?
2. What are pharmacy educators' experiences of using team-based learning (TBL) as the predominant learning and teaching strategy in a pharmacy curriculum?
3. What effect does TBL have on learner engagement in a pharmacy programme?
4. What is the student experience of learning using TBL?
5. What are the implications for healthcare educators considering using TBL in their curricula?
6. How can research of team-based learning in a pharmacy curriculum best be conceptualised to make a contribution to the literature on student-centred and collaborative learning in Higher Education?

Chapter 2 – Literature Review

2.1 Introduction

In this chapter I will present a review of the literature on team-based learning (TBL). Most published research on TBL in health professions are quantitative studies rooted in the positivist paradigm. These studies tend to compare numerical data before and after using TBL, for example assessment results or module evaluation scores. These studies are troublesome to me as an interpretivist researcher because I am unconvinced of the validity of using scientific method to compare results from different cohorts of students who have different backgrounds and life experiences. There are fewer published papers that take a qualitative approach. In these papers the authors have either described their own experiences of implementing TBL (Andersen *et al.*, 2011; Middleton-Green and Ashelford, 2013; Remington *et al.*, 2015) or collected empirical data using qualitative methods (Sutherland, Bahramifarid and Jalali, 2013; Remington *et al.*, 2015; Morris, 2016). These papers are descriptive with the authors describing what TBL is, why it was chosen and their personal perception and experiences of using it. There is also some mixed methods research that attempts to do both (Zingone *et al.*, 2010; McMullen *et al.*, 2013). There is no published research on TBL where a researcher has gathered empirical qualitative data from staff or students about their experiences of implementing TBL across a pharmacy curriculum and analysed and interpreted data using the voice of the participant alongside the researcher in a reflexive way.

2.2 Search Strategy

My search strategy was three fold. Initially I sought out policy documents published by various healthcare statutory and regulatory bodies in the UK and US to determine the importance that the regulators place on learning and teaching strategies, on active learning, knowledge application and skills development in the accreditation process. I then sought out academic papers using educational databases such as ERIC and the British Education Index along with books on educational theory. I used search terms such as learner-

centred teaching, collaborative learning, flipped learning and team-based learning with a view to deconstructing the process of team-based learning (this commences in Chapter 1), explain the educational theory behind its design and link it to established and accepted educational theories such as constructivist learning theory. Finally I sought out published studies from academics in higher education that have used team-based learning in their practice. I used a number of databases primarily centred on searching for published studies in the field of healthcare education. I used databases that included Summon, PubMed, Medline, CINAHL and Web of Science.

2.3 Educating healthcare professionals

There has been a recent move towards using an 'outcomes standards' approach to educating healthcare professionals. In the past the focus was on covering the content listed on the indicative syllabus. However the development of new accreditation standards published by, for example, the General Medical Council - 'Tomorrow's doctors: outcomes and standards for undergraduate medical education' (General Medical Council, 2009) and the General Pharmaceutical Council - 'Future pharmacists standards for the initial education and training of pharmacists' (General Pharmaceutical Council, 2011) the focus has shifted from covering content to achieving standards that involve the application of knowledge, demonstrating competence in a range of skills, and working within a values-based ethical and professional framework. For example, the overarching requirement for medical graduates is:

'Medical students are tomorrow's doctors. In accordance with good medical practice, graduates will make the care of patients their first concern, applying their knowledge and skills in a competent and ethical manner and using their ability to provide leadership and to analyse complex and uncertain situations' (General Medical Council, 2009, p15)

In the US there is now a requirement by the Accreditation Council for Pharmacy Education (ACCP) that students participate in active learning in order to develop skills in problem solving and critical thinking (Accreditation Council for Pharmacy Education, 2006 p19).

‘The development of critical thinking and problem-solving skills through active learning¹ strategies and other high level pedagogical strategies should be supported throughout the curriculum.’

In the UK, neither the General Medical Council (GMC) nor the General Pharmaceutical Council (GPhC) are as prescriptive about how students should learn. The GMC asserts that, whilst it is for medical schools to design their own curriculum to meet the required standards, it states that ‘Both curriculum design and delivery must take into account modern education theory and current research’ (General Medical Council , 2009, p51.). The GPhC goes slightly further in stating that a curriculum ‘should include a variety of teaching and learning methods’ that ‘should result in learning based on experiences’ (General Pharmaceutical Council, 2011, p43).

There has been criticism of the outcomes-based education approach (OBE) in education with some arguing that to focus only on the ‘end product’ or ‘the curriculum as a abstract concept’ isn’t sufficient. Grundy argues that an OBE approach doesn’t take into consideration the experiences teachers and students have as a consequence of a curriculum and their personal influences on it (Grundy, 1987). Grundy argues that a curriculum is a social construction and isn’t found on the shelf, but in the actions of those engaged in education. Grundy goes on to argue that the effectiveness of a product-oriented curriculum is determined by exploring the difference between the product of the learning experience and the pre-determined outcomes, or in other words the difference between the curriculum ‘on paper’ and the curriculum ‘in action’. Where the curriculum designer is the teacher, the fit may be good; however, when the teacher has not been involved in the design of the curriculum there may be less alignment between delivery and outcomes. Grundy believes that the misalignment may be due to loss of ‘control’. For example, curriculum designers have a high level of control over the curriculum whereas teachers may not and they may feel disempowered and even deskilled. Students may also feel disempowered as they cannot influence their own learning outcomes (Grundy,

¹ Active learning is a style of teaching that requires the learner to formulate answers to questions based on acquired knowledge while continuing to search for new knowledge that may provide better, more complete answers. Active learning enhances a student’s ability to think in an independent and critical manner.

1987). Rees argues for an adoption of a model of co-operative control of the curriculum which gives the authority to the academics to set curriculum guidelines, empowers the teacher to determine specific lessons and methods, and students and patients to inform and validate the curriculum (Rees, 2004). Christensen *et al.* argue that an outcome based approach for control purposes is more important in medical related education than in other academic subjects because of the need for a certain level of competence necessary for those entering healthcare practice. However, they also argue that reducing the curricula to a set of outcomes or competencies alone risks a lowering of quality, often results in outcomes that are difficult to assess, and creates a false dichotomy between the process of education and its outcomes (Christensen, Karle and Nystrup, 2007). What this means is that Christensen *et al.* are arguing that a curriculum should be designed to ensure there is a clear connection between the intended learning outcome and the process of instruction, definition of content and learning situations, and the assessment process. This is a view also shared by Biggs, in his theory on constructive alignment (Biggs, 1996). Harden argues that OBE should be a unifying concept that should empower medical educators to become involved in what should be taught, how it should be taught, how it should be assessed, and how the entire process should be managed. OBE shouldn't be an attempt to impose ridged uniformity, a degree of diversity in educational process and curriculum design should still be preserved (Harden, 2007). Whether this is possible will depend on the outcomes, the processes to achieve them, and the alignment between them. In the Bradford curriculum, there were certain outcomes that we had to include for the purposes of accreditation; however, there are others that can be achieved by empowering educators to be creative in both the design and delivery of individual modules, units and classes.

Blouin, Joyner and Pollack (2008, p.2) call for a renaissance in pharmacy education, arguing that didactic approaches aren't effective because students are not held sufficiently accountable for their pre-class learning. They contend that because students do not read, study or learn the foundational facts sufficiently out-of-class, then too much class time is dedicated to content delivery rather than application. Whilst didactic approaches can be an efficient

method of knowledge transfer arguably they don't teach students to critically assess information to solve problems. Students may know a plethora of facts but the authors assert that pharmacy graduates are ill equipped with the skills to use these facts to solve 'practice-based problems'. In a follow up paper (Blouin *et al.*, 2009) the authors make three recommendations for reform in pharmacy education: rejecting the majority use of class time for factual transmission of information; challenging students to think critically, communicate effectively and develop skills in problem-solving; and design curricula based on sound, evidence-based educational principles, for example using seminal work such as '*How People Learn*' (Bransford and Ebrary, 2000) and '*Seven Principles of Good Practice*' (Chickering and Gamson, 1999)'.

Lectures have been used for content delivery in pharmacy education for many years; however, DiPiro argues that they are a passive form of teaching which are unlikely to lead to knowledge retention, don't account for different learning styles, deliver facts that are soon out-dated, and don't encourage the development of skills such as critical thinking and problem solving (Dipiro, 2009). Penson however, argues that that DiPiro's criticisms only apply to poorly-prepared lectures or badly-designed courses. Penson goes onto to argue that lectures can include activities, group work and other "enhancements" usually associated with smaller classes, and that lecturing is a very personal and individual activity, with many lecturers able to captivate their audience with the use of humour or animations (Penson, 2012). Penson believes that there is a role for the lecture inasmuch as it can provide a "grand view" or overall picture to set the context of a topic and that a good lecturer will break up their monologue with activities to reduce passivity.

Perhaps then we engage students in their learning by engaging *with* students in the classroom, by using strategies that promote interactions between learners and their teachers. This can be achieved in lectures and I've certainly done this; however, I would argue that it becomes more challenging as class sizes increase and the students become more anonymous. Marzano and Pickering suggest that the engaging teacher must address four questions: how the student feels, whether they are interested, whether the material is important, and whether the student can complete the task. Strategies for improving the

way a student feels might include the use of humour, effective 'chunking' of topics, use of personal anecdotes, and building positive relationships with students by identifying with them and their struggles (Marzano and Pickering, 2013). Methods to keep students interested include the use of games, debates, use of guest speakers, and posing questions to answer anonymously using technology (Oyler *et al.*, 2016). Another approach that is becoming popular is the 'flipped' model of learning.

2.4 Flipped Learning

Flipped learning is an approach in which students individually study course concepts out-of-class, often using technology. Students then move in-class to study in groups in an interactive learning environment. The teacher's role is to guide and facilitate learning as students apply key concepts and engage with the content in creative ways (Flipped Learning Network, 2014).

'Flipped learning' has become more prominent in recent years. Initially called the 'inverted classroom', it was first discussed in the literature as a method of utilising technology to meet different student learning styles, dedicating class time to content application rather than content coverage (Lage, Platt and Treglia, 2000). The idea is that flipped learning provides content through different media, this could be through reading a book or e-book, watching an online podcast or video clip, or completing online questions or exercises that generated immediate feedback. This was followed by in-class questions using audience response devices followed by collaborative discussion, lab demonstrations and active and collaborative problem solving. Lage, Platt and Treglia, (2000) used a questionnaire to survey student and staff reactions with positive results on student satisfaction and engagement with students generally preferring this form of learning. Further qualitative research might have established whether all students completed the preparation, what occurred during the group discussions and more detail on how flipping the classroom was perceived by staff and students.

A qualitative study of pharmacy students' experiences across multiple flipped courses in a single curriculum found that they preferred the flipped approach to traditional learning methods; however, the students found the workload greater,

the quality of pre-class learning materials mixed, repetition of content delivery during the in-class application phase, and that it was implemented inconsistently by different educators (Khanova *et al.*, 2015).

In a survey-based study comparing student attitudes towards the flipped approach before and after a pharmaceuticals module reported a significant preference for the flipped approach over the traditional lecture format (89.5% preferring this approach at the end of the module compared with 34.6% beforehand). However, the authors noted that course evaluation responses did not change significantly nor did the overall examination performance when compared to the previous non-flipped cohort (McLaughlin *et al.*, 2013). Student preference may be dependent on the subject being studied. Wong *et al.*, (2014) report that the flipped approach was preferred for learning therapeutics but not for learning pharmacology or basic sciences.

Rotellar and Cain (2016) reviewed published research on implementing flipped teaching in pharmacy, noting that research in this area is in its infancy. They suggest that while it may be of value to students and to educators, flipping isn't without its problems. The authors suggest that convincing students and colleagues unused to this approach requires time, effort and resources. The authors argue that the time to transition students, train educators, and develop appropriate resources should not be underestimated. Herreid and Schiller (2013) discuss two problems they encountered with the flipped approach. These were ensuring that students completed the pre-class preparative exercises and that the preparatory work was designed effectively to prepare them for the in-class activities.

Flipping has been criticised as a flawed pedagogy if educators simply use technology to provide content via an online lecture without thought as to how to engage students (Ash, 2012). Ash goes on to describe flipping as one approach within a wider framework of instructional methods to engage students, but argues that it won't necessarily help reluctant learners or turn poor teachers into good ones. Bristol (2014) describes flipping as building the foundations before students engage in classroom learning; however, students need to be guided through their study to ensure the foundations are strong. Bristol argues that the

classroom experience must develop higher-order thinking through application and analyses, and ensure learning experiences are authentic and replicate actual healthcare interactions. For flipping to be effective students must come prepared; however, motivating students to prepare for class is potentially problematic.

2.5 Constructivist Learning Theory

Advances in cognitive science, in particular cognitive psychology, have informed educational theory and practices. This has led to the development of constructivist learning theory, based on the principle that learners must actively process new knowledge and integrate it with their previous understanding of the subject in order to construct new meanings (Moon, 2004). What this means is that, from a constructivist perspective, knowledge cannot be passively given to learners; they must actively construct their own meaning by adding to and modifying their previous understandings, for example through dialogue, problem-solving, reflection and teacher/peer interactions (Stage *et al.*, 1998; Hrynchak and Batty, 2012). The term '*elaboration*' has been used to describe the practice of active processing of information through activities such as discussing, summarising, verbalising or application (van der Vleuten and Driessen, 2014). Elaboration is unlikely to take place through listening to a teacher talking about the content, but is more likely to occur when learners actively work with information.

Hrynchak and Batty (2012) propose that team-based learning is grounded in constructivist educational theory as learners compare their understanding with that of others, make new connections through discussion and application, and expose inconsistencies in their understandings. Kaufman (2003, pp. 214) summarises the four main elements of constructivist learning as:

'Firstly, the teacher is viewed not as a transmitter of knowledge but as a guide who facilitates learning. Secondly, as learning is based on prior knowledge, teachers should provide learning experiences that expose inconsistencies between students' current understandings and their new experiences. Thirdly, teachers should engage students in their learning in an active way, using relevant problems and group interaction.

Fourthly, if new knowledge is to be actively acquired, sufficient time must be provided for in-depth examination of new experiences.'

Oyler argues that to foster long-term engagement it is our role as educators to connect the students to the content by not only ensuring application, applicability and "meaning making" but also providing students with choice of what they study (Oyler *et al.*, 2016).

Taking a purely constructivist approach to learning has significant implications for the role of the teacher who is no longer the knowledge provider or deliverer of content but one who can design and facilitate learning. This may be seen by some as a loss of control in the classroom and arguably a diminution in their status as a teacher and subject expert. This is because it requires the teacher to share the control of learning with their students. Effectively, taking a pure constructivist approach requires teachers to create learning situations whereby students actively process content and use it to solve problems, and in doing so develop their own learning skills and learner self-awareness. The role of the teacher is that of a learning architect, designing tasks and activities for students to actively carry out. In the classroom the teacher's role is to facilitate learning, which requires different skills from those of a traditional 'lecturer.' Empirical observational studies have shown that traditionally HE teachers dominate in the classroom. Nunn (1996) found that only 5.86% of class time involved student participation. The success of learner-centred teaching depends, in part, on the willingness and ability of the teacher to step aside and let students lead their own learning and students being prepared and willing to do so (Weimer, 2002).

I'm not arguing for a pure constructivist approach but more of a blended approach that includes some degree of active learning where students process their subject content and use it to solve problems that they would encounter in the future. I would argue that in pharmacy education there needs to be a balance between what society needs of a future pharmacist and the need for institutional, school, individual educator, and student defined elements and ownership. A university degree should be a broad-based education rather than simply training for the workplace. Workplace training comes in the workplace. Academics should have the freedom in the classroom to discuss their

disciplinary subject. The problem in this case is whether this includes using teaching methods of their choice too. Woods *et al.*, (2016) argue that there is a potential conflict between professional degree programmes such as pharmacy and freedom of individual educators. These conflicts often stem from the changing requirements of the professional body's accreditation procedures where skills, competencies and values are increasingly part of the degree programme outcomes. Another requirement is that programmes are designed and operationalized by consensus and that once established individual educators shouldn't deviate from agreed pedagogical methods and educational content (Woods *et al.*, 2016). Educators then need to be able to influence the design and evaluation of the curriculum and how it is delivered. If this leads to a fundamental change in content, the way it is used and the programme delivered then institutions have a duty to ensure their educators are developed and confident in the new approach. Academic freedom has been summarised as the freedom for the academic 'to do his or her job' and when invoked appropriately it can optimise learning for educator and student alike; however, the curriculum is the collective responsibility of the educators in the faculty to reach consensus on content and pedagogical approaches to delivery (Woods *et al.*, 2016). In doing so we have a responsibility to use educational research and evidence to inform these decisions and when making pedagogical changes to carry out pedagogical research (van der Vleuten and Driessen, 2014).

Team-based learning requires teachers to design learning activities that challenge students and encourage them to actively process content, discuss discrepancies and inconsistencies in their understanding with peers, and actively involve them in coming to a consensual decision on how to solve authentic and challenging problems. Kolmos *et al.*, (2013) explain that a good collaborative learning problem engages students and orientates to the workplace; for example, they could originate from problems from those they are likely to encounter in pharmacy practice so students see the relevance and importance, and are likely to want to solve. Kolmos *et al.* also suggest that such problems are open-ended and often have multiple correct outcomes to create discussion and debate. They should be complex scenarios that should require further research or gathering of further information through consultation with

experts. Kolmos *et al.* go on to suggest that the problems should be written to require team effort and discussion and not be answered by one individual. Drawing on constructivist learning theory the problems should also build on previous knowledge and experiences and add new information to the student's knowledge base. Finally, they should be consistent with desired learning outcomes and curriculum objectives, and promote the development of higher-order cognitive skills. Writing application exercises such as these can be difficult for teachers. In team-based learning arguably the hardest task for teachers is the design of application exercises that challenge students, create debate, and require students to apply their knowledge in the pursuit of making a group decision to solve an authentic problem (Parmelee, 2010).

Constructivist theory also requires reflection so learners can appraise their learning and modify as necessary. In team-based learning this should occur in the team discussion that takes place during the team readiness assurance test (Hrynchak and Batty, 2012).

2.6 Why use TBL?

By using TBL the pharmacy team felt that the readiness assurance process (RAP), as defined in chapter 1, could motivate students to engage with content at a fundamental level before class, and come to subsequent workshops prepared to apply this knowledge to solve problems. Employers on the stakeholder steering group set up to inform the curriculum also stated their need for pharmacy graduates to develop key capabilities, one of which was collaborative problem-solving and decision making. Educationalists on the programme development team were advising us to maximise active and collaborative learning opportunities and from the literature TBL seemed to be a pedagogical approach that helped students learn how to use knowledge rather than just provide it. Finally, the pharmacy regulator had recently changed the accreditation standards requiring the programme to be '*structured to provide an integrated experience of relevant science and pharmacy practice*' (General Pharmaceutical Council, 2011, pp. 19). Integration is a method of organising the curriculum to interrelate or unify topics usually learned in isolation (Harden, Sowden and Dunn, 1984). By designing TBL application exercises that

integrated science and practice, students could adopt an holistic approach to managing a patient case (Malik and Malik, 2011; Husband, Todd and Fulton, 2014). Other pharmacy educators had also described positive outcomes from using TBL in a highly-integrated curriculum (Nelson *et al.*, 2013).

2.7 Literature Review of staff experiences using TBL in healthcare education in the US and UK

2.7.1 Qualitative Studies of TBL in the US

There are relatively few empirical qualitative research studies that explore the in-depth experiences of TBL as perceived by staff and students. There are some studies where individual practitioners describe their personal experiences and reflections as they use TBL for the first time, and some predominantly quantitative studies that include an element of qualitative inquiry, usually through the use of open-ended questions on a survey instrument. Whilst these may provide indicators, they are only a snapshot of opinion and cannot be followed up with supplemental probing questions that explore why participants have responded in such a manner in the way that interviews and focus groups can. The majority of literature on the use of TBL in healthcare education comes from US institutions, probably because TBL was developed in the US and only more recently started to be adopted elsewhere.

Nelson *et al.*, (2013) describe the development and implementation of a PharmD programme delivered predominately by team-based learning. TBL was chosen as a way to promote collaborative learning and to deliver the programme learning outcomes. The authors report positive feedback from staff and student preference for TBL compared with their experiences of other teaching methods; however, academic staff did find that TBL required more preparation time than previously used methods. This research provides a descriptive rationale for choosing TBL and mostly positive feedback; however, it fails to establish why change was necessary and the experiences of staff transitioning to TBL. In addition, the voice of students and staff is absent; the research data doesn't go into sufficient depth to explain how those implementing and experiencing TBL perceive it.

Ofstad and Brunner (2013), in a review of literature on the use of team-based learning in healthcare education, suggest that team-based learning may be appropriate for educators seeking to improve critical thinking, problem-solving skills, and knowledge retention in the curriculum. They believe that TBL may help develop the communication and team-working skills necessary to become a competent healthcare practitioner. Other positives cited include peer learning, improved attendance and learner accountability. On the negative side, the authors also identified the need for additional staff time when designing TBL learning resources and the existence of a number of preconceptions due to previous poor experiences with traditional forms of group work. Ofstad and Brunner also reported that some teachers struggled to adjust to change in their role in the classroom and some students preferred to be passive in the lecture theatre and not have to think or to interact with others. The focus of this paper is a systematic review of the positives and negatives of educators using team-based learning in healthcare programmes in the US but fails to capture the prior experiences of these educators, why they choose team-based learning, and their experiences of change.

Andersen *et al.* (2011) discuss their experiences of implementing TBL in a nursing curriculum and describe the importance of collegial support. While the authors reported that they felt the implementation was successful overall, they encountered a number of problems. These include the anxiety of using a new learning and teaching strategy, convincing students that a learner-centred approach was more beneficial to their learning, and the considerable amount of time, effort and planning required in redesigning their programmes using a TBL format. The authors do however highlight significant benefits such as improved student engagement with preparatory work, the availability of real-time data about students' knowledge levels, enhanced opportunities for students to actively work on solving authentic and complex nursing problems, and the opportunity to develop team-working skills. Unanticipated benefits included staff becoming more selective and critical in their choice of preparatory assignments. This paper provides a useful insight into the experiences of new TBL practitioners; however, it could have been enhanced by designing the study to

collect research data from different staff and students and the use of quotations to bring in their views and opinions.

In a study of 100 pharmacy academics representing 43 US pharmacy schools using TBL, Allen *et al.* (2013) report that their faculty members perceive that TBL improved students engagement in their learning. The authors report similar benefits to Andersen *et al.*, (2011), namely enhanced student preparation for class, enhanced engagement in the classroom compared with traditional lectures, and that it supports the achievement of educational learning outcomes. The authors also describe initial problems when implementing TBL. These include some initial resistance from staff and students, logistical problems such as access to appropriate classroom space and configuration, and increased staff workload; however, they found that these could be minimised when there is management support, staff development, and a clear communication strategy to students. This is a survey-based study, although the survey instrument had a qualitative component to the questionnaire. This approach lacks depth by preventing probing follow-up questions as to why the respondents have responded as they have. The authors do, however, raise some important findings that add to the literature including enabling factors such as ensuring support from managers, that staff and students are supportive of the change, effective staff development, and that there is support in managing initial additional workload. These were recognised as barriers when not addressed in advanced of implementation.

In a study of the initial use of TBL in ten medical schools in the US, Searle *et al.* describe positive student and faculty responses, with all respondents planning to expand its use further. The authors report that the most controversial aspect of TBL is the peer evaluation process where students allocate scores to each other based on their engagement with and commitment to their teams (Searle *et al.*, 2003). The authors carried out a follow-up study two years later using semi-structured telephone interviews analysed using the constant comparative method (Thompson *et al.*, 2007). In line with other studies reported above, staff reported improved student attendance, engagement during class discussion, and development of critical-thinking skills. Student opinions on TBL helped influence staff decisions whether to continue to use it. Participants believed that

students were more positive about TBL the earlier and more often they were exposed to it, and that they should ideally use it across multiple modules. Students were however resistant to evaluating their peers and in particular to giving differential marks to team members as advocated in one of the TBL peer evaluation models. This study highlighted the need for on-going staff training with exposure to repeated sessions deemed essential to gain the necessary skills and experience. The authors also highlighted the need for convincing a critical mass of staff to support trying TBL; without this the change was less likely to succeed. Finally the authors report the importance of management support and coordinating multiple TBL activities at the curricular level to manage student workload and expectations. This study is one of only a few that uses qualitative research methodologies and is more congruent with my own approach. There are nevertheless limitations to the study. Telephone interviews rely entirely on verbal communication, which can affect the interpretive validity of the research and, in turn, compromise the validity and understanding of the participant's views by the researcher. It can be difficult to build rapport over the telephone and the interviewer cannot use visual aids or explore non-verbal communication as is possible during face-to-face interviews (Miller and Salkind, 2003). Multiple interviewers may also phrase questions or interpret answers differently. Another problem I have with this paper is the lack of representation of interviewees at the ten institutions; only one person was interviewed and these were the TBL champions, some of whom acted as interviewers elsewhere. The results may not therefore be representative of the other educators in the institution who are using TBL. If the researchers had carried out interviews with other educators in the faculty and presented their views and opinions through quotations in the research paper, then this paper would be more credible.

