Exploring Active Blended Learning through the Lens of Team-Based Learning

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EXECUTIVE SUMMARY

This chapter showcases how the collaborative learning and teaching strategy known as Team-Based Learning™ (TBL) can deliver against the conceptual components within Active Blended Learning (ABL), through exploration of different case studies from the authors' university. It begins by detailing the core concepts and theories underpinning each pedagogic approach before considering how adoption of TBL is consistent with the wider implementation of ABL. Case histories are used to highlight how these approaches enhance the student learning experience and how learning technologies can enable staff to do more of what they value within the classroom. The value of different learning spaces to facilitate TBL and augment the learning experience for both staff and students is considered. Finally, the chapter explores some of the more difficult questions around the lack of broader uptake of TBL within an institution committed to ABL as its standard approach to learning and teaching.

Keywords: Active Learning, Application Activities, Backwards Design, Blended Learning, Constructive Alignment, Facilitation, Learning Environments, Peer Review, Readiness Assurance, Team-Based Learning, Technology

INTRODUCTION

This chapter considers how Team-Based Learning™ (TBL) has been implemented at the University of Northampton as part of an institutional pedagogic shift to Active Blended Learning (ABL). Three case study examples provide a lens through which to explore aspects that practitioners could consider when designing