A further qualitative study identified both positive and negative reactions relating to the implementation of TBL in a US medical school. On the positive side, the educators found students more engaged in their learning and believed TBL had potential in the future. On the negative side, some educators and students felt that there were underprepared for TBL, there were problems with dual language and local interpretation, there was some tutor role confusion, and incidents of

teacher-targeted bullying. In this study Sutherland, Bahramifarid and Jalali, (2013) used focus groups, observations and documentary analysis to identify staff reactions to the implementation of modified TBL in undergraduate anatomy teaching in a medical school. Four themes emerged from the constant comparison method. The authors report additional unforeseen problems that required local adaptation due to a dual language stream in French and English, and insufficient time for students to work together to develop as functioning teams. Staff felt underprepared and that they required more development prior to implementation, and that students had not been adequately informed of the new TBL approach. Limited staff development led to tutor role confusion because staff had not adequately been prepared to facilitate a learner-centred classroom. However, staff noted the benefits of developing more autonomous learners and reported increased knowledge retention. Staff noted that students who prepared for class in advance were more engaged and benefited from more functional groups. Conversely those who didn't prepare were more likely to be part of a dysfunctional team. As noted elsewhere students disliked the peer evaluation process and manipulated their team figures to ensure all students received equal marks. Finally, the authors report a phenomenon unreported elsewhere, that of 'teacher-targeted bullying'. Here staff that stuck to the TBL principles by requiring students to prepare in advance were penalised by some students with poor tutor evaluation scores. I would argue that this isn't necessarily bullying, but is evidence that some students didn't want to learn using TBL or its purpose and process hadn't been explained properly to the educators and students. This could also be a result of staff misunderstanding their role and students experiencing a lack of consistency from different members of staff, which was also identified in the study.

Large-scale transition to TBL may create additional barriers that are not present in smaller-scale adoption (Remington *et al.*, 2015). In this study the authors describe how they experienced additional problems that they attributed to using TBL across multiple modules in a pharmacy programme. Remington *et al.* (*ibid*) suggest that implementing large-scale TBL creates a substantial burden on staff resource because of the time required to participate in staff training and develop new teaching resources. They also identified the need for management support

to fund and facilitate a large-scale change management project. Remington *et al.* (ibid) argue that when multiple educators are delivering multiple modules using TBL then there is a need for a robust quality assurance process to enable consistency of approach. In line with other studies reported above, the authors also describe the importance of transitioning students to TBL. They advocate orientation activities, on-going engagement with students to address their concerns, and taking iterative measures to meet these all help to enhance receptivity and overcome transitional difficulties. The authors present their findings as a reflective opinion paper based on two focus groups with staff. Unfortunately the voice of the participants is absent as the paper doesn't include participant quotations as empirical data; however, it does capture the informed opinions of the authors about the difficulties of implementing TBL across multiple modules.

Ofstad and Brunner (2013) conducted a review of the literature on TBL in healthcare education using OVID and PubMed. Their summary concludes that academic staff using TBL reported an increase in student motivation to attend classes and once they're there students participate and engage actively in collaborative learning. They also report that student understanding and knowledge retention increase compared with both passive lectures and small group learning. The authors also explored the problems that needed to be overcome when implementing TBL. These included preparing students for a new way of learning, especially those used to more traditional approaches who may find TBL hard to adjust to. Some students have had poor experiences of group work and may be reluctant to work with others again. Ofstad and Brunner go on to report that educators may also find the transition from delivering content to facilitating discussion problematic, with some reporting feeling a loss of purpose when not delivering content to students from the front of the classroom or lecture theatre. As reported in most other studies, authors also identified the need for more resources to reflect the additional time and effort needed to develop new course material in TBL format.

My own previous qualitative research study in a pharmacy school in the US reports that teachers perceived TBL to enhance student engagement and peer learning, develop transferable skills, and increased staff enjoyment of teaching;

however, TBL requires a new skill set and an upfront investment in time to develop both staff and teaching resources (Tweddell, Clark and Nelson, 2016).

2.7.2 Quantitative studies from the US

There are numerous TBL studies published in pharmacy and other medical-related fields that involve some form of quantitative analysis. Examples of these are given below. They include the analysis of student satisfaction surveys and attempts to measure learning. The latter has often been carried out by comparing assessment results or other methods of measuring knowledge and understanding before and after students experience TBL.

These studies have reported improved student preparation for class (Allen *et al.*, 2013; Nelson *et al.*, 2013b; Andersen *et al.*, 2011; Grady, 2011) and engagement in active learning during class (Persky, 2012; Pogge, 2013). Some researchers compared assessment results before and after using TBL with some reporting improvements in examination results (Zingone *et al.*, 2010b; Persky, 2012a; Redwanski, 2012b) with other reported no significant differences (Johnson *et al.*, 2014). Some students struggled with the transition to learning using TBL (Grady, 2011; Pogge, 2013). Some studies suggests that students preferred learning using TBL citing improved student satisfaction scores (Andersen *et al.*, 2011; Zgheib, Simaan and Sabra, 2011; Redwanski, 2012a; Pogge, 2013; Johnson *et al.*, 2014; Wright, Frame and Hartzler, 2014) or positive results through the use of a specifically designed TBL student assessment instrument (Mennenga, 2012; Nation, Tweddell and Rutter, 2016). However, other studies reported that student satisfaction remained unchanged (Zingone *et al.*, 2010; Elmore, Skelley and Woolley, 2014). The literature also suggests that students improved their verbal communication and team working skills (Grady, 2011; Elmore, Skelley and Woolley, 2014). Most studies identified that TBL was more work for staff during the planning and implementation phase (Andersen *et al.*, 2011; Redwanski, 2012; Allen *et al.*, 2013; Johnson *et al.*, 2014; Wright, Frame and Hartzler, 2014) although one reported less staff time (Zingone *et al.*, 2010). A systematic review published in 2013 found that of fourteen studies, ten reported increases in knowledge scores with four reporting no significant difference; however, only one of the studies reported significant

increases in student satisfaction, leading the authors to conclude that this may reflect the increased demands that TBL places on learners.

These quantitative studies provide a snapshot of opinion relating to the positive and negative experiences of students and teachers using TBL for the first time; however, using quantitative methods can be superficial and should ideally be followed of combined with smaller scale qualitative studies that probes deeper into why participants in the study feel as they do, this would sacrifice some breadth for depth.

2.7.3 TBL Studies in the UK

TBL is relatively nascent in the UK; however, there have been three papers published which describe staff experiences of implementing it in medicine and nursing. McMullen *et al.* (2014) describe a positive effect on students actively engaging in learning in the classroom through higher levels of participation, interactivity and animated discussion amongst students. Staff reportedly found the TBL sessions enjoyable and educationally valuable and expressed the desire to expand TBL to other modules. However, the authors underestimated the time involved in rewriting material and training staff to deliver TBL. They also reported that some students struggled to complete the pre-class material possibly due to excessive content, a lack of dedicated time for these working postgraduate doctors to complete the preparatory work, or insufficient incentive to do so. Finally, the peer evaluation response rates were poor, possibly because it was carried out online and was neither incentivised nor compulsory. McMullen *et al.* (2013) also conducted a mixed-method study evaluating the effect of using TBL in psychiatry students. Results from a validated Classroom Engagement Tool showed a significant improvement in student engagement in their learning in the classroom; however, the results from a similar tool used to measure improvements in attitudes towards teamwork showed no significant differences between pre-study and post-study of the TBL module. Semi-structured interviews were also carried out with a volunteer student from each team. Thematic analysis identified seven themes. Students reported the benefits from learning in teams, with team discussions helping to consolidate new knowledge. The students reported that they enjoyed learning in this way

and that it developed cohesion within the teams that was enhanced by introducing a degree of competitiveness between teams. Some learners reported that TBL motivated them to undertake the pre-reading, whilst for others the preparation was excessive and they struggled to find the time to complete it. Students reported that the focus on in-class application rather than knowledge acquisition was beneficial to them. There was also a less formal relationship with teachers which was seen as a positive; however, participants felt that it takes longer to cover fewer concepts, was less effective at conveying advanced material, and wasn't as effective for 'experts' to present their latest research.

In nursing, Middleton-Green and Ashelford (2013) describe their experiences of implementing TBL. They report excellent attendance, enthusiastic discussion and debate amongst students, and enhanced motivation to prepare for class. However, they also reported the need for additional staff time in preparing pre-reading and application exercises, ensuring the level of RAT questions was appropriate, and acquiring the use of suitable classrooms. They report that more enjoyable, interactive and participatory teaching offset these problems without the need for additional labour-intensive small group tutorials.

In a mixed methods study, Morris quantifies the workload involved in setting up TBL in a module as 61.5 days of academic time reducing to approximately 12.5 days of preparation time thereafter (Morris, 2016). In the same study an independent researcher carried out qualitative interviews with teachers and found that while teachers were positive about trying TBL, there was also a degree of apprehension because the approach was new to them. Students completed the preparatory work and were engaged in active learning during classes. Teachers reported a degree of enthusiasm and engagement amongst the students not previously seen using other teaching methods. The teaching team were mostly positive about the experience with students having done their pre-reading and being willing to engage in teamwork. However, there were a few initial difficulties with teachers adapting to their role as content expert and facilitator and learning how to shift from being the deliverer of content to eliciting information from the students.

'It's challenging to keep quiet and not answer the questions. You have to be thinking how to turn the questions around. It's a learning curve.'
(Morris, 2016, p149)

This study reports that despite the initial additional work involved in learning about TBL and preparing the resources, all the teaching staff recommended that TBL be used elsewhere on the nursing programme.

2.7.4 TBL Studies in Australia

A TBL study in nursing looked at student perceptions of TBL and reported four themes, these were motivation to participate, student engagement, critical thinking, and learning effectiveness. The authors report that students were motivated to prepare for classes through an obligation to contribute usefully to the team effort and that the social learning aspect contributed to their enjoyment of the learning process (Currey *et al.*, 2015). The authors argue that TBL increases student engagement in the classroom, achievement of learning outcomes, and develops some of the professional attributes needed in the workplace such as the ability to function in a multi-skilled team. The study is a small sample of 32 students and could have been enhanced by using semi-structured interviews rather than extended response questionnaires. The study failed to explore the students' perceptions of the disadvantages of TBL.

2.8 Summary of key themes from the literature

The structure and design of team-based learning is aligned with constructivist learning theory. TBL also takes a 'design-backwards' approach and advocates aligning learning outcomes/objectives with assessment and delivery. TBL therefore follows the model of constructive alignment as described by Biggs (1996). Professional and regulatory bodies are moving to an outcome-based model with some requiring that programmes are designed so that students experience active learning throughout the programme, and that they develop problem-solving and critical-thinking skills as part of the programme.

Educators describe similar drivers for adopting TBL. These include dissatisfaction with traditional teaching methods, a need to meet new accreditation requirements, and a desire to motivate students in their learning in

and out-of-class. By using TBL educators hoped to encourage students to develop higher-level skills such as critical thinking, to take deeper approaches to their learning, and further develop skills for the workplace.

Positive experiences cited by educators using TBL in their programme included enhanced student motivation to complete the preparatory work and to actively engage with their peers to solve tasks in the classroom. They also experienced improved student attendance, an enhanced depth of understanding, and benefits relating to learning how to work collaboratively in a team. These benefits have largely been reported in the original TBL literature and were anticipated (Michaelsen, Knight and Fink, 2002). Unanticipated benefits included staff becoming more selective and more critical in their choice of preparatory assignments, and focusing on helping students to learn key concepts rather than trying to overload the curriculum.

The structure of TBL differs significantly from traditional methods so it is likely that staff and students will require additional time and resources to transition to TBL, and a case should be made and approved before commencement. TBL experts acknowledge that considerable time and resources must be allocated for the successful implementation of TBL (Parmelee, 2010). Students also need to be prepared for learning using TBL with clear explanations as to how TBL works and why they are learning in this way.

2.9 Gaps in the Literature

Most of the existing studies on TBL are quantitative, probably due to the traditionally positivistic nature of research carried out in the medical sciences. However, there is no in-depth study that gathers empirical data from multiple perspectives using appropriate qualitative data collection and analysis. The literature fails to explore in detail the prior personal experiences of TBL practitioners when teaching using traditional methods and their own perceptions of why and if they believed the change was necessary. There is little in the literature about the positive and negative experiences of pharmacy educators using TBL across an entire undergraduate pharmacy programme, and whether these educators feel that students are better prepared for classes and are more actively engaging in learning with their peers in the classroom or not. Also

missing from the literature is whether educators believe the benefits of using TBL outweigh any problems they may encounter. Finally, there are very few qualitative studies in the literature that consider the experiences of students learning using TBL.

2.10 Contribution to the literature

This study will contribute to the pharmacy education literature by researching the experiences of pharmacy educators using TBL across an integrated curriculum. It will also contribute to the literature on active and collaborative learning by investigating the staff perceptions that TBL has on student preparation, attendance, engagement, participation and learning. The educators in this school have also been working in trans-disciplinary teams themselves to prepare and deliver the teaching; this aspect of TBL has not been published in the literature and so will be explored. A further contribution will come from investigating how these teams use content to design and deliver their TBL units and whether the staff team approach has an effect on this.

Chapter 3 – Conceptual Framework. Theory, concepts and processes related to the research design

3.1 Introduction

Morse and Richards (2002) describe the principle of *methodological congruence*, where the design of the research project is aligned with the researcher's philosophical beliefs, the research questions, the methodological research approach used, and the data collection and analysis methods chosen.

3.2 Positioning my research

As a pharmacy graduate, academic and teacher, my experiences of research prior to my EdD were dominated by scientific, quantitative approaches situated in the positivist paradigm. My journey through this programme has changed my thinking about educational research. It has made me reflect upon my own ontological and epistemological interpretation of reality and knowledge. I confess to struggling with the notion of multiple realities based upon how we individually interpret knowledge and construct our own understandings of truth. However, as I read more and began to think about how to research educational experiences from the perspective of the learner and the teacher, it became clear to me that the use of scientific methods that placed me as the researcher as an external, objective seeker of one reality just wouldn't be appropriate in my research.

A positivistic (and postpositivistic) approach to research requires empirical observation, measurement and theory verification (Creswell, 2009). Positivistic approaches require a detached, objective researcher that observes the world without involvement or influence (Sparkes, 2012). A positivistic approach didn't make sense to my research; how could I measure experiences, perceptions and beliefs and quantify them? I felt that I couldn't deductively generate a hypothesis and test it by minimising all external variables as I might have in a scientific randomised controlled trial of the effectiveness of a new drug versus a placebo. How could I remain completely objective when I have been involved in using TBL myself since 2012? Cohen, Manion and Morrison (2007) argue that it is difficult to use positivistic methods to study human behaviour because the

order and regularity of the natural world contrasts strikingly with the immense complexity of human nature.

3.2.1 Interpretivism

Interpretivist researchers take the view that human interactions are complex and cannot be measured using methods such as those used in the study of the natural world. The interpretivist researcher believes that social interactions can be interpreted in different ways, and that the researcher influences the outcome of the research. Interpretivist researchers believe that different individuals are likely to interpret data differently and influence the outcome of human interaction in different ways.

Bryman (2012) compares positivism and interpretivism by arguing that the former places an emphasis on the *explanation* of human behaviour whilst the latter places the emphasis on the *understanding* of human behaviour. The difference is that in seeking to explain human action, interpretivism seeks the empathic understanding of human action rather than the positivistic explanation of independent external forces.

3.2.2 Explaining my position

In my research I sought to explore and understand the experiences of educators and students using more traditional methods of teaching and their transition to using team-based learning. I wanted to capture the feelings of educators as they experience planning for and delivering a new pedagogical approach and how they cope with the change from a traditional teacher-centred approach to a learner-centred one. I also wanted to explore educators' perceptions of using TBL on learner engagement. Finally I wanted to hear from the students and understand their perceptions of learning using TBL. Ontologically, I believe that there are multiple realities that are constructed through our interactions with others and epistemologically that reality can be co-constructed between me as the researcher, and other human subjects as the researched, and shaped by individual experiences (Creswell, 2013). This

philosophical position sits within the social constructivist or interpretivist framework.

Bryman (2012) discusses the additional influence of values on social research and argues that social research cannot be value-free; rather that researchers should be reflexive and open about the influence of their values on the research.

3.3 Methodological approaches used in designing the research strategy

Approaches to research design are often categorised as qualitative, quantitative or mixed methods. These approaches are not, however, mutually exclusive; Newman and Benz, (1998) suggest that qualitative and quantitative should not be viewed as dichotomies but either end of a continuum, with different forms of research tending to be closer to one end or the other. One distinction is that 'measurement' is a key feature of quantitative research that is not used in qualitative research (Bryman, 2012). Another is that words tend to be predominant in qualitative research and numbers in quantitative. Closed-ended questions are more common in quantitative hypotheses and open-ended questions in qualitative interviews (Creswell, 2009).

3.3.1 Quantitative research

Quantitative research usually involves taking a deductive approach that starts with a theory or hypothesis with the research designed to test that theory (Bryman, 2012). Quantitative research is favoured by positivistic researchers and follows the model of the natural sciences; 'objectively' testing theories by assessing the relationships between variables, attempting to reduce bias by controlling variables and designing research in an attempt to generalise from research outcomes (Creswell, 2009).

3.3.2 Qualitative research

Qualitative approaches tend to favour an inductive approach where theories are generated from data rather than prior to their collection, and so the generation of hypotheses is not typically associated with qualitative studies (Bryman,

2012). Qualitative methodology is typically used to seek meaning and explanation from a social issue and explore this in much greater detail than would be typical in quantitative research (Creswell, 2009). Qualitative researchers tend to work with relatively small numbers of subjects, sacrificing scope for detail (Silverman, 2013). The qualitative researcher will seek to explain how subjects interpret their experiences and, because they are involved in the research themselves, will frame this through their own reflexive interpretation. Denzin and Lincoln (2011, pp. 3) describe qualitative research as locating the observer *in* the world, as opposed to an external observer *of* the world. They go on to argue that:

‘qualitative researchers study things in their natural setting, attempting to make sense of, or interpret phenomena in terms of the meaning people bring to them.’

The researcher is fully involved in the research and collects the data themselves using instruments they have designed. (Creswell, 2013)

In this research I will interpret the experiences of teachers and students transitioning to a pharmacy curricula delivered predominantly by team-based learning and will bring in my own experiences in a reflexive way.

3.3.3 Role of the researcher

My role as a qualitative researcher in this study differs to the role in previous quantitative research studies. My undergraduate education was, and my current academic position is, situated with a faculty of life sciences. Most research with which I have been involved has therefore been positivist in nature. My role and that of the students I have supervised was that of an ‘objective’ observer, attempting to control the variables and to impart minimal influence on the research process. Of course, I understand this approach is suitable if research is, for example, designed to evaluate the effect of a new drug in a randomized controlled trial. My discipline is pharmacy and essentially positivist, objective measuring is the research with which I was familiar and, if I’m honest, the only type I believe really took place. Naively, I thought these methods applied equally to educational and other social research and I was unaware of

alternative approaches. I'm sure this is typical in science faculties. Whilst I was studying my EdD taught modules I borrowed a book on qualitative research methods from the University library. On the way back to my office, I was 'caught' by a senior researcher in my faculty who asked me why I was reading "*such rubbish?*"

As I studied the taught modules, my thinking changed considerably. I was also involved in the implementation of team-based learning in my department. I have therefore developed my own views about TBL as a learning and teaching strategy, so felt that I couldn't remain completely impartial. I learned that, as an interpretivist researcher, I didn't have to be; indeed I shouldn't be. Reflexivity is an important part of interpretivist research and I should embrace that rather than control for it inasmuch as reflexivity recognises that researchers are inextricably part of the world they are researching, and are themselves the research instrument (Hammersley and Atkinson, 2007).

Interpretivist researchers, because of their relativist ontological position, take the view that the relationship between the researched and the researcher is intertwined, the outcomes of the research being influenced by this relationship. Denzin and Lincoln, (2011, p8) explain that:

'Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. They seek answers to questions that stress how social experience is created and given meaning.'

The interpretivist researcher often then adopts a reflexive approach, setting out how they might have influenced the study and how the outcome of their research might have changed their own beliefs, thinking and personal position. This introspective approach is, for some qualitative researchers, as important as the writing about the research subjects themselves. Taking a reflexive approach to writing may also help the reader interpret the research. As Payne and Payne, (2004, p191) state

‘Researchers being self-aware of their own beliefs, values and attitudes, and their personal effects on the setting they have studied, and self-critical about their research methods and how they have been applied, so that the evaluation and understanding of their research findings, both by themselves and their audience, may be facilitated and understood.’

3.3.4 Use of Language

Another difference I have encountered in interpretivist research is the use of language. As a science researcher I had learned to write in the third person; using an impersonal, detached approach to convey a neutral and unbiased representation of the data is normal practice in positivistic scientific writing. In scientific writing the author must be ‘physically, psychologically and ideologically absent from the text’ in order to ‘evoke an authoritative voice’ (Foley, 1998, p110). In contrast, writing in the first person is common practice for an interpretivist researcher, partly to demonstrate to their audience that they are fully involved in and are themselves an important part of their research, and partly to be ‘out and proud’ with the first person to avoid ‘feigned objectivity’ (Cousin, 2009 p10). I am comfortable that my interpretation of the empirical data is likely to differ from that of another researcher. I have been involved in introducing and using team-based learning myself and I feel it would be wrong not to write about my own experiences and interpret that of others in the context of my own. I will of course attempt to represent the data and the opinions of my research participants in a mindful and ethical manner, staying true to the data and re-presenting it within my own interpretivist framework.

3.4 Validity

Hammersley, (1987, p69) argues that: ‘An account is valid or true if it represents accurately those features of the phenomena that it is intended to describe, explain or theorise’. Quantitative data validity is based on positivist principles and enhanced by careful sampling, controlling of variables, appropriate instrumentation and statistical treatment of the data. Replicability, controllability and predictability are important factors alongside objectivity and neutrality. Samples are often randomised to prevent bias and maintain validity (Cohen *et al.*, 2007).

Qualitative researchers argue that validity in qualitative research is based on different principles. As qualitative research is about meanings, experiences and subjective interpretation of observations and interactions then to be valid the research need not be replicable, controllable and predicable but should be valid, truthful, honest, and representative of the sample. Lincoln and Guba (1985) argue that validity, by its very definition, is based on positivist assumptions and should be replaced in qualitative research by the concepts of 'credibility' and 'authenticity'. Maxwell (1992) argues that 'understanding' is more important in qualitative research than validity. Winter (2000) adds other terms used by researchers when explaining validity in qualitative research, including 'trustworthiness', 'worthy', 'relevant', 'plausible', 'confirmable', 'credible', and 'representative'.

In my analysis and discussion of the data I have tried to differentiate between my own reflexive views and when I represented the views of others.

3.5 Researching within an ethical Framework

Researchers have a number of ethical responsibilities and must carry out their research within an appropriate ethical framework. The British Education Research Association (BERA) publishes ethical guidelines for education research (BERA, 2011), and considers that educational researchers have an ethical responsibility of respect for the person, knowledge, democratic values, the quality of educational research, and academic freedom. BERA states that researchers must obtain voluntary informed consent from those who participate in the research. To achieve this, I wrote a '**Study Information Sheet**' (see appendix 1), which was provided to prospective participants in advance with an invitation to follow up with questions if necessary. I also constructed a '**Consent Form**', which explained how I intended to gather, store and use the data; that their responses would remain confidential and that any quotations I used would be anonymised (see appendix 2). Participants were advised that they were free to withdraw themselves or their data from the study at any time.

Educational researchers should also remain true to their data and be trustworthy in presenting their data in a way that is consistent with their theoretical framework and methodological approaches (Cousin, 2009). I have

attempted to represent and interpret the participants' experiences with TBL, and explain it through the lens of my own experiences in a reflexive way.

3.6 Qualitative research approach used

It became clear during the EdD taught modules that my position as an educational researcher would be that of an interpretivist pursuing a qualitative methodology. However, when presented with a range of different approaches to qualitative inquiry, it was less clear which I should pursue.

Creswell (2013) presents five different qualitative approaches to enquiry and research design. These are narrative, phenomenology, grounded theory, ethnography, and case study.

Narrative researchers collect information from individuals about their lived experiences and recreate or co-create a story about participants individual experiences (Riessman, 2008). Narrative research tends to focus on the lives or experiences of individuals or very small groups and involves the researcher spending considerable time with participants. I wanted a wider scope for my research and to create the opportunity to present multiple realities from all the educators transitioning to TBL and a range of students who had experienced it. This had the potential to provide a range of contrasting viewpoints from different perspectives.

Ethnography has its roots in anthropology and involves the researcher studying, and sometimes living or working amongst a group who share a specific culture or community (Creswell, 2013). Research is most often carried out through extended participant observations, with the researcher immersing themselves in the lives of the participants. Participant observation of TBL classes or TBL teamwork would have been possible for this research although it would have been time consuming to carry out. Observing groups and academic staff in TBL classes may also have affected the learning environment. To answer the research questions I would also have to speak with the educators and students to learn about their experiences.

Case study research involves the study of a bounded case over a period of time using multiple sources of information such as observations, interviews,

documents, audio-visual materials, etc. (Creswell, 2013). I did consider this approach; however, there seemed to be little scope to analyse multiple sources of data. Observations of classes for those new to TBL may have been daunting for the teachers. In the UK study it was likely that they saw me as more knowledgeable than them in TBL and, as Director of Learning and Teaching at that time; there may have been seniority issues in observing more junior teachers.

Grounded theory research moves beyond description and aims to generate or discover a theoretical explanation for a process or action (Creswell, 2013). The idea is that a theory is generated or grounded in the data generated from the research participants who have experienced a process or action. I believe that I could have used grounded theory in this research; however, I had an issue with the terms 'process' and 'action'. My aim was to capture educators' experiences of traditional teaching methods and of implementing team-based learning. Grounded theory might have been useful if my research question had been to explore the process of how staff learn about team-based learning over time. I could have asked them about how they used resources, their thoughts on staff development workshops, and their experiential learning as they used it. The research process in grounded theory as devised by Strauss and Corbin (1990) also seemed a little prescribed, rather rigid and complex, and seemed to have less opportunity for researcher reflexivity and interpretation. However, I accept that there have been developments in grounded theory with researchers such as Charmaz (2006) advocating for a more constructivist approach to grounded theory and Clarke (2003) suggesting that it should move away from its positivistic underpinnings.

In the end I chose to take a phenomenological approach to my research. The aim of empirical phenomenological research is to determine what an experience means to a person who has experienced a particular phenomenon (Moustakas, 1994). It was the word 'experience' that led me down the path of phenomenological research and the desire to understand and explain the experiences of my participants. Creswell (2013, p76) sees a phenomenological study as describing the 'common meaning for several individuals of their lived experiences of a concept or a phenomenon.' Taking a phenomenological

approach to my research seemed to be the best fit for my research questions, as I wanted to understand educators' experiences of traditional teaching and how they perceived the transition to using team-based learning. I wanted to learn about their experiences of learner engagement with traditional methods of teaching and with team-based learning. I knew about my own experiences of traditional teaching methods and of team-based learning in one module. However, I wanted to see beyond my own experiences and see what the collective experiences were across the faculty when implementing TBL across an entire academic programme. Findlay describes this as 'the phenomenological attitude' where researchers 'see afresh' and 'push beyond' their own experiences or established knowledge (Finlay, 2014). However, phenomenology can also be an interpretative process if one follows van Manen's approach called hermeneutical phenomenology (Creswell, 2013). I also wanted to bring in my own experiences into the research, interpret my research findings and from these construct an interpretation of the meaning of these experiences.

3.7 What is phenomenology?

3.7.1 Introduction to phenomenology

Phenomenology means, when taken literally, 'the study or description of phenomena', where phenomena is taken to mean 'anything that appears or presents itself to someone.' Phenomenology then 'involves the description of things as one experiences them' (Hammond, Howarth and Keat, 1991 pp. 1). Put simply, one could ask the question 'What is this or that kind of experience like?' (Van Manen, 1990, p9).

Different perspectives of phenomenology have evolved over time and, depending on your philosophical assumptions, phenomenology could be located in a number of different paradigms; positivist (Husserl), post-positivist (Merleau-Ponty), interpretivist (Heidegger), and constructivist (Gadamer) (Racher and Robinson, 2003). Creswell argues that because phenomenology involves subjective experiences of a phenomenon and objective experiences of commonality with others then there is a refusal of the subjective-objective dichotomy. Phenomenology therefore lies somewhere on a continuum between

qualitative and quantitative research. Some forms take a more positivistic approach, for example descriptive, empirical or transcendental phenomenology as described by Husserl and practiced by Giorgi. Other forms of phenomenology are more interpretivist in nature such as that as described by Heidegger and Gadamer and practiced by van Manen (Creswell, 2013).

Phenomenology is not only a research method used by qualitative researchers but also a perspective and I'll outline the development of phenomenology as a philosophy and a methodological research approach below.

3.7.2 The Development of Phenomenology

Although first used by the philosophers Kant and Hegel in the 18th century, it was Edmund Husserl (1859-1938) who first developed the school of phenomenology. Husserl was influenced by Brentano who first used the phrase 'descriptive phenomenology'. This led Husserl to argue that phenomenology is a rigorous study of *things as they appear* in order to understand human experiences and consciousness. Husserl argues that individual experiences should be described 'pre-reflectively' without interpretation, or in other words what is immediate in our consciousness before we have thought about it (Dowling, 2007). Husserl believed that phenomenology is a return to principles of Ancient Greek philosophy founded on the search for wisdom, true knowledge and understanding on the cosmos and man's place in it (Stewart and Mickunas, 1974). This is in contrast to the attempt at the end of the 19th century to restrict the scope of philosophy to empirical studies due to the success of the natural sciences in explaining the physical world, a term that phenomenologists referred to as "scientism". Husserl suggests that phenomenology should be a philosophy without presuppositions; that you should suspend judgments about what is real until the investigation is over; a term Husserl called "epoche". Following Husserl's approach the phenomenologist would take an objective, unprejudiced approach, describing the phenomenon without interpretation; this places Husserl's form of phenomenology more towards the positivistic end of a positivistic/interpretivist continuum. Amadeo Giorgi is a contemporary advocate of Husserl's transcendental phenomenology, using research methods that advocate pure descriptions of the lived experiences of people without

interpretation. This approach encourages researchers to 'bracket' or 'epoche' their own assumptions of the phenomenon being investigated in order to focus purely on the descriptions of the participants without any interpretation or meaning making by the researcher (Van Manen, 2011). A term associated with phenomenology is 'intentionality.' The idea here is that every conscious thing we do or experience is intentional and directed towards an object of some kind (Moran and Sokolowski, 2000), and that the reality of an object is actually related to our own consciousness of it. Husserl would classify reality then, not as divided into subjects and objects but as both subjects and objects as they appear in our consciousness. Following on from this Husserl also rejects the subject-object dichotomy, instead suggesting that 'the reality of an object is only perceived within the meaning of the experiences of an individual' (Creswell, 2013, p78). Merleau-Ponty built on the work of Husserl taking a post-positivistic approach advocating phenomenology as a way of rediscovering our first experiences, and helping us view them in a new light; that is as a pre-reflective experience (Moran and Sokolowski, 2000). He engaged extensively with the sciences and descriptive psychology but argued that the objective and subjective are inseparable. He believed that the essence of a phenomenon is reality, but that essence cannot be fully known. He held many of the perspectives of Husserl but without separating out consciousness from the world (Racher and Robinson, 2003).

Martin Heidegger, however, advocates the use of hermeneutic phenomenology arguing that the lived experience should be interpreted by the researcher (Racher and Robinson, 2003). This approach sits within an interpretative paradigm and involves the researcher being open, empathic and curious to what is being described by the participants, whilst also being reflexive and mindful of one's own position (Finlay, 2014). Heidegger's view is that the phenomenon should be understood rather than just be described and that in order to find understanding of meaning one must interpret. In the interpretivist paradigm the investigation is on human experience, subjectivity and multiple possible truths (Racher and Robinson, 2003).

Gadamer, (1976) builds on the work of Heidegger by taking a constructivist approach to phenomenological philosophy. He advocates that one should

situate the meaning of others in relation to our own meanings. In other words, understanding is constructed by the researcher from their interpretation of the descriptions of others, and placed in the context of their own personal experiences and involvement of being in that world themselves (Spence, 2001). Gadamerian phenomenology is more dialogical and requires further feedback and discussion between research and study participants (Dowling, 2007).

3.7.3 Phenomenology as a methodological approach

The Dusquesne School of Psychology at Pittsburgh University are credited with developing research methodologies for existential-phenomenological research that follow a more positivist Husserlian approach of description, reduction and search for meanings that are transformed into a general description of experience (Polkingholm, 1989). Bracketing is a fundamental strategy in transcendental phenomenology; however, in research studies, it is common for researchers to describe their own experiences with the phenomenon and bracket out their own views prior to describing the experiences of the research participants. The research data, as advocated at Dusquesne, is then reduced to significant statements, quotes and themes. This is followed by a textual description of what the participants experienced, a structural description of how they experienced it, and finally a combination summary to convey the essence of the experience (Moustakas, 1994).

Hermeneutical phenomenological research methods seek to understand the individual's subjective experiences as they engage with the phenomenon rather than the objective reality of the phenomenon itself. Van Manen describes hermeneutical phenomenological research as being both descriptive and interpretative, arguing that phenomena have to be interpreted and that a lived experience must be explained in such a way that it involves an interpretative process (Finlay, 2014). When planning a research project, van Manen (1990, pp. 163) suggests researchers identify the phenomenon as 'the object of human experience to be studied'. In doing so, he argues that it isn't really possible to explain human behaviour in the same way as when studying the natural sciences. Interpretative phenomenology is always retrospective requiring reflection on past experiences (Van Manen, 1990). Research subjects therefore

need to have already experienced the phenomenon under investigation, and be able to recount and reflect on the experiences they have had. In hermeneutical phenomenological research methods the research makes an interpretation of the meaning of the lived experiences (Van Manen, 1990). Van Manen doesn't subscribe to the need for the researcher to bracket themselves from the research completely; however, there needs to be an openness and sensitivity and being aware of our own bias.

Dilthey and Rickman, (1976) argue that we can explain nature but human life we must understand. Van Manen argues that natural sciences are studied through observation, experiment and quantitative measurement, whilst studies of human understanding involves description, interpretation and reflection (van Manen, 1990). I wanted to take an interpretivist approach to my research so did not merely want to describe the experiences of others. I choose to interpret their experiences alongside my own, and that of other published work, to construct meaning and understanding in a reflexive manner. For my research, this meant that I explained my own background that led up to the research in chapter 1. As I interviewed participants who had experienced the phenomenon I wanted to explore their personal experiences, interpreting their answers as I did so, and to probe deeper as necessary. I then constructed a narrative that included my interpretation of these experiences, placing the findings in the context of my own experiences and that of others from the literature, while ensuring that I represent the participants' voices bringing in my own voice in a reflexive way.

3.8 Research Design

A number of authors have described their recommended approaches in gathering research data through the use of interviews. Kvale and Brinkmann (2009) describe seven stages of an interview investigation as thematizing, designing, interviewing, transcribing, analyzing, verifying and reporting. Rubin and Rubin (2011) outline a similar process although the stages aren't as fixed and the sequence can change. I followed a structure proposed by Creswell (2013) as outlined below:

- Decide on the research questions best answered by interviewing

- Identify interviewees
- Decide on the type of interview
- Confirm the recording procedures
- Write the interview protocol
- Pilot the protocol
- Identify a location to conduct the interviews
- Write and complete the consent forms
- Follow the use of good interview procedures.

3.8.1 Types of Research Interviews

An interview is a conversation, usually between two people, but one where one person, the interviewer, is seeking responses for a particular purpose from the other person, the interviewee (Gillham, 2000). The qualitative research interview is designed to explore experiences, meanings, and depth by taking a constructivist approach. This is in contrast to the quantitative interview which tends to be more structured, for example researchers may tick off pre-determined responses to a list of structured questions for later analysis using quantitative methods (Warren, 2002). There are also different levels of formality and relationships with qualitative research interviews, which often probe much deeper, take longer, and which often require the development of rapport and a relationship between interviewer and participant.

3.8.1.1 The qualitative research interview

One advantage of the qualitative interview is that it is more flexible and can be tailored by the researcher to specific lines of enquiry. Researchers can introduce follow-up questions to probe emerging themes in a way that more structured interviews or questionnaires do not allow (Robson, 2011). Another important element of qualitative research is that the researcher is the key instrument, that is the researcher in person collects the data. This means that the researcher can identify non-verbal cues and follow-up with a line of questioning that has the potential to capture rich, and unique data that would otherwise be missed when using other forms of data collection. On the other

hand, there can be problems with the use of the qualitative research interview. They require trained interviewers who can pick up on verbal and non-verbal cues, they are time-consuming to conduct, transcribe and analyse, and generate large quantities of data that can be difficult to analyse.

Qualitative interviews should be interviewee-focused with interviewees doing most of the talking and encouraged to go 'off-topic' (Bryman, 2012). Individual qualitative interviews can be divided into unstructured and semi-structured. Researchers using unstructured interviews may only prepare a few prompts or ask one open question at the start of the interview. The researcher's role is to guide naturally occurring conversations with flexibility, depending on what emerges (Cousin, 2009).

The semi-structured interview is structured around a set of themes in an *interview guide* (Bryman, 2012), which the researcher uses to facilitate the interview, usually by formulating questions. The interviewer can alter or add to these prepared questions depending on the 'flow' of the interview (Cousin, 2009; May, 2011). Usually the interviewer will consistently ask all the questions on the interview guide to provide a degree of structure; however, there is more opportunity for the interviewer to ask probing, follow-up questions to delve deeper, for example to explore why a subject feels as they do. The interviews are still predominantly interviewee-focussed but allow some structure to the discussion, that has been prepared in advanced and is aligned with the research questions. For this reason I have used semi-structured interviews to collect data. Robson (2011) suggests that the interview should last for between 30 and 60 minutes and most of the interviews fitted within this category.

A focus group is a technique for interviewing more than one person, usually at least 4 people, at a time. It is essentially a group interview, however Bryman (2012) suggests that there are differences between the two terms. Group interviews might be seen as a way of saving time and money by interviewing multiple participants; however, the focus group researcher is interested in how individuals respond to a question or topic specifically as members of a group rather than as individuals. In addition the researcher may often want to consider how group members respond to each other's views. The researcher then tries

to build a view, not just from what is said but also from the interactions that take place between the group members (Bryman, 2012).

3.8.2 Data Analysis and Representation

Creswell (2013) suggests that data analysis consists of a number of stages. Initially data should be prepared and organised, then reduced to themes through the process of coding and coding condensation, and finally represented through appropriate means such as a written discussion, figures or tables. Kvale and Brinkmann (2009) argue for six steps of analysis, three of which take place during the interview or focus group itself. As participants explain their experiences and feelings they will think and reflect in real time. This may then provide new interpretations and discoveries they weren't aware of before. Finally during the interview or focus group the researcher should provide a reflective summary and interpretation of what has been described and as they have understood the discussion. This enables the participants to reflect further and confirm, amend or add to their initial explanations. The fourth step would be the transcription, organisation and textual analysis followed by member validation, possibly by re-interview, and finally capturing any action that might have taken place as a result of the initial interview.

Chapter 4 – Methodology

4.1 Introduction

The methodology that I used in this study includes collecting empirical data from academic staff at Bradford School of Pharmacy that have been asked to transition from traditional teacher-led pedagogy to team-based learning as the predominant learning and teaching strategy. I've also collected qualitative data from students who have experienced learning using TBL. I've analysed the results and discussed these in conjunction with published literature and my own personal reflexive experiences.

4.2 Researching within an ethical Framework

Researchers have a number of ethical responsibilities. The British Educational Research Association (BERA) publishes ethical guidelines (BERA, 2011) and considers that educational researchers have ethical responsibilities in terms of respect for the person, knowledge, democratic values, the quality of educational research, and academic freedom.

BERA states that researchers must obtain voluntary informed consent from those who participate in the research. To achieve this, I provided prospective participants with a '*Study Information Sheet*' (see appendix 1) and an invitation to ask follow-up questions before, during or after the interview or focus group took place. I also constructed a '*Consent Form*', which explained how I intended to gather, store and use the data, that responses would remain confidential, and that quotations and identities would be anonymised (see appendix 2). Participants were advised that they were free to withdraw themselves or their data from the study at any time at no penalty.

Educational researchers should also be trustworthy in presenting their data in a way that is consistent with their theoretical framework and methodological approaches (Cousin, 2009). It was certainly my intention to represent the participants' experiences, interpret this data, and explain it through the lens of my own experiences in a reflexive way.

Effective research interviewing is an art, the skills for which require training and practice to be effective. Interviewers have an ethical duty to consider their own abilities in conducting research interviews. They should, for example, be able to identify the sensitivities that can arise during interviews, understand issues of vulnerability and power, recognise signs of stress, and be able to handle these issues sensitively. With potentially sensitive topics, the researcher should give consideration to the effect that the questions and discussion might have on the interviewees during and after the interviews, and to having support available or to signpost sources of support should this be needed. Researching private lives, thoughts, and sensitive subjects areas can create ethical problems that need to be anticipated and addressed as part of working within an ethical framework (Miller and Bell, 2002).

Researchers should also give consideration to any power relationships with participants (Kvale and Brinkmann, 2009). I was aware that my position as the School's *Director of Learning and Teaching* during 2013 could have an impact on how the staff and students responded to my interview questions so I took steps to mitigate this impact. First, I had relinquished this position when I was appointed to a 2-year full-time secondment out of the school during 2014 and 2015, when the data collection took place. All of the staff and some of the students will have been aware of my previous role. Accordingly, before each interview or focus group commenced, I made the participants aware that I was there in the capacity of a researcher and wanted to hear their open and honest opinions, whether they were positive or negative, and that I welcomed criticism of the initiative. Second, I made it clear during the interviews and focus groups that because I was acting as a researcher and, in accordance with the consent form, their views would be entirely confidential.

Ethical approval for this study was sought and provided by the biomedical, natural and physical sciences research ethics panel at the University of Bradford on 17th December 2012 (see Appendix 4)

4.3 Research Questions

Three of the six research questions are best answered by collecting data from semi-structured interviews. Research question four could be answered by either

semi-structured interviews or the use of focus groups; however, I chose to use focus groups to gather data from the collective experiences of students as I felt this provided a safer and more supportive environment for students. The remaining questions are best answered by analysing the data and through reflexive discussion and placing the findings in context of the literature on collaborative learning (see table 4.1).

Table 4.1 explains how the research questions are to be approached

	Research Question	Research Method
1	What are pharmacy educators' experiences of using more traditional methods of learning and teaching?	Semi-structured interviews with up to 20 members of academic staff
2	What are pharmacy educators' experiences of using team-based learning (TBL) as the predominant learning and teaching strategy in pharmacy curricula?	Semi-structured interviews with up to 20 members of academic staff
3	What effect does TBL have on learner engagement in a pharmacy programme?	Semi-structured interviews with up to 20 members of academic staff and focus groups with three cohorts of pharmacy students
4	What is the student experience of learning using TBL?	Focus groups with three cohorts of pharmacy students
5	What are the implications for healthcare educators considering using TBL in their curricula?	Reflexive discussion in context of published literature, data analysis
6	How can research of team-based learning in a pharmacy curriculum best be conceptualised to make a contribution to the literature on student-centred and collaborative learning in Higher Education?	Reflexive discussion in context of published literature, data analysis

4.4 Methodological procedure

4.4.1. Identifying Interviewees: Sampling and inclusion criteria

Purposeful criterion sampling involves selecting a group of people who are the most appropriate, through meeting specific criteria set by the researcher, to inform the research and help them to answer the research questions (Creswell, 2013). The inclusion criteria I chose for the educators was a minimum of two years' experience of using team-based learning at Bradford. I chose two years so that the teachers experienced more than one iteration of using TBL across two academic years.

18 academic members staff in the University of Bradford's School of Pharmacy had experienced team-based learning over a period of 2 academic years (2012/2013 and 2013/2014). I contacted these staff by email and asked for their consent to take part in a 30-60 minute interview. These were conducted between May and July 2014. 16 members of academic staff agreed to be interviewed, one was unavailable due to illness and the other didn't feel experienced enough to take part. The structure and process of TBL can take some time to understand. From my own experiences, the first time using TBL is the most challenging and time consuming as you are still developing your understanding of the processes and skills involved. By setting the selection criteria to a minimum of two years' experience, I hoped to overcome the effect of initial inexperience of the methodology.

I also wanted to explore the student experiences of team-based learning. I was keen to gather the experiences from a wide range of students across the year groups. At the time of this element of the data collection there were three cohorts of students who were enrolled on the new MPharm programme in years 1, 2 and 3 who were learning predominantly by TBL. In addition year 4 of the outgoing programme had also been using TBL in two final year modules. I chose to conduct a focus group for years 2, 3 and 4 at the end of the 2014/15 academic year. I invited students from each of these years to attend a focus group. All students were invited as they met the inclusion criteria of having

experienced TBL as a student. Focus groups usually consist of between six and ten participants (Morgan and Scannell, 1998) so I set a limit of ten participants per year group. I recruited nine students from year 4, ten from year 3 and eight from year 2. I circulated the interview guide in advance so the students could come prepared.

Table 4.2 Composition of Focus Group

Year Group	Old or new MPharm Programme	Number of participants
2	New MPharm Programme	8
3	New MPharm Programme	10
4	Old MPharm Programme	9

4.4.2 Method of data collection

I chose to collect data from academic staff through semi-structured interviews and from students through the use of focus groups. This is common practice in phenomenological research, which aims to understand the views and opinions of individuals who have experienced the phenomenon at hand (Creswell, 2013). I discounted the use of other forms of data collection and analysis such as documents, audio-visual materials and observations. These aren't commonly used in phenomenological enquiry and I didn't feel they were congruent with the research questions, which primarily focused on exploring the reflective experiences of pharmacy educators and their perceptions of student engagement and the student experience of learning using TBL. A future study might include the observations of student engagement in a TBL classroom; however, in this study I wanted to explore the educators' perceptions of student engagement and the lived experiences for students. This might include any reflections they have on their own engagement in their learning or that of their peers.

4.4.3 Recording and transcription

It is difficult to take notes whilst conducting an interview or focus group so some kind of audio-recording is usually used to avoid interfering with the flow of discussion (Cousin, 2009). In this study I used a voice recorder to capture both the words and paralanguage used (intonations and emphasis or the way in which words are used). Audio recordings don't capture body language or visual expressions so these need to be noted manually by the researcher. Data from the recorder needs to be stored securely as these could identify the subject and breach ethical requirements of research studies. The data recorder in this study was locked away when not in use and the audio files and transcriptions stored on a computer in a locked office and secured by password access and deleted when the transcriptions had been completed.

Before data analysis can take place the recordings are usually transcribed into the written word ensuring that intonations, pauses and idiomatic expressions are also captured. Kvale and Brinkmann, (2009) note that transcription should be an interpretative process rather than a simple clerical task and there is a danger that the data is transformed and abstracted in the transition from oral to written word. Transcriptions should therefore be carried out by the researcher to ensure that the ethos of the interview is captured along with the actual words. The transcription is actually the first step in the analytical process and for this reason I transcribed all the interviews and focus groups in this study myself.

4.4.4 Interview Guide and Piloting

Prior to the interviews I decided on a core set of questions that I would ask to all participants with the intention of using probing, follow-up questions where appropriate to gain a deeper understanding as the need arose. (See Interview Guide in appendix 3)

Creswell (2013) suggests that interview questions and procedures should be piloted to refine the process as necessary before embarking on actual data collection. I piloted my educator questions, process and procedures on two members of academic staff and student questions on a group of my personal tutees before starting my data collection. As a result I removed two surplus

questions and made amendments to two others to ensure they were clearer and more open in nature to increase participant understanding and optimise discussion.

4.4.5 Conducting the interviews and focus groups

Creswell goes on to suggest that a suitable location should be identified that is private, comfortable and quiet. All my one-to-one interviews were conducted in a private office that, as far as possible, was free from interruptions and noise. The focus groups were carried out in classrooms or meeting rooms that were booked solely for this purpose and set up to appropriately engage the participants in open dialogue.

Prior to commencing the interview or focus group I asked each participant to complete and sign a consent form, which were collected and later stored securely.

During the semi-structured interviews I asked each question on the interview guide, following up with supplementary questions as necessary to probe deeper, confirm meaning, or further pursue an interesting and relevant line of enquiry. I also watched the participant's body language watching for non-verbal clues and listened for intonations and emphases to which I recorded and followed up on as necessary and appropriate. I ensured that I guided the conversation but provided ample time for the participant to discuss and reflect on their experiences; the interviewee did most of the talking. The interviews generally lasted between 30 and 60 minutes.

During the focus groups I asked each question to the group and focused not just to the responses from the person speaking but also to interactions between the students and the body language of those listening but not talking. I tried to ensure that all participants were able to contribute to the discussion if they wished to. Similar to the interviews I was able to ask follow-up questions to check meaning and pursue other interesting lines of enquiry.

4.5 Data Analysis and Representation

I followed Kvale and Brinkmann's first three steps during the interviews and focus groups attempting to capture experiences, perceptions and reflections and tried to paraphrase these to allow time for reflection and validation during the interview or focus group.

I transcribed each interview and focus group word-for-word myself, making notes on the use of paralanguage, intonations, pauses and emphases and interpreting meaning from both what was said and the way it was said. I provided each interview participant with a copy of the transcription for member checking. This provides confirmation that the transcription is a true account of the interview and provides the participants with the opportunity to add to, amend or remove any part of the interview transcription. I didn't do this with the focus groups, as there were multiple participants; however I will consider doing this in future research projects.

I found the data analysis spiral discussed by Creswell (2013) useful as I planned and carried out the analysis from data collection through to representation. I did this by taking a 'spiral approach' visiting and revisiting the data, interpreting and reinterpreting, reading and rereading, coding and recoding as I moved towards representing the data. In analysing the data I followed Creswell's (2013) suggested approach to phenomenological analyses and representation that included data organisation, reading and memoing, describing, classifying and interpreting data into codes and then themes, interpreting and then representing and visualising the data.

4.5.1 Organising the data

I used the computer software programme NVivo 10 to organise, arrange and code the data.

4.5.2 Reading and Memoing

Although I now had the data on a computer, I found that there was no substitute for manually reading through the data line-by-line and making marginal notes or

memos on paper. I would then add these into NVivo for later use when coding and analysing.

4.5.3 Describing, classifying and interpreting the data into codes and themes

During this stage I immersed myself in the data and, using NVivo, coded each paragraph of the transcription based on the participant's answers. This is based on my own interpretation of the words I read. Any notes I made during and immediately after the interview or during the transcription process also informed my interpretation. These notes included paralanguage, emphasis, and the way the words were used during the interview. I assigned a label to the code and added, amended and reviewed codes as I went through the data, whilst continuing to assign each section or paragraph of the transcription to a code. There is debate amongst qualitative researchers as to whether codes should be counted to quantify their occurrence amongst subjects. Huberman and Miles (2002) suggest that codes are counted and reported based on regularity and occurrence; however, others (Creswell, 2009) use regularity as an indicator of participant interest in a code, but don't report counts in articles as this conveys a more quantitative approach. I took the latter approach in my analysis and haven't included the occurrence of specific codes, but did use their regularity to inform my analysis and interpretation. Once the data had been coded, the codes were then all reread and aggregated into more general themes that were used to write the report (Creswell, 2013).

4.5.4 Interpreting the data

Once the themes were formed the next step was to interpret and make sense of the data and identify meaning (Lincoln and Guba, 1985). I did this by abstracting themes to make sense of the data and interpreting them in the context of both published data and in a reflexive way based on my own experiences. This I have attempted to do in light of my own experiences of learning and teaching in higher education both before and after using team-based learning.

4.5.5 Representing the data

The final stage of data analysis is to represent the data so that it appears meaningful, credible and trustworthy, but is also interesting to the reader. Choosing what and how to represent the data is an important part of the analysis. Cousin (2009, pp. 49) describes writing as a “*sense-making activity in itself.*” I’ve tried to represent the data from each theme in an authentic manner, using the data to tell the story so the reader gets a sense of the experiences that the educators went through as they experienced a new pedagogy. I have drawn on published research to help explain the experiences that I describe and see how my findings compare with those of other writers. Finally I have brought in my own voice in a reflexive way to explain my own experiences and locate them with those of others. Taking a reflexive approach accepts that my own subjectivity will always be present so by including these views I hope to be transparent and open, and ensure that the reader understands my position and how I am representing the data. Indeed Moustakas, (1994) suggests that the researcher commences the representation of the data with a full description of their experiences with the phenomenon. This I have done so my stance is clear to the reader from the outset.

Finally it is important to capture the implications for other healthcare educators considering using TBL in their curricula and how the research would be of benefit to them. From the literature review I identified that there is a lack of qualitative research on staff and student experiences of implementing team-based learning across an entire curriculum. Consequently I hope this research may be of benefit to others taking a similar approach. Researchers should also include a section on study limitations and suggestions for further work. This is captured in the final chapter.

Chapter 5 Findings and discussion

5.1 Introduction

In this chapter I will discuss the findings from interviewing 16 members of academic staff and facilitating discussion in three student focus groups at a UK school of pharmacy in Bradford.

The themes that emerged from the coding and thematic analysis of the data are shown in Table 5.1. They are presented and discussed under the six areas of enquiry that I explored with the participants of the study.

Areas of enquiry explored by researcher	Emerg ed themes
Experiences of previous teaching methods	<ul style="list-style-type: none">• Student engagement• Student learning
Initial perceptions of TBL	<ul style="list-style-type: none">• Understanding TBL• Concerns about major pedagogic change• Concerns about group work.
Development needs	<ul style="list-style-type: none">• TBL processes and practicalities• Writing application exercises• Developing appropriate facilitation skills
Benefits	<ul style="list-style-type: none">• Student engagement• Student learning• Teacher benefits
Challenges	<ul style="list-style-type: none">• Workload• Logistics• Application exercises• Facilitation skills
Lessons learned, evolution of practice and personal development	<ul style="list-style-type: none">• Skills and practices as a TBL practitioner• Pedagogic practices• Personal transferable skills

5.2 Experiences of Previous Teaching Methods

Themes that emerged from this area of enquiry were *student engagement* and *student learning*. These are explained in detail in 5.2.1 and 5.2.2 below.

5.2.1 Student engagement

When asked about their experiences of teaching students prior to using TBL most participants talked about their struggles with engaging students in large classes, specifically lectures. This ranged from poor attendance and passivity in students through to classroom management issues such as having to deal with disruption. A few participants commented that lecture attendance was regularly low but when more students attended they became difficult to manage. Some participants made a link between student numbers, compulsory attendance and lecture disruption.

Lectures to 200 students are a battle because half of them aren't interested and half of them aren't listening...basically its crowd control. If lectures weren't compulsory and you got down to the 30-40 who wanted to be here then it would be a great experience. (Participant 16)

The lectures that I'd done were to really big groups of 200 to the full year of pharmacy and I'd found issues with crowd control, partly behavioural issues, partly students just switching off because they're not interested in the subject. (Participant 9)

The lecture theatre environment can be a difficult one to manage with 200 people. (Participant 2)

In a lecture room you can tell there are a lot of students who aren't listening, the people at the back, either doing something on their mobiles or switching off completely. You know that there are a few at the front who are interested and listening and nodding when you speak but you know that the majority are not...I feel like I'm policing more than teaching. (Participant 13)

The negative comments related largely to the participants' experiences of large group lectures, particularly when used predominantly for content delivery. There

seemed to be a correlation between student numbers and increased disruption, when the cohort size was smaller, there was less disruption. This suggests that the issues relate to group size rather than the pedagogy used. However, prior to lectures becoming compulsory, attendance was regularly less than 50%, suggesting a high degree of 'non-engagement' (Trowler, 2010). However, those students that did attend were positively engaged, there was no disruption to the lecture, and those that chose not to attend had to study the content independently. It was only when lectures became compulsory that a small but vocal number actively disrupted classes. The number '200' was mentioned several times, suggesting this was a threshold number that, in the eyes of the educators, created more problems. As student numbers grew, the students became more anonymous. When the pedagogy used was a passive, content focused lecture, that didn't always hold their attention, then the large student numbers exacerbated this problem of poorly engaged students.

This seems to corroborate the views of Cantillon (2003) and Ramsden (2003) as discussed in Chapter 1. Poor student engagement in large lectures is also in line with previous research that I carried out in a school of pharmacy in the US. Here teachers also struggled to interact with students in lectures and to ascertain if the pace and level they were delivering at was conducive to student learning (Tweddell, Clark and Nelson, 2016).

While student numbers were certainly a factor, so too was the choice of subject content and teaching methods used for delivery.

I feel that there were some people who were not engaged but we couldn't do much about that. Sometimes half the time would be spent managing minor disruptions. I used to bring them to the front. Basically there needed to be more engagement in a class. (Participant 1)

The topics I was teaching it was sometimes hard to engage them because it was very 'sciencey' when I was lecturing to the whole group. I don't think the students particularly loved it, plenty of them looked like they were dozing off in a corner. (Participant 4)

I never got the feeling that they were engaged, if I was asking questions in the lectures then they never really answered them or if they did it would be the same student who would answer all the time and you knew there was a whole load of people that you didn't get to. (Participant 12)

I've been teaching a while and I like to think I was further on the [didactic/dialectic] continuum using more interactive techniques in a lecture than a traditional didactic 'tell you what's what'...a lot of the job was around behaviour management and shutting them up so people could hear and especially if you do try to build in activities there's skill in getting them to shut up after an activity....I don't think lecturing is dead, it's efficient but I don't think it's good quality learning that comes out at the end. (Participant 15)

Some participants appeared to focus on what Gibbs and Jenkins (1992) refer to as student control to 'maintain order' in lectures. My own early experiences were similar. I found that if the lecture was pure content delivery of a subject that wasn't particularly interesting, or that students couldn't directly relate to, they soon became bored and sometimes disruptive. This is what Biggs, (1999) calls the first stage of teacher growth and focuses on '*what the student is*'. Placing the blame for a poor experience in the lecture theatre on students was commonplace in our previous curriculum.

Most participants went on to discuss strategies they used to increase engagement in lectures, usually by planning some form of activity.

What I tended to do was build in more interactive aspects to lecturing. If it was me standing talking for 50 minutes then I didn't get much back from the students and I could tell they were bored...I usually asked them questions and discussed things with them in the lecture theatre rather than necessarily delivering straight material. (Participant 3)

I always tried to introduce interaction into them [lectures] but that's difficult with 200 students. The lectures I enjoyed most were those I managed to successfully introduce interaction such as voting, quizzes or that sort of thing (Participant 4)

These teachers have clearly reflected on lecture delivery and are trying to improve student engagement in the classroom. These participants report some success in bringing in varying degrees of active participation into a lecture. This is in line with other research studies (see, for example, Crouch and Mazur, 2001; Lasry, Mazur and Watkins, 2008; Gauci *et al.*, 2009). These teachers have moved to what Biggs calls 'Stage Two' of teacher growth (Biggs, 1999) that is '*what the teacher does*', focusing of improving the management of teaching delivery.

However, other participants reflected on their experiences of trying to build in more interaction into lectures, and why this wasn't as successful as they'd hoped.

*You can put some interactive things in [to a lecture] but then actually trying to get them back onto listening to you is quite difficult and hard work I would say. You have a feeling that you're teaching, but are you **really** teaching? You're ticking a box to some extent. (Participant 5)*

Lectures felt very much that you're talking to a blank wall the majority of the time. I did try to get some interaction in by building in quizzes and things like that but it was only successful with those that were really keen. The rest just sit there. When you're talking around a lecture people sit there and don't take notes or aren't recording it, basically they seem to be there because they feel they have to be, but you feel like you're not getting anything back from them. (Participant 6)

My previous research reports mixed results with teachers introducing more active learning strategies into lectures such as problem solving. There was some success; however, because some students hadn't all attended the previous lecture or completed the pre-work in advance, then they weren't all ready to solve the problems posed (Tweddell, Clark and Nelson, 2016).

Audio-visual technology has been proposed to increase interactivity and enliven lectures; however, Fink (2004) argues that this strategy fails to address two major problems associated with large lectures: anonymity and passivity. Hogan and Kwiatkowski (1998) argue that the emotional effect of large classes and the

rapid increase in class sizes is an under-researched area. They argue that in large lectures students can be inconspicuous in a crowd without the need to think. This can lead to a withdrawal and detachment or disengagement, which Hogan and Kwiatkowski (1998, p1407) argue can be quite pleasant for students.

'daydreaming and distancing are to the fore; a state of detachment is achieved which can be quite pleasant and almost trancelike. Students can be physically present but not fully or actively 'here'.'

However, just because students may not always be actively thinking in a lecture theatre doesn't mean they won't learn the content themselves later on their own, in a workshop or tutorial, or when preparing for summative assessments.

When questioned about large group lectures most of the participants believed that, in terms of learning, they had limitations.

I'm not in favour of large group lecturing. It's a way of trying to pass information from one person to another but whether anything gets processed in between is subject to debate I think. (Participant 6)

In general I haven't had difficulties with large groups in lectures except that you are aware that there's more talking and of course you can't get the interaction in big lectures so while it personally hasn't been a big issue, the quality is probably a bit less in big lectures. (Participant 8)

However, two of the participants did enjoy being the 'sage on the stage' and lecturing about their subject.

I enjoy lecturing because I've been doing it for 25 years and I used to have 150 and that number wasn't a problem for me. (Participant 1)

Well I enjoy talking to the students, being the person who leads the lecture rather than having to facilitate...it was nice from my point of view to spend all the time talking about something that I'm interested in. (Participant 13)

The performance role of the teacher, holding an audience by telling them how much you know about your subject can be very enjoyable for the teacher. Penson argues that the ability to captivate the audience using humour and animations and breaking up the monologue with activities to reduce passivity can be an enjoyable experience for students and teachers (Penson, 2012).

My previous research also reported some positive experiences of lecturing with teachers able to build a rapport and engage students. In that study some participants also reflected on their own experiences as a learner in a lecture. Some participants benefited from lectures while others lacked the self-discipline to revisit the lecture content in order to improve their understanding after the lecture (Tweddell, Clark and Nelson, 2016).

My own journey as an academic took me through all three phases referred to by Biggs (1999). I initially designed my modules so that they were predominantly delivered by lectures and practicals. Essentially, lectures covered content and practicals focused on application and problem-solving. However, I found lectures turgid and passive for learners so I introduced activities and problems into lectures to engage them and show context. I later moved the entire content into student study guides that included reading, web-resources and activities that eventually replaced lectures allowing more time to apply knowledge in practical classes. I wasn't aware of the terminology at the time however I had effectively 'flipped' the learning. My problem at this time was motivating students to engage in pre-class study.

As programme leader, I presided over a programme with growing student numbers. The learning and teaching strategy for a programme of 70-80 students per year was less effective with 200 students. Lectures to 200 students became problematic as staff struggled to maintain order, and create an effective learning environment. Small group workshops and practical classes became larger and required numerous repetitions, putting a strain on staff, rooms and timetables. It was time to stop trying to 'impose order' in the classroom and try and 'create order' with a new strategy.

We realised that the time had come to do something different...part of the reason was around recognising and acknowledging the limitations of

the standard didactic teaching approach, some of it was recognising those limitations and thinking about what we could do differently. (Participant 11)

12 of the 16 participants commented that they had a preference for small group teaching, and argued that attendance and engagement was greater, and that they were more enjoyable for staff and students; however, each small group class had to be repeated a number of times due to the size of the cohort.

Labs were very enjoyable because you've much smaller numbers and you can get round and talk to them. They're actually doing something and they're a lot more engaged. (Participant 16)

Workshops and small group teaching was more enjoyable because I like the interaction with the students. I like to talk with them and answer their questions. (Participant 4)

Two participants pointed out that lectures should have been for content delivery and workshops and practical classes for application; however, because students weren't attending lectures, then workshops were increasingly being used for content delivery, which was ineffective and inefficient.

I'd always preferred the smaller group teaching to lectures. I always preferred to facilitate rather than just talking at them. However, students would come into tutorials still expecting to be taught, they expected you to deliver content to them rather than coming prepared with questions. And we had to repeat this six times. (Participant 9)

Workshops were better because you were trying to get them to apply things that were covered in lectures. We asked them to read around the topic between lectures and workshops. You can say it but you can't make them do it. Some did but others clearly didn't or weren't in the lectures and hence they couldn't work on the cases because they didn't have the underpinning knowledge. The students were at different levels then and that wasn't ideal. (Participant 5)

One participant reported more success with taking more of a flipped approach to teaching.

What I did like were workshops where they had the topics in advance, they did a bit of work on the topics and we then had some sort of dialogue in the workshop. That seemed to engage them quite well and most of them were motivated to take part. (Participant 6)

However, another participant commented that they forced the students to prepare in advance by checking their work and evicting those that hadn't prepared from the classroom.

They would have had scenarios in advance and if anyone clearly hadn't prepared I would ask them to leave and come back to a later session when they'd done some work, now whether they did the work or got their friend's [answers], I've no idea. (Participant 9)

This is really another example of attempts to enforce order rather than create it by motivating and rewarding preparation with no check to confirm the preparation was the student's own work.

The reasons for moving to TBL in a large nursing school module at Plymouth University with 257 enrolled students were similar. Morris, (2016, p148) explains that:

'the teaching team referred to previous difficulties associated with students not engaging with the subject material, not undertaking required reading and therefore coming unprepared to sessions; and considered whether TBL would result in more engagement and consequently deeper learning.'

5.2.2 Student Learning

A number of participants reflected on the degree to which learning took place during lectures.

It becomes easy to do an autopilot lecture and the ease of this is quite appealing. You might think that you've really honed your material and are

doing a really great job. The realisation comes when you mark the end of year exam papers and realise just how little has sunk in and how others are just regurgitating your words. Despite getting really good marks for regurgitating your words part of me would still wonder if they really understand it or have they just memorised what I said. (Participant 10)

You might feel as a teacher that you're doing a good job delivering course content. However, if half your students are absent from classes and students are taking surface approaches to learning, then you may only realise this when marking end of term assessments. This might be that the first time you realise that students aren't learning so well and perhaps you're not doing such a great job after all. A contrasting argument might be that it is the student's responsibility to learn the content and if they don't, then they **should** fail the assessments.

The majority of staff participants didn't believe that students gained a sufficient understanding of the content from lectures in order to apply this in subsequent small group classes, although there were two contrasting views.

I don't think they learned anything in a lecture, they never came prepared, even if you asked them to they'd never do it, well maybe a few keen ones would. The majority wouldn't have a clue what was in the last lecture. You can tell that when you ask questions from the week before. I wouldn't assume that they are reading anything after the lectures either. (Participant 13)

It's hard to tell how much they've retained from lectures. Sometimes someone might refer to something I said in a lecture in one of the labs, but not often. Usually it was me saying "do you not remember this from the lecture? I told you this last week!"...I don't know how much they retained really, certainly not half of what I was trying to tell them. (Participant 4)

I think learning definitely takes place in a lecture. I covered some knowledge-based topics that were hard for them to follow and put in a lot of time and research to focus on the difficult point they would not

understand...My lecture notes were fully comprehensive and understandable to people who didn't attend my lectures...Lectures do the job and are definitely the most efficient way of doing it. (Participant 14)

Two teachers did manage to engage their students in lectures and created comprehensive notes for them to read afterwards, possibly to try and compensate for poor lecture attendance, although arguably this could contribute to poor attendance. One teacher, however, saw it as their role to provide opportunities for students to learn in lectures and that is where their responsibility ended. It was then up to the students to choose to attend or not. Their argument was that it wasn't their role to provide multiple opportunities for students to learn based on their individual learning styles. The following participant sums up one of the problems with this approach quite nicely.

Looking at the exam answers, I think a lot of student took notes in lectures but didn't do much with them until the time of the exam so learning did look as if it was a bit superficial. (Participant 8).

There are few lectures in the new curriculum so it was difficult for these particular students to reflect on them; however, the 4th year students had experienced many lectures in their early years and were better able to reflect on their experiences. From a student perspective the experiences of lectures were mixed. Some benefited from them, others didn't. The general consensus was that they wanted a blended approach with some lectures, particularly where there were difficult concepts, and perhaps some pod-casts to refer back to. Some students did identify that lectures didn't motivate them to study the material again until close to the exams; however for others they were sufficiently motivated to pick up a book afterwards.

Lectures were the worst way for me to learn. My marks have improved since I've been doing TBL. TBL is definitely more hands on and is my style of learning. [Year 4 Student Focus Group]

Sometimes I wish they would lecture a little bit more on the really tough concepts that we seem to have problems with, instead of saying 'OK lets

*work on the next application' so maybe take a little more time to explain.
[Year 2 Student Focus Group]*

I really liked lectures and I definitely learned more I think from going to lectures. [Year 4 Student Focus Group]

I liked it, I enjoy learning but I had to study after the lecture, I'm not an audio-learner so I have to go back and reteach myself anyway so when I found out about TBL, I thought this fits with my learning style because I'm learning by myself initially anyway. [Year 4 Student Focus Group]

I know it would be better to come to class prepared and it would mean a better experience but if I wasn't forced to do it I would never do it. I would turn up and if I didn't understand something I would read the chapter afterwards. [Year 4 Student Focus Group]

Lectures were good and helpful for learning purposes and helpful to attend but depending on my class, sometimes you could just read the book to pass the exam so coming to class wasn't necessary. [Year 4 Student Focus Group]

We don't have many lectures but when we do I feel like I'm less motivated. [Year 3 Student Focus Group]

I feel that I didn't really learn at the time during lectures. I'd cram the night before the exam, seeing it all for the first time. [Year 4 Student Focus Group]

5.3 Initial Perceptions of TBL

Academic participants were questioned about their initial thoughts, feelings and perceptions when first introduced to the idea of switching to TBL. Some participants expressed excitement that this was the right direction to take. They believed it could solve the difficulties we were having with student attendance, motivation and engagement in their learning. There was also a belief that TBL was congruent with the integrated nature of the programme, as required by the accrediting body. A few participants however were anxious about change and a new way of teaching. Two participants were concerned that implementing TBL

across a large programme with a large number of staff was too much of a revolutionary change. There was also concern about the complexity of TBL and doubts as to whether we would succeed. Finally a few participants expressed concerns about the use of group work due to previous poor experience of this form of learning. The themes that emerged from this area of enquiry were: *understanding TBL; concerns about major pedagogic change; concerns about group work.*

5.3.1 Understanding TBL

Approximately a third of the participants understood the principles of TBL and the underpinning educational theory and philosophy behind its design straightaway. The other participants stated that it took them longer to grasp the concept and needed to explore it further through reading about it, participating in a workshop as a student, hearing about it from those that had used it, and experiencing it themselves as a teacher.

Participants in the former category spoke of TBL as a way of overcoming some of the student engagement issues they were grappling with.

It was very clear to me early on that TBL would iron out a lot of the issues we were having and turn them into a more positive experience for everyone (Participant 3)

It became obvious to me pretty quickly that it was a very logical and rational approach that would hopefully overcome a lot of the problems that we were experiencing with traditional teaching and that it was well evidenced. The rationale for it was really easy once you'd got your head around what it is and you start to see how many problems it solves, then you kind of wonder why everybody isn't using it (Participant 10)

Other participants were initially confused and needed time, training and resources to understand the principles behind TBL.

The first thing was that it seemed rather complicated which it is actually, and then it's dead simple once you've done it. Reading about it and

trying to grasp it conceptually is actually quite tricky. My concern was the complexity of it. (Participant 11)

My initial reaction was that it makes perfect sense but it wasn't until I could actually visualise what it was, see it in action and take part that it became clear. I could read about the advantages but until I could see it, it meant nothing. (Participant 15)

One participant expressed excitement when first encountering TBL.

My initial thought was that if we can pull this off then it will be brilliant because all the best bits of teaching is in workshops where you interact with people and the worse bits are spouting on for an hour when nobody's listening or learning from what you're saying...So, I was quite excited about it, it felt to me like the right thing to do. (Participant 5)

Another participant understood the educational evidence behind it but was sceptical as to whether it was transferable to UK undergraduate pharmacy students.

It seemed to make sense and to be a good idea but I was worried that our students wouldn't behave in the expected way. I was worried that they were very young compared to the students in the US. I thought that TBL requires keen students and I wasn't sure that our first year had that sense of purpose or commitment yet. I was quite sceptical about it but what we were currently doing was wrong, so I thought that anything had to be an improvement. (Participant 13)

Others have argued that transitioning to TBL can be a conflicting and often emotional journey for the educator (Roberson and Franchini, 2014). My previous research reported a similar combination of excitement, anxiety and scepticism about TBL as well as concerns about group work. However, in this situation the school of pharmacy was a new school, so educators had a choice as to whether to take the job and those that did were more likely to favour TBL (Tweddell, Clark and Nelson, 2016). The findings were also similar to a UK study in nursing where, prior to using TBL, participants expressed feelings of

excitement at trying something different and apprehension about using a very different approach to teaching (Morris, 2016).

My own reflections were that TBL seemed to make sense to me when I first read about it. As programme leader, I was the one that had to manage many of the problems with poor student engagement in their studies, disruption in lectures, and the results of surface approaches to learning. I could see that this shift in pedagogy could be what we needed to deliver the new programme.

5.3.2 Concerns about major pedagogic change

The biggest initial concern that participants had was the enormity of the task ahead.

I was concerned about whether we'd be able to get all staff on board. I was concerned about how difficult it would be to create the materials as it looked like the preparation was going to be time consuming. (Participant 10)

I thought that it would be difficult even for staff who were engaged and on-board and liked the idea, but for staff who weren't it would be even more of a challenge. (Participant 1)

Two participants made reference to using TBL in an integrated programme. Integrating different disciplines into modules requires staff to work together more than before. This would, however, have been a necessity regardless of which pedagogy was chosen to deliver the programme.

Looking at the way we were planning to introduce TBL and make our curriculum more integrated at the same time, I could see both opportunities and challenges to get people to work across traditional disciplines. I thought this was a good thing to do but was going to be difficult. (Participant 11)

My primary concern was how we were going to work together to develop the resources to deliver TBL in an integrated programme. This was going to involve cooperation in a way that we'd never done before. (Participant 6)

A related concern was that of the workload involved in creating TBL learning resources. Some participants felt that writing study guides, RAT questions and application exercises would be time consuming when compared with preparing lectures, especially when this involves staff working together in a new way.

It sounded like it would be an enjoyable thing to do as a teacher but because it was a very different way of doing things, there would be a lot of work involved in terms of writing new teaching materials and changing the way we do things. (Participant 11)

I had concerns about workload needed to implement it whilst running out the current course, particularly around pack development and writing the RATs. (Participant 5)

How well and quickly you transition to TBL is likely to depend on the teacher's experiences in the classroom; feelings about themselves and their role as a teacher; perspectives on students; and attitudes about teaching in general (Roberson and Franchini, 2014). A teacher who regularly reflected on their teaching and adapted it based on feedback and the needs of their students may already have experiences with student-centred learning processes. A teacher who is perhaps more traditional and focuses on content delivery is likely to have to change their thinking more significantly.

5.3.3 Concerns about group work

There were concerns from a few participants about using more group work. When explored further this was due to prior poor experiences of using group work and group assignments. In the past we used a number of assessed out-of-class group assignments on the programme that created problems of inequity of workload, students often divided up the work rather than working on the project collaboratively. In addition, when group work is completed out-of-class, more conscientious students may not trust their peers to do the work to their satisfaction and hence take on a disproportionate amount of the work themselves, and then complain about it (Michaelsen, Knight and Fink, 2002). There was some concern that some students might pass with little effort due the

work of their peers; however, as the participants stated, the concerns did not seem to come to fruition.

I was concerned that we'd have people that never showed up but their team marks get them through a module. I'm not worried about that now but I was at the outset. (Participant 10)

I was concerned at the beginning that we'd have weak students who won't have contributed getting propelled through to passing by stronger team members. (Participant 14)

The misconception that the marks of weaker students would be inflated or compensated for by their peers was also an initial concern of some of the participants who took part in my previous research on this subject in the US. They too came to realise that this wasn't an issue with TBL (Tweddell, Clark and Nelson, 2016)

Prior negative experiences of group work at school, college or on prior degrees were also raised by a number of students in the focus groups.

They would make you find a group and do some kind of project together, mostly we would split the work up and come together at the end. It wasn't necessarily working together as a group. So it didn't really work, there was never the connection with the people. [Year 4 Student Focus Group]

We broke it all up, someone did the finance, someone the marketing, so we didn't really learn about what each other was doing. [Year 2 Student Focus Group]

I used to see group work as punishment. It was like a gigantic project that was due and they would stick you in a group and it would just be awful because you would find that a few people would take control, a few people wouldn't. Divvying up the responsibilities was awful and you ended up with a presentation that maybe 2 people did and 2 people just sat there. When I first heard about TBL I thought' oh, gosh, who would

do that?’ Who would go and do group work on its own? I soon found out it was different. [Year 3 Student Focus Group]

A lack of incentives that reward individual preparation and team contributions and performance may result in students prioritising individual needs over group effort, which may lead to some students carrying the load for the group. TBL may help ameliorate this through the use of predominately in-class group work, and incentivising preparation and team contribution through the assessed readiness assurance process as well as through summative peer evaluation.

Group work is an umbrella term used to describe numerous learning opportunities involving students working together in a group or team. Group work can vary in quality of the student learning experience with some students benefiting from peer discussion, peer learning, and peer support through to others that report factions, free-loading and difficulty in finding time to meet up. It can also be facilitated more or less well by teachers. Students can be working *in* a group, that is cooperative learning, or *as* a group, that is collaborative learning (Hammar Chiriac, 2014). The former may involve working individually on separate sections of a group task that is subsequently brought together and presented as a group endeavour. The latter, Hammar-Chiriac argues, is a more meaningful exercise where students utilize the different skills of the members of the group to achieve a common goal and involves problem-solving and reflection. If students are working as a group to solve a particular problem they are arguably more likely to be actively participating or engaged in active learning, the penultimate point on Trowler’s continuum of student engagement in learning (Trowler, 2010). Hammar-Chiriac goes on to report that previous studies (see Einarsson *et al.*, 2007) of student experiences and conceptions of group work in higher education found positive and negative aspects to group work that were both task-related and socio-emotional. Potential positive aspects including affiliation and learning from each other and negatives included the time involved, conflict, and students who didn’t contribute to the team effort. A study investigating the experiences of students working in groups in higher education reported that 97% of participants responded that group work facilitated their learning and developed their collaborative working skills ensuring they learned more or different things by working in groups than if

working alone (Hammar Chiriac, 2014). This was achieved through discussion and questioning each other's perspectives. Other benefits cited in the study included supporting and helping each other, forming friendships and increased motivation to read and prepare for the next group session. Participants also reported negative experiences of group work such as homogeneous group composition, poor attendance, lack of preparation for class, lack of clarity of team roles, and disagreements or clashes with a team member that affected the group climate. When there is inequity in contribution, which may arise from different levels of motivation and ambition, then this may lead to members of the group who are more active than others which may lead to resentment. My own experiences of teaching using group work before using TBL was that students would be given group tasks such as writing a short presentation together and presenting it back to the group. Students regularly complained that they struggled to meet as a group, that the work was unevenly distributed, and that they were often 'carrying' other students who were often absent at the presentation.

When using traditional group work there is a danger that members of newly formed groups may prioritise their individual work and effort over that of the group, often referred to as freeloading. When there are incentives that measure and reward individual preparation for and contributions to the team effort then arguably the concept of freeloading can be overcome (Michaelsen, Knight and Fink, 2002).

5.4 Development Needs

The participants were asked about their development needs. Responses fell into three main themes: *TBL processes, practicalities and theory; writing application exercises; developing effective facilitation skills.*

5.4.1 TBL processes, practicalities and theory

Virtually all the academic participants believed that they needed to learn about TBL, the theory behind it, and its logistics and practicalities.

At first it was very much about understanding what the process is, what needs doing when, how it all works. I think the initial training we had with Larry covered that well. (Participant 5)

We needed to learn about what it was, what it can do, what it can't do, what the theory is behind it, what is its advantage, what difficulties might we encounter, that sort of thing. This was nicely covered by the internal and external training sessions we had and by reading the TBL book we were given and seeking further information from the TBLC website. (Participant 11)

The recurring theme was that the training provided covered the initial process and practical needs of participants. A few participants commented that they wanted to learn more about the educational theory behind TBL and research evidence that it would be effective for student learning. There is research evidence for active and collaborative learning (van der Vleuten and Driessen, 2014); however the evidence for TBL is still emerging and so far the outcomes are inconclusive (Fatmi *et al.*, 2013).

I'm a theorist and I always like to ask the 'why' question. Why do we do that, why is that important, why do it that way? I also wanted to see the evidence that it works. I always needed that context, which we got so that was good. (Participant 2)

Another participant felt that they needed to watch how other staff delivered their TBL sessions.

For me what was important was watching people. I don't know whether it would have changed what I would have done but it definitely made me feel more confident having watched more sessions. I felt I got a lot better after observing other people. I think that sharing good practice helped a lot with my confidence too. (Participant 9)

One participant felt that while the training helped set the context, they were more of an experiential learner and learned more once they started to deliver TBL sessions themselves.

The training was OK, it showed us what we needed to do but the way I learn is through experience. The first few times that I ran TBL session gave me the experience I needed...sitting in a TBL training session delivered by TBL helps get you started but until you've actually done it and tried to deliver a session yourself you aren't really there. (Participant 3)

The consensus was that participants needed a combination of theory, observation, and experiential learning. This is similar to my previous research; however, participants in the US study also described the benefits of post-class and lunch-time 'brown bag' sessions as a means of informal peer support and to discuss successes and talk through problems that they might have encountered (Tweddell, Clark and Nelson, 2016). Andersen *et al.*, (2011) also found that peer support was important; the opportunity to get together through informal meetings to debrief and discuss their individual successes and challenges were deemed to be important and beneficial.

An educator who chooses to use TBL in their own module for which they have full responsibility is likely to self-educate, be motivated to learn the processes, and persevere to make it work through choice. However, when implementing TBL across a programme or multiple modules there is likely to be a variety of expertise and commitment to the change across the educators involved. In this case it is vital to have an effective staff communication and development strategy in place (Remington *et al.*, 2015). A lack of initial staff development can leave staff feeling underprepared and inadequately informed about TBL (Sutherland, Bahramifarid and Jalali, 2013), which leads to issues with effective implementation.

5.4.2 Writing application exercise

The two aspects of TBL that participants identified as key staff development needs were writing application exercises and developing effective facilitation skills. Michaelsen and Sweet (2008), suggest that creating effective application exercises that promote higher-order learning and enhance group cohesiveness is the most difficult aspect of using TBL.

I required a lot of help about how to write a good application exercise. The 4S criteria that Larry went through was really useful getting me started but I did need more help afterwards too. (Participant 12)

The key thing for me was developing the skills to write really good application exercises. This is really challenging actually. It seems quite easy to write one that ticks all the boxes when you're writing it but when you see it in action you realise that the students didn't pick up on the things I thought they would. (Participant 10)

In TBL, following the '4S' design strategy will help optimise student engagement in their learning, foster discussion within and between teams, and motivate and encourage effort. Students should work on *significant* problems that are authentic and important in the discipline. Each team should work on the *same* problem to promote inter-team discussion and energetically engage with the subsequent debate. The teamwork should culminate in making a *specific* choice or a collaborative decision about how they would go about solving the problem, this they would then defend in the subsequent inter-team debate. Finally, a team member will *simultaneously* report their choice of action to publically commit to their decision, promote discussion and debate and prevent teams from 'answer drift', which is changing their answer to go with the majority (Michaelsen and Sweet, 2008; Tweddell, Clark and Nelson, 2016). Effective task design is an important factor for students to see the benefits and have positive experiences of teamwork (Weimer, 2002).

Planning and writing application exercises that challenge teams to apply their new knowledge to the task through discussion, further research, and problem-solving can take considerable time and thought. Application exercise design is the most critical aspect of successful implementation of team-based learning (Michaelsen and Sweet, 2008; Parmelee and Michaelsen, 2010; Roberson and Franchini, 2014) and where the highest level of learning occurs (Ofstad and Brunner, 2013). Creating effective application exercises has been reported as one of the biggest challenges reported in the literature (Farland *et al.*, 2013) and requires more time, thought and planning than anticipated (Andersen *et al.*, 2011). Application exercises need to be sufficiently difficult to require team

discussion and team effort, but not so difficult as to confuse the students, and therefore planning these can be difficult (Andersen *et al.*, 2011).

5.4.3 Developing effective facilitation skills

Another significant staff development need was learning how to facilitate a learner-centred class, although this was dependent on the experiences that the participants had in using student-centred learning approaches.

My development needs were mainly around how to effectively facilitate a TBL class. (Participant 16)

I was worried that I wasn't going to be the best facilitator. I like to talk to the students and I was worried that I wasn't going to be able to get them talking or that I was going to be able to hold back enough. (Participant 13)

The workshop I attended helped me to ensure I involved all the groups, drawing out their answers, who to target first and how to ask the right questions. That was important to me. (Participant 7)

Two participants felt that they learned their facilitation skills more through experiential learning than anything they learned prior to starting TBL.

I just had to practice. My urge was to jump in and say 'well I'd do this and I'd do that' and it's really hard to step back and allow the students to do it. I think the facilitation of the sessions is probably the thing about TBL really. It's also about having the confidence to say 'well actually there isn't necessarily a right answer, there could be several possible answers' and getting them to understand that. Also to be confident in the fact that you won't always be able to answer all their questions and know all the answers. (Participant 12)

I feel more confident now, not as a result of any training but through getting in there and doing it and experiencing it. (Participant 16)

Two participants reflected that they felt more confident facilitating TBL classes at the beginning due to prior experiences, although one claimed that they improved further with practice.

I was very comfortable with facilitation purely because of another job I used to do which was purely facilitating post-grad courses. I was never the content expert so I did a 3-day training course on it [facilitation skills training]. (Participant 15)

At the time I felt that facilitation skills was probably one of the things I needed to develop least as I felt that the way I taught used facilitation rather than direct teaching. But it has made me reflect on how I do it...certainly to begin with I still had to stop myself from giving the answers too early. (Participant 5)

The skills required by a classroom facilitator differ partially from those needed for content delivery. The ability to actively listen, paraphrase, summarise and draw out the answers from the students rather than providing the answer and explanation yourself are key (Gullo, Ha and Cook, 2015). In TBL the academic is still the content expert but uses dialectical questioning approaches rather than didactic teaching methods (Morris, 2016). When using TBL in a nursing study most teachers adapted well to the shift from imparting information to eliciting information from students; however one did recognise that it was different for them.

It is challenging to keep quiet and not answer the questions. You have to be thinking how to turn the questions around. It's a learning curve. (Morris, 2016, pp. 149)

From my own experiences, students are unlikely to answer a question posed to a large group; however, once you hone in on a particular team of 5 or 6 students, then you are more likely to elicit an answer. If the team's answer or collaborative decision has been publically and simultaneously displayed, then any differences in class decisions are likely to lead to class discussion. Sometimes students may be keen to justify or defend their decision or

challenge the decisions of other teams, while others may require some coaxing (Sibley *et al.*, 2014).

In TBL, effective facilitation is critical to the learning that can take place through inter-team discussion and debate, and through challenging the understanding of learners (Gullo, Ha and Cook, 2015). It is important that the teacher resists the temptation to join in (Sibley *et al.*, 2014). Remington *et al.*, (2014) report their experiences of implementing TBL across several courses and found that different approaches to facilitation were being used by academics. Some would tell students the answers early on or would give their expert opinions by giving a lecture, while others would facilitate inter-team debates. My own experiences are that the facilitation skills needed for the TBL classroom are different from other forms of teaching. Generic facilitation skills training is certainly useful for all staff new to TBL; however, I concur with others that experiential learning, coupled with on-going staff development, including observations, reflections and feedback, is optimal to develop effective facilitation skills for delivering effective TBL. I agree with Remington *et al.*'s., (2014) recommendations that when multiple instructors are involved with implementing TBL across multiple courses or at programme level, then this becomes essential.

5.5 Benefits

Themes that emerged from this area of enquiry were *student engagement, student learning, and teacher benefits*.

5.5.1 Student engagement

The biggest and most commonly cited benefit of TBL that emerged from the data can be categorised under the umbrella theme of *student engagement*. Educators often experience a lack of student preparation before classes and poor attendance at them (Chad, 2012). TBL seems to engage students on a number of different levels. The data suggests that it improves students' motivation to independently study advanced assignments out-of-class, that it improves class attendance, and that it creates a framework for active engagement through collaborative problem-solving during in-classes activities.

5.5.1.1 Engaging through motivation

Some participants stated that one of the key benefits was that students came to class prepared and having completed their pre-class preparatory work, allowing class time for application.

It's very clear to me that most students do study the materials we give before attending the class sessions. (Participant 7)

They're definitely prepared for the sessions to the point where they do ask a lot of questions. I find myself keeping things back and saying 'wait until next year. We'll cover that then'. I think this is because they get ahead of themselves. They're so well prepared; we've clearly got them thinking. (Participant 9)

The data suggests that the Readiness Assurance Process (RAP) motivates students to complete the advanced assignment, a finding echoed by others (see Andersen *et al.*, 2011; Allen *et al.*, 2013; Nelson *et al.*, 2013a; Ofstad and Brunner, 2013; Morris, 2016), and in my previous research in the US. (Tweddell, Clark and Nelson, 2016)

In the focus groups students also commented on the motivational affect that TBL has on them to prepare for classes and study afterwards. This seemed to focus on the team rather than individual effort.

I feel a bigger pressure to come to class prepared and have read the material, because I have group members that are depending on me. [2nd Year Student Focus Group]

My competitiveness also does well with TBL too. When my team knows something and I don't it makes me wonder why I don't know it so I go back and reread the notes. [Year 3 Student Focus Group]

To optimise student motivation, the RAP process must be summative and contribute towards the module marks. If the RAP is only formative then some of that motivation is lost and students are less likely to prepare as well (Michaelsen, Knight and Fink, 2002).

TBL takes a flipped approach to learning. In Chapter 2 I discussed some of the problems of using a flipped approach to learning (Herreid and Schiller, 2013). One of these is the failure of students to prepare for class. This research suggests that students are preparing more in advance of their classes; this is also in line with my own experiences and could be as a result of the regularly scheduled summative readiness assurance tests. Students will want to achieve a good mark in their individual test; however, the comment above from the student focus group suggests that the team test and the accountability that comes with working in a team also motivates students to prepare. In a small team it would soon become apparent if students arrived unprepared, therefore peer pressure is likely to be an important incentive too.

5.5.1.2 Engaging through attendance

Another benefit is that attendance appeared to have significantly improved.

Definitely students showing up to class, attendance is amazing. (Participant 13)

Attendance is so much better than it was. It's nice to see the students so enthusiastic about a subject and really they are genuinely interested, they're not there just to get a good grade. They're there because they want to know the answer and there's a buzz in the room when they're working on the exercises. (Participant 9)

Attendance was a problem with the pre-TBL programme. The Readiness Assurance Process involves individual and team summative assessment that provides an extrinsic motivation to attend. This supports the findings of other researchers who also saw an increase in attendance with TBL (Allen *et al.*, 2013; Nelson *et al.*, 2013; William Ofstad and Brunner, 2013) and in my previous research attendance was found to be substantially improved. (Tweddell, Clark and Nelson, 2015). However, the attendance for application exercise, whilst better than before, wasn't as high as expected (see section 5.6.3 below).

Some students described how TBL motivated them to attend classes more than lectures. This was the general consensus although the view wasn't unanimous.

One of the big things for me was that I never went to lectures. Basically I was like able to learn on my own and just get through it. Being in TBL it makes me come so that for me is the biggest thing. So if I come to classes and I focus then I'll be fine. When I don't come to classes is when I start to cram and learn it for the test but not actually learn it, if that's makes sense. So that puts a stop to that a little more. It makes me pace myself. [4th Year Student Focus Group]

You can't afford to miss the TBL sessions. [3rd Year Student Focus Group]

I had some lectures on my foundation programme and I was motivated to attend these. [2nd Year Student Focus Group]

5.5.1.3 Engagement during classes

Student engagement during application exercises was also seen as a key benefit. As virtually all students have completed their preparatory work then they're able to discuss it with their peers and apply it to solve problems. Application exercises are designed to actively engage students in discussion, debate, problem solving and decision-making.

The biggest thing for me is the way it promotes discussion in the classroom; that's absolutely fantastic (Participant 4)

Application exercises are quite enjoyable because you get a bit of debate going. Students get quite passionate about why they've chosen a particular course of action so that's good to see because they're clearly motivated. (Participant 2)

It's nice to see the students so enthusiastic about a subject and really they are genuinely interested, they're not there just to get a good grade. They're there because they want to know the answer and there's a buzz in the room when they're working on the exercises. (Participant 9)

Most of the academic participants spoke of enhanced student engagement; however, around a third also spoke of the difficulties that this can bring when

managing a TBL classroom, the need to write engaging application exercises, and how difficult it can be to write effective ones.

There is quite good engagement in the application exercises but I have had problems. They're not always as attentive as they need to be; although someone did point out to me the problem is the exercises. TBL encourages them to discuss and debate with their colleagues and therefore it's more difficult to expect them to be quiet when you want them to be quiet. (Participant 8)

Good application exercises can engage the students really well, but I find I really have to work hard developing good application exercises that will keep them stimulated. (Participant 8)

The fact the students are so engaged is probably the biggest benefit. It always amazes me that they have all this time to talk with each other and almost all the time they are talking about and discussing the questions you've given them. That didn't happen before in traditional small group teaching, they were always talking about something else. TBL seems to really engage them. (Participant 2)

Morris, (2016, p149) reports that there was 'a real buzz in the room...and a degree of enthusiasm and a level of engagement amongst the students that had not been experienced with previously used teaching strategies'. Morris goes on to argue that creating an environment where students are involved in collaborative learning was found to be a large benefit of TBL through actively engaging students in their learning. Krause (2005) suggests a number of working principles to enhance learner engagement. These include creating an environment that stimulates discussion and debate, optimises opportunities for active and collaborative learning, problem solving in small groups, and self and peer assessment.

Students also appear to benefit from the interaction with their peers.

I like the interaction. Definitely within the teams we all have different perspectives whatever the application is and all bring different things to the table. The discussions that we have between the teams, especially

the ones we don't agree on, those are, I'm sure, designed to be stimulating, well I find them to be [3rd Year Student Focus Group]

5.5.1.4 Engagement through feedback

In TBL students receive immediate feedback during the team test (tRAT), which is part of the Readiness Assurance Process. If they don't get the question right then they discuss it again and keep trying until the correct answer is revealed.

When you're facilitating the peer feedback I think probably that is the most rewarding. (Participant 15)

Equally, it is also important for educators to know whether students have understood the key course concepts from the pre-class advanced assignment. One of the benefits of TBL is that teachers receive immediate feedback about which questions the cohort has answered correctly and which they have struggled with. This gives an indication as to which concepts might need further explanation and enables the teacher to go over any misunderstood course material.

The biggest thing is getting us on the same page, having a sense of who's understood the pre-reading and who's not. (Participant 1)

There is much written about the value of student feedback. In a literature review on formative feedback, Shute, (2008) recommends that feedback should be supportive, timely and specific, and goes on to recommend that in order to promote retention of conceptual knowledge, feedback should be immediate, as is normal practice during the Readiness Assurance Process. This may explain the engaging nature of the team-readiness assurance test as the students work together to complete the test, receiving immediate feedback as to whether their answers were correct or not. During the readiness assurance process staff also receive feedback as to whether the students understand key concepts; this was deemed to be helpful to the participants. This enables staff to tailor and focus the discussion and feedback on the concepts that have been less well understood by the students. Technology can be used to provide this degree of understanding; for example Cain, Black and Rohr, (2009) report positive results when using audience response devices to gather data on student

understanding during lectures. The content of the lecture was modified based on the responses received and the degree of understanding of the key concepts by students. My own use of audience response devices in lectures and in TBL have been largely positive, the ability to gather and access real-time data on students' understanding has been very helpful in focusing a short discussion after the test. I have however encountered some logistical issues including their ease of use and mobility, and problems including user errors and occasional problems of connectivity.

5.5.2 Student learning

There was a clear belief amongst participants that more class time was dedicated to the application of knowledge when learning using TBL, and that this will prepare students better for practising pharmacy once qualified. In pharmacy, information is readily available; however, learning how to access the right evidenced-based information and then learning how to use it effectively is an important aspect of pharmacy education.

The biggest positive is that you get better application of knowledge, better exposure to real practice for students. This benefits staff learning too as you have to be better prepared yourself [Participant 12]

I'd say that in modern day pharmacy practice it's far less important to have the content and far more important to be able to access it, know what to do with it and apply it to different situations [Participant 15]

There was also a belief that students were learning more from an earlier stage, questioning their understanding to a great extent, and taking deeper approaches to learning than before. A number of participants spoke of an increased energy in the room and the rich discussion that emerged from team discussions.

The energy in the room is just phenomenal; the discussion that you hear amongst the students, the depth and complexity of the topics that they can address in an application exercise is over and above anything I've seen before. [Participant 10]

The students are definitely learning more, I can tell that from the type of questions we are getting from them. I've never dreamt of hearing such depth in year 1. [Participant 13]

When you see 2nd years discussing issues in a way that you're maybe not had 3^d or 4th years do before you know that this approach has just got to be right. [Participant 5]

They're obviously learning much more as they go along. The discussion and engagement we get in application exercises are great. [Participant 8]

Another positive raised by participants was the belief that TBL was helping students develop skills needed in the workplace, and the hope that this would make them better practitioners in the future. These included decision-making, team-working, communication, negotiation and problem-solving skills.

I hope that it's developing students' decision making skills and confidence because they're having to make collaborative decisions within a fixed timeframe and having to justify them to other students in their team and to the wider group. This is often what happens in practice. [Participant 11]

The most rewarding thing is what we call the hidden curriculum, the things we didn't expect, that building of personal confidence and developing skills such as team-working skills, negotiating skills and communication skills, it's seeing them improve in that way [Participant 15]

It's that team approach that they learn...if they can't work with other people and apply what they know to help contribute to collaborative decisions for the benefit of the patient, then they're not going to be good pharmacists. [Participant 2]

Students themselves also identified that learning how to work with other people would be beneficial.

I like the fact that it teaches you how to work with people. You're forced to work with different personalities and we don't always agree and

always come to a consensus on our answer but it shows you how to compromise. [3rd Year Student Focus Group]

You really learn to work with other people. There are some people that you're not going to get along with in the real world but you need to learn how to work with them. I mean you can't quit jobs because of people all the time. [4th Year Student Focus Group]

It's already helped me in terms of communication skills and also gaining the confidence...it's definitely made me feel more confident in my own intelligence. I used to be terrified to speak in front of even small groups. [2nd Year Student Focus Group]

It has made me a better communicator whereas you were that person who reads the book and I can regurgitate and that's all I can do. I just think it makes me more well-rounded. [3rd Year Student Focus Group]

These results are in line with those of other studies. In their study of the use of TBL across pharmacy schools in the US, Allen *et al.*, (2013) found that TBL was perceived to be more effective than traditional lectures in promoting learning across all domains of Bloom's Taxonomy, with the greatest difference at the higher-level domains. Nelson *et al.*, (2013) reported that students perceived that TBL was improving their abilities to communicate and think critically, hence improving their professional competencies. In a review of the educational theory base of TBL, Hrynchak and Batty, (2012) also conclude that TBL enables students to develop critical thinking and team-working skills. Ofstad and Brunner (2013) reviewed the literature across the education of a number of healthcare professions concluding that TBL improves interpersonal and team skills and knowledge retention. A systematic review of quantitative student performance data (Fatmi *et al.*, 2013) concluded that TBL appears to improve knowledge, although they believe that more research is needed. From my own experiences it is the fact that students come to class prepared to work with and apply their knowledge to collaboratively problem-solve and do so at higher levels of Blooms Taxonomy (Bloom, 1956) that promotes deeper approaches to learning. I would argue that when students are held accountable to their peers and motivated through assessment and task design, then these could be the

reasons students work, prepare, and learn to levels we've not seen before on the programme.

5.5.2.1 Peer Learning

One of the participants also described peer learning as an important benefit of TBL.

I think one of the benefits is the discussion that they have during the tRAT. I think peer learning can be so rich. I'm sure they must benefit from that discussion (Participant 3)

This was also reiterated in all three of the student focus groups.

People bring different things to the table and that adds to your thinking to, so you're not only engaging with what you've learning by yourself but also what you have learned from your teammates. [3rd Year Student Focus Group]

In some cases teaching what you know to another person kind of reaffirms what you know at the same time so you will keep it for years to come. That's also another good thing like I know what I'm weak at is anything structural chemical related, I'm not very good at that so I'm relying on other people who do know that to teach me. It helps that way too. [4th Year Student Focus Group]

That's what I like about the team is that I learn from the other members, every day I'm sure I learn something from somebody. Somebody's always got some way of explaining it better than the way I understood it myself. [2nd Year Student Focus Group]

Peer learning was a theme that emerged from research I carried out in the US with a number of participants identifying it as a benefit of TBL (Tweddell, Clark and Nelson, 2016). Topping (1996) describes peer learning as occurring when one student explains a concept to others. Lockspeiser *et al.*, (2008) found that students who learned from their peers, and those who served as peer teachers, all identified advantages to their own learning. Peer teachers benefit by processing the concept, verbalising it and in doing so are relearning the concept

again through explanation. Recipients of the explanation benefit by hearing it from a peer that has gone through the same learning recently themselves, and are usually at a similar stage of development. Banham and Dawson, (2016, p 12) elaborate on the benefits of peer learning in school children:

‘On occasions it might be a peer in the classroom who can find the right language to explain a tricky concept to another student. Also a pupil who is struggling might be more likely to interrupt a peer for clarification or to ask a peer to slow down and go over something again until it is understood.’

When learners discuss with others, summarise, justify or verbalise their responses they are undergoing elaborated learning. Cognitive science has shown that how we memorise, store and retrieve information is enhanced when the learner actively processes information rather than passively consuming it (van der Vleuten and Driessen, 2014). Constructivist learning theory suggests that knowledge cannot be simply given to learners. To learn effectively learners must actively construct their own meanings by relating new knowledge and experiences to pre-existing ones (Stage *et al.*, 1998). Chin and Brown, (2000) report a study of deep and surface approaches to learning and found that students who took a deep approach were more spontaneous with their ideas, gave more elaborate explanations, referred to personal experiences and asked questions relating to explanations and causes. Students who took a surface approach provided explanations that just rephrased the question, referred only to what was visible, and asked questions about basic factual or procedural information (*ibid*). Arguably, presenting students with challenging and authentic problems to discuss, debate and solve can help create meaningful learning. Novak, (1988) explains that this form of learning require relevant prior knowledge and meaningful learning tasks compared to surface learning that is arbitrary, verbatim, unrelated to experience, and lacking learner commitment to relate new and prior knowledge. In TBL, learners are presented with authentic and meaningful learning problems as application exercises. As learners work on solving these together they utilise and apply prior knowledge and learning and together agreeing a specific team decision. In coming to a collaborative

decision learners often develop elaborate analyses, evaluations, and explanations in their teams. This is developed further during the facilitated inter-team discussion when students elaborate further by summarising, defending and justifying their collaborative decision to other teams. This was also identified as a strength by the student focus groups.

[In TBL] during an application exercise, if someone has a different thought to you, then you have to explain why you think your answer is correct so that actually makes you think more about what is being asked of you. It's kind of a higher-level thinking. [4th Year Student Focus Group]

You remember things better, that's the whole point of TBL is that you learn things better when you apply it. [3rd Year Student Focus Group]

5.5.3 Teacher benefits

5.5.3.1 Team teaching

A significant benefit of using TBL across the curriculum seems to have been the team approach used by pharmacy educators to the development and delivery of the TBL learning resources, and the camaraderie this has established. Approximately two thirds of participants discussed how they had benefited from working with other educators, including those outside their immediate discipline area. Most of these also stated that they now have an increased understanding of the programme as a whole and the role that they and their colleagues have in its delivery.

Previously when we used to do lectures each one of us did our own module and there was very little interaction with any other staff. With this [TBL programme] everybody is involved and I have a more holistic view of the whole course and I have increased my understanding of the practice side and of pharmaceuticals by working with these people. [Participant 1]

There are so many positives from getting people working together, learning about the programme and what other people bring to the table. (Participant 14)

The biggest positive for me is working with [staff] teams that I've not worked with before. I've learned a lot more about the school itself, what skills we have and the people we have and that they can offer. As a result of using TBL there is a new team spirit that has built up across the school, not only for the students but also for the staff. (Participant 13)

Participants explained the benefits of learning from, with and about each other as they developed the new programme and learned about TBL together. For example this could be by bouncing ideas off each other or reflecting together on what went well and what could be improved after a TBL class.

Working and teaching with staff outside my immediate discipline has helped me to refresh my knowledge [of that discipline] and personally I've enjoyed doing that [Participant 5]

I've been working with colleagues I wouldn't normally work with...I've learned a lot of things myself and it's made the writing of the material a lot more interesting [Participant 9]

Working with other staff has helped me develop my skills as a TBL practitioner. Sharing ideas, reviewing other people's resources and seeing how they deliver a TBL class has been really, really helpful for me. [Participant 6]

Participants also spoke of how working as staff teams to develop TBL resources helped them to provide a more integrated curriculum, as required by the pharmacy regulator, and how this has focussed their thinking to ensure their content is relevant to the practice of a pharmacist.

I feel that we're creating something that is genuinely integrated, which has involved working closely with colleagues that I don't normally work closely with and that's actually been really enjoyable as well. [Participant 10]

The positive experiences for me are that I've been able to see the application of the sciences to more practice applications by talking to other staff, which we never did before when modules were standalone. I

can now see more where the course is going and it's forcing me to think 'what does a student need to know to be able to do their job' rather than thinking 'what shall we cover because it's interesting for us'. [Participant 16]

These benefits weren't anticipated, primarily because the literature predominantly considers quantitative measures of student feedback and performance when used in specific modules. Using TBL across a programme isn't common and there is little in the literature about this. However, two papers have been published on this subject, one where TBL was implemented across a pharmacy programme and the other across multiple modules. Nelson *et al.*, (2013) reported benefits of TBL 'Brown Bag' sessions when implementing a TBL curriculum for the first time. Here staff would meet regularly to share early experiences of successful applications and address any problems collaboratively. Remington reports that academics implementing TBL across several course modules increasingly supported each other's developments by sharing successes, working through any problems they encountered (Remington *et al.*, 2015). Some of the participants in this study spoke with pride and passion about their achievements as teams and how they feel closer as a department as a result of using TBL. My own experiences of TBL have been positive when working alongside others in the development and delivery of TBL resources. I also believe that there is a synergistic effect of bouncing ideas off each other, learning from how your co-facilitator engages students, and reflecting on the class together afterwards. There is also merit in setting up a peer review process so that TBL resources can be reviewed by staff who haven't been involved in their development. This also helps with quality assuring resources and with the dissemination of our own learning.

5.5.3.2 Teacher enjoyment

Ten of the participants specifically commented that they enjoy this style of teaching.

It's just so much more enjoyable and you come out of sessions knowing from their answers and responses that they've learned something. I've felt with the first and second years that they know and understand so

much more than I would have expected them to at this stage and that gives me a real feeling of satisfaction. I think that's the big highlight for me. [Participant 4]

It gives you a buzz when they challenge and question you. They will have really thought it through. They're able to analyse and debate from a really early stage and that challenges us! Sometimes you have to say 'well I think you might be right, I'll have to check that'. [Participant 5]

I really enjoy it, especially when you're able to create something that does more than the sum of its parts and does more than you were expecting. [Participant 15]

Michaelsen, Knight and Fink, (2002) report that one of the greatest benefits of TBL is the positive impact on the teacher. Observing students engaged in problem-solving in your discipline, asking deep and pertinent questions, taking part in meaningful debate and coming to class more prepared than ever before can give a deep sense of satisfaction, and can provide or restore the joy of teaching.

It just feels so, so worth it and that's not just down to integration, that's not just down to working with colleagues, those are all good benefits, but it's down to the TBL approach and the energy that that brings to the classroom and the student body that make it worth it. [Participant 10]

I've really enjoyed using TBL and hopefully we'll continue with it for a long time and get really good at it. [Participant 3]

I really enjoy it. I don't really ever remember walking out of a lecture and being amazingly happy that I've done a really good job, but you do with TBL and I look forward to them [TBL sessions]. [Participant 4]

A lot, if not most of the staff like teaching in this way, although some did have an initial fear of doing something different. [Participant 11].

Others have reported increased staff enjoyment of teaching, both in the pharmacy TBL literature (Grady, 2011; Kebodeaux, Vouri and Hurd, 2014) and in other disciplines (Michaelsen, Knight and Fink, 2002; Walters, 2012; Sibley et

al., 2014). Although not TBL, a qualitative study of social studies teachers' views of learner-centred instruction (Yilmaz, 2008) found that teachers' demonstrated positive attitudes and enjoyed using learner-centred approaches over traditional ones. I also reported in my research in the US that TBL improved the enjoyment of teaching for some teachers and was the reason that some of them joined the school (Tweddell, Clark and Nelson, 2016).

5.6 Difficulties

Participants raised a number of difficulties encountered during TBL implementation. Four main themes that emerged from the data: *workload; logistics; application exercises; facilitation skills.*

5.6.1 Workload

The additional work involved when commencing TBL has been well documented (Andersen *et al.*, 2011; Chad, 2012; Nelson *et al.*, 2013; Ofstad and Brunner, 2013; Remington *et al.*, 2015) and the results from this study show that workload was problematic for staff. The time needed to design effective TBL resources should not be underestimated, and sufficient resource and lead-time should be set aside when switching to TBL for the first time. This is compounded when transitioning from a traditional approach in an existing programme to using TBL across all stages of a new programme. There was a few months lead-time but we did underestimate the time involved. Additional funding was made available for staff training, equipment and refurbished rooms; however, there wasn't sufficient extra human resource to backfill staff time.

One of the biggest challenges is that I underestimated how much time is involved in developing a TBL unit from scratch. [Participant 11]

The workload has been immense because we are effectively delivering an old course and writing a new course all at the same time [Participant 10]

However, as these participants point out, this additional workload isn't necessarily all attributed to TBL. The entire programme was new and therefore some degree of additional work was to be expected, particularly as the regulator required a higher degree of subject integration than before.

I think that if we'd done integration in another way then that would have been a big workload as well. [Participant 10]

You're writing your units to follow on from others, linking everything together in themes, working with others so the extra workload is more than just TBL; however, it still seems a lot more work to pull together the TBL materials than it does to write one lecture. [Participant 11]

The consensus though was that preparing TBL resources for the first time required effective time management, a considerable amount of planning, and lead-time to prepare the resources when a module is run for the first time.

It's the time involved, not just time to sit and write but the time to think, the time to discuss with others and plan it. Having that headspace to think and plan is quite rare. [Participant 12]

The biggest negative is that it is very labour intensive [Participant 14]

The amount of time required to create good quality material is significant. In the early stages we didn't realise how long it would take which was a problem. We now know how long it takes but we still can't find the time and so it's still a problem, but at least we know that now. [Participant 15]

However, once the resources were created, participants generally felt that the second iteration would be significantly less work. This generally turned out to be a correct assumption. The teachers were also asked to reflect on what worked and what didn't work and capture this learning so it would be available to them when planning for the following year.

The workload involved in creating good TBL materials is a significant piece of work for a group of staff but that is going to go away once we've created the whole course. It will be a case of tweaking, improving and reflecting on what worked and didn't work last year...I think that once

we're at steady state then the workload will be no bigger than any previous course or variation or method of teaching. [Participant 10]

This was demonstrated in a study in nursing education where the time taken to learn about TBL and develop a module from scratch was estimated to be 61.5 days for the first delivery. This was reduced by 80% to 12.5 days in the subsequent delivery (Morris, 2016).

One participant felt that students didn't appreciate how much preparation went into preparing the TBL resources and felt quite resentful about this.

It requires a lot of work in the background and this is not seen or appreciated by students so when you get a kick-back from one saying 'you're not doing any of the work, I'm doing all of the work' then I'd really like to say 'well just come and watch me write a unit and see how much work I'm doing' [Participant 4]

It is therefore important that both staff and students understand the role of the teacher in designing learning activities that help students to process, and use the course content rather than just providing it.

Two participants did comment that while the workload was heavy, the delivery was often over a short period, leaving significant time between units for research and other administrative duties.

It feels very full on but then it's done in 2 weeks, so I think that it's very concentrated blocks which in a way I prefer because it leaves other full weeks for doing research or anything else because you know where your teaching's going to fall and it's in concentrated spells. The preparation at the beginning while we're writing it is obviously a lot of work but you'd get that with any new course. [Participant 9]

Teaching in short intensive bursts is actually quite nice. They're hard and you're tired but potentially if you do a 2-3 week unit there's nothing to stop you having a week off afterwards and then spend the next month on your research, which for a lot of staff will be quite lovely. So it's a lot of work bringing it in but it's always going to be more work. [Participant 10]

However two other participants commented on how tired they were after a TBL session, particularly after facilitating two sequential two-hour application exercises.

I've found the double sessions of application exercises a struggle. I know that I don't perform as well in the second session as well as the first.
[Participant 8]

It's much more exhausting than it was. The way the timetable works means it's a condensed short burst of intense classroom time, which is exhausting at times. [Participant 15]

If TBL is going to be used across a programme the planning, resourcing and organisation is likely to be greater than when used in individual modules (Remington *et al.*, 2015; Tweddell, Clark and Nelson, 2016). Andersen *et al.*, (2011) also reported underestimating the effort and planning required. Participants generally agreed that preparation time was initially substantially greater and, although it did decrease the subsequent year, it was still thought to be higher than traditional teaching methods such as the lecture. Chad (2012) concurs that educators are likely to require more preparation and administration time to deliver TBL compared to using traditional methods. Ofstad and Brunner (2013) agree that it will take time to review, revise and reconstruct existing course material to a TBL format. Kebodeaux, Vouri and Hurd (2014) report that 75% of respondents indicated an initial increase in workload. However, Cox, Kemp and Rodger (2013) found that TBL did not require additional resources but did need a rebalancing of the teacher's time away from content delivery and into writing resources and pre-class planning. My own experience is that commencing a complete academic programme from scratch requires considerable time and effort. However, switching an existing module from traditional methods to TBL required considerably less time, as many of the resources already existed, many of which may only needed minor adaptations to the content and logistics.

Students also identified that TBL required a lot of work for them too:

It's a lot of work. There's a lot of time outside of the classroom. I feel like we're always studying. [3rd Year Student Focus Group]

5.6.2 Logistics

Participants raised a number of logistical and quality assurance barriers. These included managing assessment and attendance data, the allocation and setting up of suitable rooms, using technology, working with other staff, quality assuring the readiness assurance process, and ensuring consistency across the programme. These are all related to using TBL at scale.

There are some administrative challenges around managing student attendance data and how marks for iRATs, tRATs and application exercises are allocated. [Participant 11]

There were other logistical issues at the outset but have been largely overcome by processes. These included equipment, technology, room availability and the logistics of the RAP process.

A lot of the negatives at the beginning were to do with logistics, learning how to use the technology and equipment. They were pretty easy to fix. [Participant 2]

One participant found that the rooms used for the RAP weren't appropriate and that the university assessment regulations weren't designed for this form of assessment.

The TBL rooms are ideal for the application exercises but the rooms we're using for the RAP sessions aren't really fit for purpose and set up for assessments. The standard assessment regulations were unworkable for this and we've had to devise new ones and get these approved. [Participant 11]

Another participant commented that the use of regular RAPs led to increased invigilation and the feeling of 'policing' tests. If closed-book summative classroom tests are to be used, then some form of invigilation is needed for this element.

The RAP takes up a lot of academic time in terms of policing student conduct. Because they're being tested and it counts, it can drive some of them to some bad behaviour. We do tests all the way through the modules so that had been quite a challenge. [Participant 2]

There were also comments about the logistics of working with other staff. Whilst working closely with other staff when designing TBL resources was seen as a positive, it also caused logistical difficulties such as finding time to meet, different ways of working, and of managing expectations. Teachers had previously worked more independently on developing and delivering their teaching resources, and some participants struggled to work in a more collaborative approach.

Logistically it's a challenge to physically get together. Other people work differently to me, I like to be organised and prepared but others work to different timescales. When I do get the resources they've produced some really good stuff but the effort it takes is quite stressful and sometimes it's a lot easier to go 'oh I'll just do it myself' [Participant 12]

Some staff are just not used to working with other people and that has been a challenge. It's been hard to get them to do things within the timeframe and some don't want me to critique their work whereas I really want people to do that for mine. Some just say, 'I'll do my bit and your do yours and we'll stick them together' but of course that's not really the idea. It's hard criticising senior colleagues and I find it difficult to say 'actually what you've written is not much use to me' [Participant 4]

Two of the participants clearly found it difficult to work with other teachers who may have been more used to working in different ways to them. However, whichever method was used to integrate science and practice more effectively, as required by the pharmacy regulator, would potentially have created this barrier so it's unlikely to be unique to TBL.

Remington *et al.*, (2014) also report logistical hurdles when implementing TBL on a large scale. These were centred on staff workload burdens and classroom infrastructure. They also encountered significant problems with inconsistency in

approach to TBL, which seemed to be less of an issue in this study, although two participants did raise it.

We do need to develop a more unified way of doing TBL as there are different messages from different lecturers [Participant 13]

Consistency in running TBL sessions, particularly application exercises is still an issue. There needs to be some variety with the design of applications however we need more consistency with the delivery of these sessions, for example what students can take away with them. [Participant 11]

This lack of consistency was also raised in one of the student focus groups and one teacher seemed to be using TBL differently to the rest,

We have one teacher, I don't know if it's her inexperience with it or she doesn't understand the way it's supposed to work, it just doesn't work as well with her applications. [Year 2 Student Focus Group]

5.6.3 Application Exercises

Participants commonly identified application exercise design as the most demanding element when writing TBL units.

I hadn't thought that the application exercises would be a problem but they were harder to write than I thought they'd be. I needed quite a bit of help putting these together [Participant 6]

I find the application exercises the biggest challenge in terms of where to pitch the level. You want to push them beyond the reading pack and the answers aren't meant to be easy to find, but there again you don't want to make them too hard either. I did one that was too hard and I had to give them hints so they could do it. If you make it too difficult then you'll lose them. [Participant 9]

Designing, planning and managing application exercises is at the heart of effective team-based learning (Roberson and Franchini, 2014). The planning

and designing of application exercises is a vital stage of the process but application exercises need to be congruent with learning outcomes, authentic, and engaging. They require team effort, and create debate and discussion of complex issues that culminate in a decision. From my experience it is important to think about how the student teams will tackle the problem, what resources will they access, what knowledge will they draw upon to inform their decisions. You need to anticipate the pitfalls, the dead-ends that some of them will take and plan for how you facilitate the discussion, and ensure the students capture the key learning points from it. Andersen *et al.*, (2011) report that it was their belief that application exercises would be easy to write; however, the reality was that they were more time-consuming than anticipated. Farland *et al.*, (2013) also report that application exercises are difficult to write, especially at the higher levels of Bloom's Taxonomy (Bloom, 1956).

Another difficulty was planning and anticipating how long application exercises will take teams to solve in the class.

The main downside for me was getting the timings right. I found that I had to use a timer and be strict to keep the pace going. If they've got 20 minutes to do the task then you need to keep them moving. Occasionally you might need to give an extra couple of minutes here and there and this needs to be built into the timings. [Participant 6]

This was also raised during the student focus groups

I know that the timings of some of the applications can be kind of tricky. Sometimes there's too much time for an application, sometimes there's not enough time for an application. [2nd Year Student Focus Group]

some teams just take a lot longer than other teams and it really impacts what happens in the classroom. [4th Year Student Focus Group]

An application exercise can be well designed but not well executed. If teams are given as much time as they need then they will finish at different points, leaving some teams waiting around for a substantial amount of time leaving class discussion time squeezed at the end. Setting an approximate timeframe

for each exercise will provide teams with an end point to work towards and help overcome any differentiation in team motivation and focus.

There was also some, albeit lesser, concern about how teams captured the written rationale behind their decision for later summative marking.

We assess some application exercises and the rationales that they produce are quite mixed. They don't tend to write that much and it tends to be a bit scruffy. The discussion is good and they learn the main points but I don't think they get much from writing it down, perhaps some individuals do. [Participant 9]

It is currently our School's policy to assess some application exercises; however, there is some debate about whether extrinsic incentives are necessary with TBL application exercises. The results from a study in a medical school suggest that students preferred ungraded application exercises, which reduced stress and improved group discussion. There was, however, some concern that effort and motivation might be reduced, although this wasn't realised in the summative assessments which produced no significant differences between graded and ungraded application exercises (Deardorff *et al.*, 2014). The use of summative application exercises on our MPharm programme should probably be revisited. If deemed necessary, there may be other methods of assessing team rationales such as through verbal responses. This area needs further research.

This issue was also raised during one of the student focus groups and there was a general consensus that if application exercises weren't assessed then there would be less motivation, perhaps demonstrating that pharmacy students are still motivated extrinsically by marks.

People wouldn't put as much effort in. People would just pick an answer and hope that another team has the right answer. Or they wouldn't show up. [3rd Year Student Focus Group]

There was also some concern that there was insufficient variation in the type of application exercises used.

I think students are getting bored with the repetition of the same application exercise format. Whenever we do anything to change that format students like it, which tells me that the same structure of select from a list can be overused. So thinking of creative ways of doing application exercises is important. [Participant 13]

Different formats for designing and reporting application exercises are probably important to ensure variety. The '4S' criteria used in developing application exercises is a framework to foster discussion, debate, collaborative decision-making and elaborated learning and as such creativity is to be encouraged. Sibley *et al.*, (2014) provide examples of the use of voting cards, whiteboards, post-it-notes, gallery walks, transparencies, all of which can be used to increase the variety of the design and reporting of application exercises. Roberson and Franchini, (2014) provide suggestions for framing TBL application exercises e.g. ranking, sorting, scoring, sequencing, matching, selecting, assigning, creating and rating. In my experience, designing application exercises provides the opportunity to be creative in trying different types of tasks to engage the teams.

There was a general consensus that TBL had improved attendance, particularly at RAP sessions; however, attendance at application exercise sessions, whilst better than lecture attendance, was still not as good as expected.

I would say that they are more engaged than before but there are still students who don't turn up to application exercises. I think there is still an issue with them prioritising the test. So we get 98% attendance for the RATs and yet we're down to 80 something per cent at the application exercises. Maybe they've got legitimate reasons but there always seems to be gaps in some teams...and that's frustrating. [Participant 2]

This hasn't been reported in the literature. There could be a number of reasons for this. Whilst attendance at the Readiness Assurance Process was reported as excellent, students don't always seem to be motivated to attend all application exercises, perhaps because they don't always see them as important to their learning. Students may be balancing academic work, part-time jobs and potentially other responsibilities more than a generation ago. They will often sacrifice class and study time in order to work for money

(Richardson, Evans and Gbadamosi, 2014). They may have to make a difficult choice over which class to miss. Faced with a choice, they are likely to choose to attend assessed classes over non-assessed classes.

5.6.4 Facilitation skills

A number of participants encountered some difficulties facilitating a TBL class. Some of this relates to facilitation skills and classroom management of active learning.

I have had problems with facilitation. I think they're not always as attentive as they need to be although somebody did helpfully point out that the problem is with the exercises. TBL encourages them to discuss and debate with their colleagues and therefore it's more difficult to expect them to be quiet when you want them to be quiet. It's trying to get them to appreciate that there's a time for talking and a time for listening.
[Participant 8]

There's a lot of people who switch off during the discussion, they all think 'well I've got the answer, I can see that most people have put the same answer, I don't want to know anymore than that' and that can be hard to facilitate. [Participant 3]

I did struggle at first with the whole summarising and paraphrasing and turning the questions back onto them. I had to stop myself just going into 'lecture' mode and giving them my answers or opinions too soon.
[Participant 1]

This was also commented on during one of the student focus groups:

Some staff need to improve the way they ask the questions. [2nd Year Student Focus Group]

Facilitating a TBL application exercise is likely to require different skills to giving lectures. It will of course depend on how much experience the teacher has had with other forms of active learning and small group teaching prior to TBL. Ofstad and Brunner (2013) also report that moving from the more traditional 'sage on

the stage' to 'guide on the side' could lead to a feeling of a loss of purpose in some educators as they are no longer controlling all the learning in the classroom. I would also echo the view of participant 1, even after 5 years of using TBL, I still have to stop myself from giving my view or the correct answer too early and instead try and call upon the student resources in the room to correct mistakes or answer student questions. Active listening is also important so you as facilitator can summarise, paraphrase and confirm understanding. Remington *et al.*, (2014) also reported differences in the approaches that their teachers used in facilitating application exercises and identified the need for staff focus groups, peer review and on-going staff development.

5.7 Lessons learned, evolved practices and personal development

Participants were asked about what they'd learned from their experiences of using TBL, how their TBL practices had changed over time and whether these experiences had contributed towards their personal development. The key themes that emerged were: *skills and practices as a TBL practitioner; pedagogical practices; personal transferable skills.*

5.7.1 Skills and practices as a TBL practitioner

Participants spoke about how their TBL practices had evolved and the skills they'd developed as TBL practitioners. Participants spoke of four distinct areas of development. These were the design and development of application exercises; the facilitation skills for TBL; developing multiple-choice questions for the readiness assurance tests; and designing the advanced assignment.

Of these four areas, participants spoke in more detail about what they'd learned from designing, developing and delivering application exercises for the TBL classroom.

I've got better at writing the [application exercise] questions. You need to make them interesting enough and challenging enough to get a really good discussion going afterwards. If they're not particularly exciting or

engaging or real then a lot of students just want to get the answer and get out of there. (Participant 10)

When you get it right, they get really engrossed in the discussion and they're all arguing about it, you can't get them out of the classroom! It's fantastic when that happens, but it doesn't happen enough yet. I do feel like I need a bit more development in creating these really good application exercises. (Participant 10 continued)

The most successful application exercises I have used are authentic, so that students can see the purpose, relevance of the task, and can actually picture themselves encountering similar problems in the workplace. Application exercises should create discussion and debate in teams and between teams, require team effort and discussion, and be designed to have multiple possible answers which student teams defend. These are difficult to write and the participants often struggled at first.

I definitely started off making them too easy. I've made them harder and harder and less structured to the stage where I thought they'd never get them, but most of them do, or at least most of the way there by the end of the session. (Participant 9)

Another participant talked of improved confidence with experience and the importance of sharing ideas and experiences.

I feel that I've got better at writing these as I've got more experienced because you start to get a feel for which types work well. I think it's important to see how other people write theirs and to try and observe how they run them. (Participant 11)

The same individual went on to discuss the need for experimenting with different types and styles of application exercises

I've now got particular styles that I know work well and I tend to stick to them; however, what I should be doing is introducing as much variety as possible...I don't think we've got the balance right between consistency of approach and variety. (Participant 11)

Another participant discussed how they had started off with one form of application exercise in year one and then went onto experiment with other forms in year two

I started off with the single choice with one answer and then in my second year experimented more with asking them to create something, for example a revision guide for someone else to use and asking them to draft ideas of what would be the most important things that they'd put in it. (Participant 15)

Participant 4 sums up the general feeling that participants spent the first year learning what worked and what didn't, developing their own skills and confidence in task design and delivery, and by year two were developing a desire to experiment with new types of application exercises to increase variety.

I'm much more confident now. I feel much more that I know what I'm doing and I'm starting to experiment with different types of application exercise now. I feel braver and a much better idea of what will work and what won't work. (Participant 4)

When using TBL across a programme some participants were concerned about the overuse of some types of application exercises. They suggested that staff explored creating and testing out new and different types of application exercises. Without this some participants thought that students and staff might tire of the format, particularly if the traditional MCQ format became overused.

If they've all got set pattern then it becomes very samey and I think that the excitement that we have at the beginning will wane...Larry spoke of using maps and pinboards and it would be really good if we could develop that sort of thing. (Participant 3)

Participants spoke about their learning from experimenting with different types of application exercises, reflecting with each other about what worked and what didn't, and sharing their experiences with a wider audience. Creating a supportive learning environment for teachers is likely to be important when teachers are introduced to and start using a new pedagogy such as TBL across a programme. This peer support mechanism to share ideas and experiences of

what worked and what didn't has also been advocated by others using TBL across a programme (Nelson *et al.*, 2013) and across multiple modules (Remington *et al.*, 2015)

Participants also spoke of their development as a facilitator in the TBL classroom.

I think I've got better at facilitation. I've dropped into a personal style which works for me. This was fairly quickly, after one or two sessions. (Participant 16)

The ability to think on your feet and facilitate the discussion, actively listening to and responding to what people are saying. Learning that it's not just about 'here's what you need to know' and telling them it or here's the answer. It's about engaging them more in discussion through facilitation. (Participant 2)

Facilitation came fairly naturally to me as I've had some experience teaching to small groups of multi-professional groups at weekends where all I did was facilitate and steer a discussion. That experience helped enormously. (Participant 10)

I've got a lot better at holding back, not giving the prompts but drawing out the discussion and justifications from the students. I don't feel the need to fill awkward silence if no one talks immediately; I know someone will chip in. (Participant 9)

Participants advocated strategies such as waiting for students to speak, using supportive and encouraging phrases or open questions, and directing questions to other students or teams. Other techniques included listening in to the intra-team application exercise discussions to identify interesting lines of enquiry or conversations, and identifying students with specific expertise or experience, all of which can be drawn out and elaborated on during the inter-team discussion after the teams have revealed their decisions. These strategies, along with others such as summarising, paraphrasing and asking students to formulate their own questions to ask other teams are also advocated in the literature (Sibley *et al.*, 2014; Gullo, Ha and Cook, 2015).

A further important developmental area highlighted by a few participants was the need to ensure that the RAT questions were written at the right level.

I struggled initially with ensuring that the RAT questions were at the right level. Are we testing their engagement with or are we trying to do an exam for the module at the beginning of the unit. Learning to get the level right is important; the RAT questions shouldn't be overly complex.
(Participant 2)

The purpose of the readiness assurance process (RAP) is to ensure students understand the fundamental principles, concepts and knowledge that they can apply to a problem in the subsequent higher-level application exercises (Sibley *et al.*, 2014). Assessed RAT questions motivate students to prepare for class and reward them, through assessment, for doing so. Farland *et al.*, (2013) advise that RAT questions cover 'big picture' concepts and that most are written at the lower levels of Bloom's Taxonomy (Bloom, 1956), but to also incorporate some questions that are sufficiently challenging to create discussion during the team readiness assurance test (tRAT). From my own experiences it is sometimes difficult to predict how well students are going to perform on RAT questions. Educators using MCQ questions should be encouraged to review the performance of each question by evaluating its difficulty and discriminatory indices. These factors are important in deciding whether questions can be reused, reworded or discarded. Some participants in my previous research study also struggled to achieve the right level of difficulty in their RAT questions, having initially set them too hard (Tweddell, Clark and Nelson, 2016).

The final development area related to the authoring of advanced assignments; these have evolved from initially being predominantly reading packs to becoming interactive study guides.

The pre-class work has become much more interactive. I think the quality of the pre-reading has become much more structured using language students will understand with signposted activities and making them more interactive, so that's definitely improved. (Participant 15)

5.7.2 Pedagogic practices

Some participants spoke about an increased understanding of curriculum design, educational theory, and how they'd learned more about the subject areas that others have traditionally delivered in the past in isolation.

It makes you see everything completely differently...I understand more of the theory about teaching and why we have learning outcomes and things about curriculum design that I didn't really understand before.
(Participant 12)

I now know much more about the way students learn and I understand now that it's much more than just the delivery of content. I think much more from an educational point of view rather than a content deliverer.
(Participant 15)

One participant spoke of how TBL helped her understand the difference between 'assessment *for* learning' and 'assessment *of* learning' and how relating the practice of TBL to educational theory helped with her postgraduate studies.

I used examples of TBL quite frequently when talking with my fellow students on the PGCHP and how it helps engage students and how we manage feedback...thinking about how we used TBL and the theory behind it really helped me when I was writing my assignments.
(Participant 2)

Some participants spoke in particular about how TBL is a conduit toward increased integration of different subject areas and the benefits this has to them as educators delivering a wider curriculum. This is now a requirement of the pharmacy regulator. In an integrated pharmacy curriculum, the relationships between different science and practice disciplines have been strategically planned to form a composite programme (Husband, Todd and Fulton, 2014). An integrated pharmacy curriculum can help students to see the relevance of the pharmaceutical and pharmacological sciences to practice problems; this helps prevent compartmentalisation of subjects previously taught in isolation. However, the challenge is to ensure the balance is right between ensuring

students are presented with a logical and organised sequence of learning but still understand the role of the different disciplines when applying their knowledge to solve complex problems, and are still challenged to make their own integrations across disciplines (Husband, Todd and Fulton, 2014).

I've got better at trying to figure out ways of integrating my subjects with other disciplines and write things that are more clinically relevant than I might otherwise have. (Participant 10)

It's been good to work more closely with people of a science background when we've been developing and delivering teaching. I think this develops the scientists to be more aware of how their subjects can be applied more to practice and develops the practice people to be more aware of the underpinning science. (Participant 11)

TBL is a great tool for integrating across disciplines in a field. (Participant 15)

Integrating science and practice in TBL application exercises makes me re-learn my science and ensure I draw on this when writing the practice cases. (Participant 5)

Previously each one of us did our own thing with very little interaction with any other staff...with this TBL curriculum I have a more holistic view of the whole course and I've increased my understanding of pharmacy practice as a result. (Participant 1)

This is not without its challenges. The more integrated a curriculum, the less emphasis there is on individual disciplines but the more there is a need for staff participation, communication and collaboration in curriculum planning (Harden, 2000). Such situations require the curriculum design process to take a programme-based approach, requiring collaboration across the entire programme team, rather than focusing on a composite of individual, sometimes stand alone modules.

Another key learning development for some participants was the process of backward design (Wiggins and McTighe, 2005). By thinking first what students

might need to do with the knowledge, it helped plan what content to include and what to leave out.

When I first started I wrote the pack first and then the iRATs and then the application exercises but after talking it through with colleagues and reflecting on what didn't work we started at the end and worked backwards. (Participant 11)

By designing the programme backwards from the outcomes we wanted students to achieve at graduation and delivering it using an engaging, active and much more student-centred learning and teaching strategy, we hoped we would transform students from learning about pharmacy to thinking like a pharmacist. What we didn't anticipate when commencing this project was the effect it would have on many of our colleagues and how using TBL would develop them as educators too.

I would say that it's definitely made me a better teacher and facilitator of learning. Just seeing this whole new strategy opens your eyes to why you're actually an academic in the first place and why you're doing it. You know it isn't just to churn out lectures and get people to learn parrot fashion; it is to get them to learn how to use knowledge and develop skills and helping them do that is really rewarding as a teacher. (Participant 9)

5.7.3 Personal transferable skills

Some participants commented that developing TBL resources as a team had developed their own team-working and time-management skills. When staff worked more independently they weren't perhaps as timely with developing their materials, often leaving it until the last minute and peer review of teaching resources was not commonplace. Some participants commented that their organisational skills had improved as had their willingness to work in a team.

I've become more efficient through working in a team myself. Organisation was not one of my skills that I was proud of; however, I've certainly got better at it. I've developed my ability to organise and

manage other people too as you have to do this as a unit lead.
(Participant 13)

When we first started we all prepared our own bit of the reading pack but we've got better as working as a team to make sure it's more integrated now. My biggest regret the first time we ran it was not having the time to have it peer reviewed. We've got better at that through better time management. The peer review process is a really useful one. (Participant 6)

The development of transferable skills in staff was an unintentional outcome of developing a student-centred integrated approach to delivering the curriculum. There has been nothing reported in the literature about this benefit, possibly because the use of TBL across an entire programme is still rare.

5.8 Team dynamics

In the focus groups the students were asked about how the teams function and if they'd encountered any difficulties in their teams. The responses were mostly positive, although a small proportion of students had experienced a student who wasn't as motivated as the rest of the team. This problem student was raised in two of the three focus groups, although this wasn't the norm, it still did occur occasionally and caused some resentment.

For me I had a really great team last year and I have a really great team this year too. [2nd Year Student Focus Group]

Last year my group was amazing, everyone was really productive and really helpful. This year there's a couple of people who are lacking in that field and are probably dependent on other people. [3rd Year Student Focus Group]

Two students in different focus groups reflected on the fact there were a small number of people in their year who weren't as committed, but learning how to work with such people was good experience for the future.

Sometimes you get in a team where there is one person who doesn't have the same drive or work ethic. You kind of know who they are at this

point and you know if you're on a team with them you just expect it; we find a way to make it work. [3rd Year Student Focus Group]

I was in a group last year who had super strong personalities, like 4 of them and we spent all the time arguing, not even in the most productive way. But we worked it out. But I think that's like a huge life lesson as you're not always going to be in the workplace where you have nice people who are willing to help. A lot of the time you're going to have strong personalities and people who don't like you for no good reason. So that's really good experience. [2nd Year Student Focus Group]

I feel like we become a proper functioning team about half way into the semester. [2nd Year Student Focus Group]

The problem team member isn't a regular thing, but there are a couple of students for whom it's a pattern. [3rd Year Student Focus Group]

5.9 Benefits versus Difficulties

All participants were asked whether the benefits of using TBL outweighed the difficulties they had to overcome. Of the 16 participants, 13 believed that they did, giving mostly positive answers. Two of the three remaining participants believed that it was too early to say at this stage with the remaining participant believing that TBL wasn't appropriate for their subject in stage one of the programme.

Definitely (Participant 1)

Yes, absolutely. Massively (Participant 10)

For me they do, that was an easy answer (Participant 12)

For pharmacy it is definitely better (Participant 14)

The positives outweigh negatives. TBL is worth the effort Yes! (Participant 15)

Absolutely, without question. (Participant 4)

Yeah, yeah, yeah, definitely (Participant 6)

Yes, definitely (Participant 9)

There are fewer negatives than positives but we do need to do something to overcome some of the challenges that still exist (Participant 11)

Yes! Despite all the weekend work because once the programme is written the extra work will ease. I feel it's the right thing to do so despite the extra hours so many people have done, it still outweighs that negative. (Participant 5)

I think it's early days yet. It has taken me a while to understand it and it's been a lot of work setting it up. Hopefully that will ease as time goes on. (Participant 8)

It's too early to say at the moment. We'll know if it works after they graduate if they're better pharmacists (Participant 16)

The first year modules are largely there because they contain things that the students need to know and they need that knowledge before they can start applying it...so trying to force the first year material into TBL format wasn't easy [Participant 7]

The consensus from participants was that there are definite pedagogical benefits and when coupled with the development of transferrable skills, and the satisfaction that participants felt after a TBL class, this outweighed the additional work involved in transitioning to TBL. This correlates with my previous US study where the majority, but not unanimous, view was that benefits did outweigh difficulties (Tweddell, Clark and Nelson, 2016).

The student view was similar. The majority liked TBL and felt that they were benefited from it; however, there were two students who preferred to learn by themselves.

It has exceeded my expectations as to what I thought it could do for me.
[3rd Year Student Focus Group]

I have some regrets as I prefer to work by myself. [2nd Year Student Focus Group]

I'm not falling asleep. I'm not just passively sitting there. [4th Year Student Focus Group]

Sometimes a strong personality will conflict with the group but overall it's pretty good. [3rd Year Student Focus Group]

Earlier in the degree I skipped class a lot. There were 200 people in a lecture. I just got distracted. I'd come to class but I just couldn't concentrate on what the teacher was saying. I didn't read ahead of time either so I was bad. I just understand it so I thought I might as well just skip it. I feel way more responsible right now because I have to come prepared so it's helped me a lot – I'm happy. [4th Year Student Focus Group]

TBL may not be for everybody but for a lot of people it's the right thing to do. [3rd Year Student Focus Group]

These findings are in line with those reported elsewhere, that students and teachers have mostly been satisfied with TBL (Allen *et al.*, 2013; Middleton-Green and Ashelford, 2013; Nelson *et al.*, 2013b; Morris, 2016).

Chapter 6 – Summary, Implications and Conclusion

6.1 Introduction

This chapter will summarise the key findings, make recommendations from the research, discuss the implications of the research, and explain how this research has contributed to the literature on TBL and learning theories that relate to active and collaborative learning. It will also outline the limitations of the study and recommendations for future work. Finally I will provide a conclusion to the project.

6.2 Summary, recommendations and implications of this research

6.2.1 Experiences of Large Group Lectures

This research has shown that most of the pharmacy educators in the study had experienced Trower's characteristics of non-engagement and negative engagement when lecturing to large numbers of pharmacy students (Trowler, 2010). This seemed to be more problematic when lectures were used to deliver one-way content and was exacerbated by growing student numbers and the introduction of compulsory attendance. Some pharmacy educators had had some success in enhancing positive engagement in lectures through the use of interactive tasks and technology. However, lectures were mostly being used traditionally to provide content intended to be used or applied in subsequent small group workshops. For this to work effectively learners needed to revisit the content between the lecture and the workshop and it seemed that increasingly this wasn't happening, so workshops were repeatedly being used for content delivery. Students did however see the benefit of having some lectures, particularly when the concepts were difficult to grasp. A small minority claimed to be motivated to study after a lecture although most weren't. I would suggest that a blended approach is used; this could include some non-compulsory lectures for those that benefited from them. If these were recorded, then students could access them as needed. Some focussed lectures do probably still have a place in undergraduate pharmacy education as they are a useful tool to set the context for the subject content, revisit previously learned concepts that may be important to new learning, and provide an opportunity for

students to hear from a subject expert. The lecture experience for students and staff is improved when the student numbers are smaller, when there is some form of interactivity between student and teacher and between students, and therefore some form of active learning. I would argue that lectures should not be compulsory and if students wish to watch a recorded lecture at a time of their convenience, or independently self-study the content then this may develop their skills as independent learners. I do think we have to accept though that the learning that takes place in lectures isn't always optimal and that the data from the focus groups suggests that many of the undergraduate pharmacy students aren't sufficiently self-motivated to self-study or prepare for subsequent classes designed for application, higher-level thinking and problem solving.

6.2.2 Planning to use TBL

What was clear from the research was that our teachers had different levels of initial understanding of TBL at the beginning and required different types of staff development and on-going support. There was also varying degrees of enthusiasm and scepticism for implementing TBL across the pharmacy programme. The research suggests that an initial consultation with staff and students, an on-going staff development and support strategy, and continued dialogue between both staff and students and between members of staff is needed. While there was significant commitment to and enthusiasm for change, there were also concerns and anxieties that needed to be addressed, either collectively or on a one-one basis. Part of the concern was the scale of change required for a programme-wide initiative.

There was significant concern about the increased use of group work. Both staff and students cited prior poor experiences of group work and, as a consequence, were likely to need reassurances that the in-class group exercises used in TBL differ from more traditional out-of-class group activities. The results suggest that these initial concerns didn't come to fruition. Previous complaints from students to staff about freeloading, inequity of work, lack of trust, and of difficulties in meeting up out-of-class didn't emerge.

The research showed the necessity for some initial training in the key concepts of what TBL is, how it works and what it is designed to achieve, including an

understanding of the theory behind its design, and on-going peer support. Participants needed a combination of theory, observation, and experiential learning.

It was clear from the research that participants required significant time to plan and prepare the learning resources in advance; this was compounded by the integrated nature of the programme, which requires teachers from different disciplines to work together in designing these resources.

Others have reported similar findings; in a web-based survey of multiple TBL practitioners that considered the factors affecting TBL implementation, (Thompson *et al.*, 2007) reported the need for staff agreement and cooperation, adequate preparation time and resources, and effective staff training. The areas deemed most important from this research were the need for skills and expertise in developing effective application exercises and support and guidance in facilitating a TBL classroom.

- Recommendation 1 – that sufficient time and resources are needed to facilitate the training and developmental work necessary for TBL implementation

Morris, (2016) suggests that 61 days of academic time is required to develop staff so that they can design and deliver a module by TBL; this subsequently was reduced by 80% to 12.5 days for the second iteration.

6.2.3 Teacher benefits

One of the themes identified by this research is that the team approach to content design and delivery and the learning from this was beneficial to participants. This is particularly important so that they can support one another. It was also felt that this team approach aids curricular integration and staff understanding of the expertise of others and their role in delivering the curriculum, as well as creating a better understanding of the curriculum as a whole. Another benefit was the feedback that others can provide through peer review of teaching resources. Although this wasn't identified in this research, this could be seen by some academics that might prefer a more autonomous way of working, as a challenge to their academic independence.

- Recommendation 2 – that academics implementing an integrated pharmacy programme using TBL work in small cross-disciplinary teams of 3-4 to design and deliver their resources. By taking this approach staff will learn from and support each other.

6.2.4 Administration, Logistics and Quality assurance

When using TBL across a curriculum there are some additional logistics to consider. These include managing the regular assessment data that TBL generates through the Readiness Assurance Process, timetabling classes in spaces conducive to collaborative learning, and developing procedures and protocols that can be used across the curriculum to ensure consistency of approach. The University assessment regulations and quality assurance processes weren't designed for a summative approach to assessment *for* learning as used in the Readiness Assurance Process.

- Recommendation 3 – For the programme management team to develop processes and procedures for managing each element of TBL and consider who will be responsible for implementing, overseeing and quality assuring these processes day-to-day. Seek out assistance from quality assurance officers to review and rewrite assessment regulations as necessary.

6.2.5 Student engagement

This research suggests that TBL can enhance student engagement on a number of levels. The data suggest that TBL can improve students' motivation to independently study advanced assignments out-of-class, that it can improve class attendance, particularly at RAP sessions, and that it can create a framework for active engagement through collaborative problem-solving during in-classes activities. This research suggests that TBL can enhance student engagement in their learning through both intrinsic and extrinsic motivation. At the start of a TBL module or programme, students are extrinsically motivated through the Readiness Assurance Tests. However, the results suggest that as the team works closely together the members start to bond and become increasingly accountable to the team for their preparation, attendance, and contributions to team endeavours and the motivation becomes more intrinsic. If

students are interested in the subject then they will show positive signs of cognitive engagement through attendance and active participation in the tasks and subsequent discussion. I would also argue that the development of accountability to the team is a sign of positive emotional engagement as students develop a sense of belonging. The data from the focus groups suggests that some students do believe that their success is dependent on the success of the combined efforts of the team, and that this provides them with some of the motivation to prepare and to attend classes. Also, because teams receive instant feedback in the tRAT, it will become clear if a team member hasn't prepared or has misunderstood a concept. That instant feedback was deemed to be important to students in the focus group too, as they didn't want to be the only one in the group that didn't understand a particular subject or concept.

It was also clear from the academic staff comments that the vast majority of students did prepare and had engaged with the preparatory materials, enabling application and problem-solving to a higher level than before. One could argue that a prepared student that is motivated to attend class and who collaboratively contributes to an educationally purposeful activity, is positively engaged at many levels and is taking a deep approach to learning. Motivating the learner is key because, as Coates argues, it is they that are the ultimate agent in positive engagement in their studies (Coates, 2005). The factors in TBL that contribute towards positive learner engagement are summarised in figure 6.1 below.

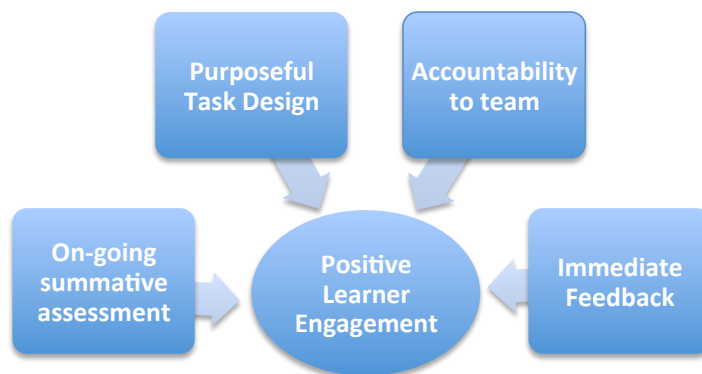


Figure 6.1 Factors in TBL that contribute to Positive Learner Engagement

6.2.6 Deeper Approaches to Learning

In TBL the majority of class time is dedicated to working collaboratively on application exercises in teams. We know from the research that the readiness assurance process motivates students to come to these application sessions with an understanding of the key foundational concepts. If the problems are significant and authentic, create discussion in the team that fosters peer learning, and culminates in a collaborative decision that they must elaborate on and defend to other teams, then I would suggest that this active processing of knowledge supports constructivist learning theories and ultimately leads to deeper approaches to learning. This is summarised in Figure 6.2 below.

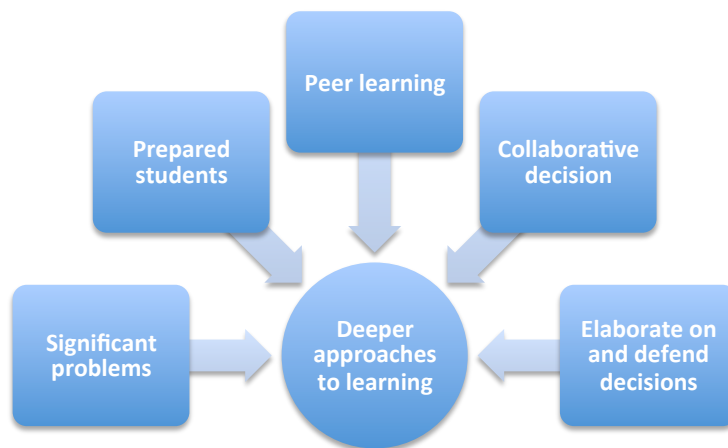


Figure 6.2 Factors in TBL application exercises that contribute to students taking deeper approaches to learning

6.2.7 Transferable Skills

The research suggests that TBL develops transferable skills in students. This was suggested by both academic staff and in the student focus groups. The students in particular identified that TBL helps them learn how to work with people that perhaps have different personalities to them, and helps them negotiate and compromise when necessary. The students also confirmed that learning using TBL helped develop their communication skills and confidence. The World Health Organisation identified seven professional characteristics that

were considered to be essential expectations in the basic educational and training of a pharmacist (World Health Organization, 1997). These were the pharmacist as a caregiver; decision maker; communicator; leader; manager; life-long learner; teacher. Learning by using TBL may play a role in developing some of these professional characteristics. The workplace skills the research identified as being potentially developed by TBL are shown in Figure 6.3 below.

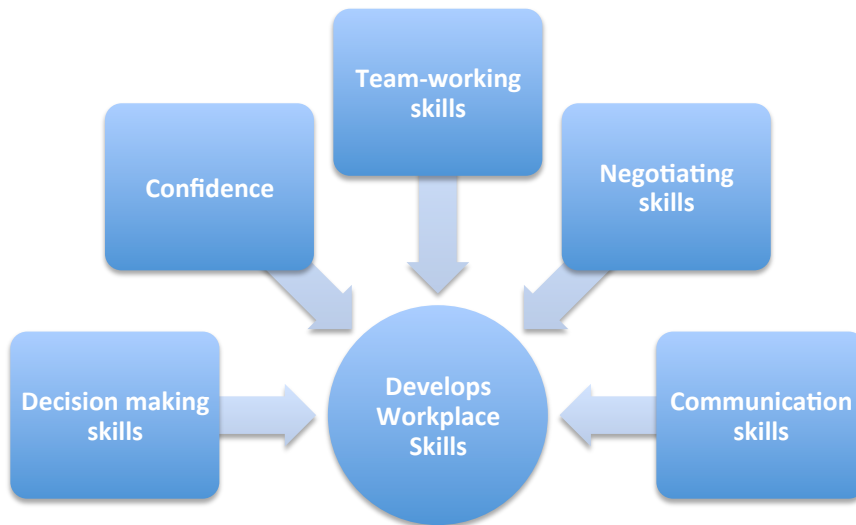


Figure 6.3 Workplace skills developed by TBL as highlighted by the research

6.2.8 Curricula Integration

This research suggests that TBL may be an appropriate pedagogical approach to consider if curricula designers are intending to develop more integrated pharmacy programmes. The UK pharmacy regulator requires that the MPharm curriculum is '*structured to provide an integrated experience of relevant science and pharmacy practice*' (General Pharmaceutical Council, 2011, pp. 19). Integration is a method of organising the curriculum to interrelate or unify topics usually learned in isolation (Harden, Sowden and Dunn, 1984). The evidence for curricula integration is mixed, with little empirical research that graduates become better healthcare professionals; however, more research is needed in this area (Husband, Todd and Fulton, 2014). It is, however, a requirement for

accreditation and was one of the external drivers for choosing to use TBL in our curriculum. We believed that application exercises had the potential to integrate the different pharmacological and pharmaceutical sciences with pharmacy practice. Although subject integration ultimately takes place in the mind of the student, Harden, (2000) suggests there are many advantages to an integrated curriculum. These include increased learning in context, a reduction in irrelevant information in a programme, a less fragmented curriculum, opportunities to develop higher level learning objectives. Arguably it also encourages students to take a more holistic view of a patient's problems. The disadvantages include the loss of the fundamentals of a discipline, less enthusiasm to integrate by teachers, and difficulty in teaching outside of one's discipline, all of which are significant challenges to developing an integrated curriculum (Harden, Sowden and Dunn, 1984).

6.3 Contribution to Educational Theory

This research makes a contribution to the literature on student-centred and collaborative learning in Higher Education through the potential that TBL has to increase student engagement in their learning. TBL does this by using, applying and revisiting course content at increasing levels of difficulty and complexity. Students appear to be motivated to engage with the advanced assignment through individual and team assessment, and through the increasing accountability that they develop to their team. During the individual readiness assurance test (iRAT), students process information, initially at the lower level of Blooms taxonomy (Bloom, 1956) by remembering and developing understanding. During the team readiness assurance test (tRAT) students reengage with the content by analysing their answers and comparing their understanding with that of their team. Peer discussion and peer learning enhances engagement and interaction. During application exercises students actively reengage with the course content for a third time, now at a higher level as they analyse challenging problems, evaluating possible solutions, and creating an argument to verbally defend their chosen decision. If the tasks are also designed so that the students have a personal connection to them then this should also enhance engagement and motivation. TBL is congruent with constructivist learning theory as learners have the opportunity to actively revisit

their understanding of course concepts with their peers and process theory understanding through discussion, problem-solving and verbal elaboration of the justification of their team decision. The way in which TBL revisits course concepts in increasing complexity and at higher-level of Blooms Taxonomy is represented in Figure 6.4 below.

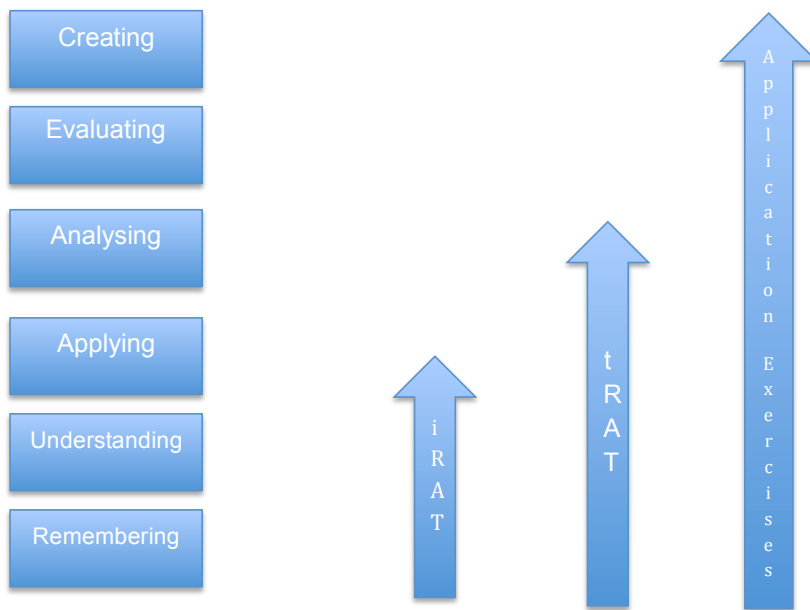


Figure 6.4 Diagrammatic representation of Student Engagement with Course Concepts at different levels of Blooms Taxonomy in Team-Based Learning (Bloom, 1956)

In chapter one I suggested that the concept of student engagement is based on the constructivist assumption that learning is influenced by how an individual participates in 'educational purposeful activities' but also relies on institutions providing the 'conditions, opportunities and expectations' to engage (Coates, 2005). This research suggests that using TBL has enhanced student engagement in their learning in a pharmacy curriculum and that it has done so by creating the conditions and opportunities to do so. If the individual student perceives the activities and exercises to be 'educationally purposeful' then this is likely to enhance students' intrinsic motivation and engagement further.

6.4 Limitations

As with all qualitative research this work is an interpretation of the results. I have attempted to represent the views of the participants as far as possible and interpret them in a reflexive manner. However, my own preference for TBL over traditional teaching methods has grown throughout the project the more I have used it and I want to acknowledge this. I conducted each interview myself and it may be possible that the findings could have been influenced by my presence in each interview. A qualitative research report is an interpretative construct; the researcher interprets the words that have been spoken and constructs theories by comparing the experiences of participants with their own. Another researcher may interpret the words differently, possibly reaching different conclusions. The writing of a qualitative text cannot be separated from its author (Creswell, 2013). This thesis is a personal construct based on my own interpretation of the research data and will have been influenced by my own experiences of learning and teaching in pharmacy and of team-based learning. I have explained my own position reflexively and accept that my own values, biases and experiences will have influenced this research.

This research was conducted in my own institution in a pharmacy programme that now uses TBL as its predominant learning and teaching strategy; however, it doesn't purport to be generalizable to all pharmacy programmes at other institutions. Unlike positivistic research, qualitative research doesn't attempt to control all the variables so as to be replicable and comparable, rather it provides a subjective interpretation of the experiences, observations and interactions. It can, however, provide insights to other pharmacy educators considering using TBL as a learning and teaching strategy. This research therefore provides an interpretation of the experiences of educators using TBL for the first time. The research has identified some of the benefits of, and barriers to, using TBL across a programme. There were two staff members who were eligible to participate in the study but who were unable to. One was on long-term sick leave and the other didn't feel that they had sufficient experience with TBL to contribute as they were predominantly focused on postgraduate teaching. It is possible that their views may have differed from those interviewed and changed the research findings.

6.5 Recommendations for further work

This study has taken a phenomenological approach to a qualitative study by considering the experiences of staff and students using TBL as the predominant learning and teaching strategy across a pharmacy programme. This approach relied upon the staff and students reflecting back on their experiences and entering into a discourse with me as an interviewer. Another approach might be to carry out an ethnographic study involving participant observation of the teams working together in TBL to observe the discussions, the team dynamics and how team members interact with one another. This could be done using a webcam. Participant observation of how different academics facilitate TBL sessions would be another possible research project, particularly as this was one area that some of the academic staff found challenging.

This study involved 16 staff interviews and three student focus groups; however, a future study could focus exclusively on the student experience via a longitudinal project over the length of the programme to see if their opinions change over time with repeated exposure to learning using TBL.

One of the benefits highlighted by this study was the perception from participants that TBL was developing transferable skills and therefore has the potential to enhance student employability. Further work could include a longitudinal project that investigates the extent to which a pharmacy TBL curriculum achieves this claim by interviewing graduates, tutors and employers once students have graduated and entered the workplace.

This project also identified that students are learning from each other and that they engage and interact in teams. It would be interesting to investigate what happens over a period of a semester or an academic year as students work regularly in their teams. How are the team dynamics operating/established and how do they evolve or develop over time? What effect might the use of peer evaluation have on team dynamics and what makes a successful TBL team?

Finally, is there any evidence of TBL fatigue or further improvements? A set of follow-up staff interviews a few years after the initial ones might identify different findings.

6.6 Conclusions

I will conclude this thesis by revisiting the six research questions from Chapter 1.

6.6.1 What are pharmacy educators' experiences of using more traditional methods of learning and teaching?

Pharmacy educators' experiences of the traditional methods of teaching used prior to team-based learning were mixed. Experiences of large, content-focussed lectures were, in general, problematic with poor attendance, lack of interaction between teacher and student, poor student engagement in learning, and sometimes, active disruption. Attempts by teachers to increase interactivity, promote active processing of information through, for example, peer instruction, were deemed to be more successful as engaging students; however, students weren't always ready to discuss or apply their knowledge during a lecture. Small group work such as practical classes, workshops, or tutorials was deemed to be more successful, although student preparation for these was mixed. These results support the findings by others (Blouin, Joyner and Pollack, 2008; Blouin *et al.*, 2009; Dipiro, 2009; Morris, 2016; Tweddell, Clark and Nelson, 2016). A small number of pharmacy educators were positive about the use of more traditional teaching methods, a view echoed by Penson (2012). This view of the minority was in line with previously published research (Tweddell, Clark and Nelson, 2016). It was clear from this research that the majority of pharmacy educators had experienced difficulties with, and were far from satisfied with, the learning and student engagement during traditional teaching methods; large lectures in particular. I would suggest that pharmacy teachers should include more student interaction, active learning, and peer discussion in their classes and that programme designers consider some of the newer pedagogical approaches that are designed to incentivise attendance and pre-class preparation, promote accountability, and enhance student engagement in active and deeper approaches to learning.

6.6.2 What are pharmacy educators' experiences of using team-based learning (TBL) as the predominant learning and teaching strategy in a pharmacy curriculum?

I would conclude from this research that the majority of educators and students believe that TBL is a better approach for student learning than the traditional methods used previously in pharmacy education. TBL appears to improve attendance at, preparation for, and active engagement during scheduled classes. Incentivisation, authentic task design, and team accountability seem to drive the enhanced motivation and engagement. Time that is dedicated to peer discussion and peer learning, application and collaborative problem solving, and the development of transferable skills were cited as benefits and leading to deeper approaches to learning. TBL does however require initial resources for staff training and a substantial time commitment to develop or transition teaching resources to a TBL format, which may be preclusive to its use. However, if resources are available and there is a commitment to redesign teaching to deliver it in a more learner-centred approach, then for most pharmacy educators the benefits seem to outweigh the initial difficulties. Findings from this research support previously published research in healthcare education (see Andersen *et al.*, 2011; Allen *et al.*, 2013; Nelson *et al.*, 2013b; Ofstad and Brunner, 2013; Morris, 2016; Tweddell, Clark and Nelson, 2016). Using TBL across a curriculum creates additional difficulties. Ensuring consistency of approach, logistics of timetabling suitable rooms, staff development, and managing increased assessment data were all attributed to using TBL across the programme. Consistency of approach and large-scale staff support and development were also identified as difficulties in another study where TBL was used across a programme (Remington *et al.*, 2015). However, TBL implementation at scale seemed to promote team camaraderie and sharing of best practice, an enhanced understanding of the programme and the contributions that others make to it, a better understanding of curriculum design and pedagogical practices, and a more integrated curriculum. The former has also been reported in various other studies (Nelson *et al.*, 2013; Remington *et al.*, 2015; Tweddell, Clark and Nelson, 2016) and the latter in two studies (Nelson *et al.*, 2013; Tweddell, Clark and Nelson, 2016).

6.6.3 What effect does TBL have on learner engagement in a pharmacy programme?

I would conclude from this research that using TBL as a learning and teaching strategy enhances student engagement in their learning during their pharmacy education programme. In chapter 1, I suggested that student engagement in learning required more than motivation to study, it required a personal connection to learning and a psychological investment in studying (Lamborn, Newmann and Wehlage, 1992; Oylar *et al.*, 2016). From this research I would suggest that TBL could be used as a strategy to motivate preparation through assessment, but which also provides a personal connection and a psychological investment through authentic task design and the development of team accountability. TBL supports the three dimensions of student engagement, as identified by Fredricks, Blumenfeld and Paris, (2004) and expanded for HE by Trowler, (2010). It does this by providing opportunities to engage *positive behaviours* through attendance and participatory task design, *positive emotional engagement* through encouraging a sense of belonging and accountability to the team, and *positive cognitive engagement* through peer discussion, immediate feedback, and by actively working on significant, challenging and authentic problems, and defending their chosen answers to their peers in other teams.

6.6.4 What is the student experience of learning using TBL?

The student experience of TBL was largely a positive one with the majority, but not all, students preferring TBL to more traditional methods of learning. Students believed that TBL motivated them to engage with pre-class content and that they benefited from team discussions and peer learning during the tRAT, team application exercises, and the facilitated whole class debates. Some students had some issues with balancing their workload, particularly if the pre-work was long or involved difficult concepts, and sometimes the way that staff facilitated the class discussion or managed the timings of application exercises could be improved. Students strongly believed that TBL was helping develop their communication and team-working skills and developing their confidence, all of which would help them when entering the workplace. Most of

the time the team dynamics worked well; however, there had been some issues with personalities and the occasional problem team member. Students identified that learning to manage disagreements or occasional team conflicts would be a skill that was transferable to the workplace.

6.6.5 What are the implications for healthcare educators considering using TBL in their curricula?

TBL appears to be an appropriate pedagogy through which to integrate disciplinary subjects traditionally taught in isolation. The UK pharmacy regulator now requires a higher degree of curricular integration for accreditation purposes, following the lead of the UK medical regulator. In using TBL to integrate disciplines, this research has shown that educators can benefit from working with other educators outside of their traditional discipline. It also suggests that working in '*teacher teams*' was a positive experience and can lead to learning more about the role of other disciplines in the programme, while also ensuring the curricula content is relevant to the practice of a pharmacist. There is little in the literature about this phenomenon, probably because there are few pharmacy programmes that use TBL as the predominant learning and teaching strategy. Further research on curricula integration and educators working in teams would be beneficial. The research suggests that TBL may increase teacher enjoyment of teaching; however, this may be largely because they were experiencing a new teaching experience. It would be interesting to follow this up with further research to see if this is still the case in a few years time.

It is clear from this study that setting up a new undergraduate pharmacy programme delivered predominately by TBL, or transitioning an existing one to TBL, requires considerable initial time commitment, a degree of teacher development and willingness to work together, and sufficient forward planning before implementation. This is line with other published studies (Andersen *et al.*, 2011; Ofstad and Brunner, 2013; Morris, 2016); however, when used across a programme by multiple educators the time and resources required are likely to be much greater. In this study participants thought subsequent iterations will require significantly less time and resources. This finding is supported by the

results of another study, which found that the time required for a subsequent iteration was reduced by 80per cent (Morris, 2016).

If the initial time and resource is available then this study suggests that TBL may help to enhance student engagement in their studies, promote deeper and higher-level learning in the classroom, and develop additional transferable skills to enhance employability. Students learn how to analyse data, evaluate the options with their peers in a safe and supportive environment, and make a collaborative decision that they may be called upon to defend and justify. These are all skills likely to be useful in a contemporary healthcare environment.

6.6.6 How can research of team-based learning in pharmacy curricula best be conceptualised to make a contribution to the literature on student-centred and collaborative learning in Higher Education?

This research suggests that Team-Based Learning is best conceptualised as being a structured approach to flipped learning. Students are incentivised to study the basic concepts out-of-class through assessment and developing accountability to the team, with class time dedicated to collaborative and peer learning. TBL placing the emphasis firmly on application of knowledge to solve significant problems and through peer discussion, elaboration, shared decision-making and immediate feedback. This research suggests that such an approach enhances student engagement with their learning and focuses class time on helping them make sense of and use knowledge rather than just providing course content.

TBL takes a constructivist approach to learning by revisiting course concepts with increasing difficulty and complexity in a spiral curriculum approach, and in doing so develops higher level thinking skills and a deeper approach to learning (Marton and Säljö, 1976; Hrynchak and Batty, 2012). In TBL each phase of learning is designed to prepare students for the next. The use of peer teaching and peer learning adds another dimension to learning through social construction of knowledge. In peer learning students discuss discrepancies and inconsistencies in their understanding with their peers. Students have

suggested that a dialogical approach between peers is a safe and comfortable approach to test out ideas that can be argued more confidently when justifying and defending team answers to the entire class. Students are accountable for their team decisions and by arguing, often passionately, for their chosen action or decision then I suggest that this active processing or elaboration aligns appropriately with research in cognitive science on how we learn, and with constructivist learning theory. This research also suggests that TBL appears to have been received more positively by both educators and students than traditional forms of group work. Initially, there was concern expressed by both educators and students about the use of more group work due to previous poor experiences of it. This is arguably because TBL creates what Slavin calls positive interdependence where goals are shared and dependent of the success of the team (Slavin, 1996) and the individual accountability to the team that emerges as a result. TBL also appears to have overcome some of the criticism of flipped learning reported in the literature where students failed to complete the preparatory work, and that this preparatory work was designed to prepare them for the in-class application activities (Herreid and Schiller, 2013) or that it doesn't develop higher-order thinking or replicate healthcare interactions (Bristol, 2014).

The literature suggests that TBL has mostly been used by pharmacy educators in individual modules rather than as the main learning and teaching strategy across an entire programme. While TBL is the main pedagogy, we do use other approaches too, for example laboratory classes, tutorials and capability development, some limited lectures, and work-based learning. TBL constitutes approximately 70 per cent of the contact hours. This research suggests that TBL can be used across a programme. The research identified additional benefits of use at programme level that includes an improved staff enjoyment of teaching and benefits from working together as staff teams, an improved understanding of the programme as a whole and both their and their colleagues' contributions towards it. It is however, also clear from the research that using TBL at scale across a programme requires significant planning, training, resources and a time commitment from educators.

Knowledge and information is available and accessible like never before through the exponential growth of technology. The challenge for pharmacy educators is to support students to learn how to access the most appropriate, evidence-based information and use this appropriately for the benefit of patients. There has been an increased interest in the flipped approach to learning in pharmacy education in recent years and TBL may provide a structure to the flipped approach that may be attractive for pharmacy educators. This research suggests that TBL may be an appropriate pedagogy for pharmacy educators to consider, not necessarily exclusively, but as a complementary approach to aid disciplinary integration, enhance student motivation and engagement, and develop some of the transferable skills required in the practice setting.

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Appendix 1a - Study Information Sheet – Academic Staff

Study Information Sheet – Academic Staff

Thank you very much for agreeing to participate in this study. This information sheet explains what the study is about and how I would like you to take part in it.

The purpose of the study is to analyse and evaluate staff and student experiences of, and lessons learned from, the use of team-based learning in the pharmacy degree programme at the University of Bradford.

In order to elicit your views, I would like to interview you as part of a research study that contributes towards my EdD Programme of educational research. If you agree to this, the interview will be audio recorded and will last between 30 and 60 minutes.

The information provided by you in the interview will be used for research purposes. It will not be used in a manner that would allow identification of your individual response.

At the end of the Study, the audio recording and transcription will be destroyed however anonymised quotations may be used in the project write up and in future collaborative publications.

Once again, I would like to thank you for agreeing to take part in this Study. If you have any questions about the research at any stage, please do not hesitate to contact me.

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Appendix 1b - Study Information Sheet - Students

Study Information Sheet - Students

Thank you very much for agreeing to participate in this study. This information sheet explains what the study is about and how I would like you to take part in it.

The purpose of the study is to analyse and evaluate staff and student experiences of, and lessons learned from, the use of team-based learning in the pharmacy degree programme at the University of Bradford.

In order to elicit your views, I would like you to take part in a student focus group as part of a research study that contributes towards my EdD Programme of educational research. If you agree to this, the interview will be audio recorded and will last between 30 and 60 minutes.

The information provided by you in the focus group will be used for research purposes. It will not be used in a manner that would allow identification of your individual response.

At the end of the Study, the audio recording and transcription will be destroyed however anonymised quotations may be used in the project write up and in future collaborative publications.

Once again, I would like to thank you for agreeing to take part in this Study. If you have any questions about the research at any stage, please do not hesitate to contact me.

Simon Tweddell
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Appendix 2 – Consent Form

Interview Consent Form

- I, the undersigned, have read and understood the Study Information Sheet Provided
- I have been given the opportunity to ask questions about the Study.
- I understand that taking part in the Study will include being interviewed and audio recorded
- I have been given adequate time to consider my decision and I agree to take part in the Study
- I understand that my personal details such as my name will not be revealed to anyone other than the interviewer
- I understand that my words may be quoted in publications, reports, web pages and other research outputs but my name will not be used.
- I understand that I can withdraw from the study at any time and I will not be asked any questions about why I no longer want to take part.

Name of Participant: _____

Signature of Participant: _____ Date: _____

Signature of Researcher: _____ Date: _____

Appendix 3 – Interview Guides

Interview Guide – Academic Staff

Themes to be explored during the interview

1. Previous Experiences of teaching pre-TBL
2. Initial perceptions of TBL
3. Concerns prior to using TBL
4. Development needs
5. Positives and negative of TBL (from their experiences)
6. Individual and group evolutions of TBL practise as a result of reflections on experiences
7. Personal Development
8. Additional comments

Group Interview Guide – Students

Themes to explore

1. Previous experiences of learning and teaching methods pre-TBL
2. Previous experiences of group work
3. Initial perceptions and concerns about learning using TBL
4. Perceptions and experiences of using TBL
5. Thoughts about TBL as a learning process
6. Advantages/Likes
7. Disadvantages/dislikes
8. Suggestions for improvement

Appendix 4 – Confirmation of Ethical Approval

Hi Simon

Ethics Application E.266

Title: A Phenomenological study of team-based learning in pharmacy curricula

Your ethics application has now been seen by two reviewers and a copy of their reviews are attached. As you can see both reviewers have recommended approval and the comments they have included are for information only.

I can therefore confirm that Dr Martin Brinkworth, Chair of the Biomedical, Natural and Physical Sciences Research Ethics Panel is happy to take Chair's action to approve this project on behalf of the Research Ethics Panel.

Please add a sentence to any information given to participants to the effect that ethics approval was given by the Biomedical, Natural and Physical Sciences Research Ethics Panel at the University of Bradford on 17th December 2012.

Best wishes

Lynda

Lynda Nuttall
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Appendix 5 - Example of coded segment of transcript

Interview 11

Interviewer

What have been the positive experiences of TBL

Participant

I think that there are lots. The students like it, the students give really good feedback about it. A lot, if not most of the staff like teaching in this way, although some did have an initial fear of doing something different. I think you can see in the application exercise sessions particularly there's usually quite a buzz in the room and the student groups are more often than not staying on track and talking about what you want them to talk about. For me I think the bits that I enjoy are the bits where the students are trying to defend their answers to each other and you're getting them to develop their skills in terms of justification of answers so they're understanding more the reasons behind the answers are as important as the answers themselves and they seem to be taking more of a structured approach to coming to an answer and the logic behind why they've come to that answer which is what you need to do as a healthcare professional if you're recommending something to a patient you need to be able to talk through why you're recommending it like that. So for me I think that's a big positive. I hope that it's developing students' decision making skills and confidence because they're having make collaborative decisions within a fixed timeframe and having to justify them to other students in their team and to the wider group. This is often what happens in practice. Also in terms in written justification when they're getting marked for the summative application exercises. So I think and hope that it developing their decision-making skills as well. I think that I haven't been involved as much yet with TBL teaching on the new course in the earlier years but I think it's starting to have some advantages in terms of people working more closely together across different disciplines. I haven't been involved in that as much personally but I will be in the next academic year so I think that's another advantage. And student feedback like I said at the beginning

Interviewer

Which one of those do you think is the most important benefit?

Participant

Student engagement is obviously a big benefit but actually I think a bigger benefit is what the students get out of it. I think the fact that they understand a lot more of the reasoning behind the material that they're learning and how they might apply that to practice I think will make them better practitioners going forward, better able to apply to remember that knowledge and to be able to apply it in practice. I think that's the biggest advantage but that will remain to be seen whether that's true when we see what impact it has on passing the registration exam and employer reputation of our students and that kind of thing. The gut feeling is that it seems to be having an impact but it's too early to tell because we haven't had students who have gone through the course to the end yet.

Simon Tweddell 6/1/2018 13:30

Comment [1]: Staff enjoyment (Teacher benefits)

Simon Tweddell 6/1/2018 13:30

Comment [2]: Concerns over change

Simon Tweddell 6/1/2018 13:30

Comment [3]: Student Engagement

Simon Tweddell 6/1/2018 13:30

Comment [4]: Staff enjoyment (Teacher benefits)

Simon Tweddell 6/1/2018 13:30

Comment [5]: Student Learning. Transferable skills

Simon Tweddell 6/1/2018 13:30

Comment [6]: Student Learning. Transferable skills

Simon Tweddell 6/1/2018 13:30

Comment [7]: Integration (Student Learning) and Teacher Benefits

Simon Tweddell 6/1/2018 13:30

Comment [8]: Student Engagement

Simon Tweddell 6/1/2018 13:30

Comment [9]: Student Learning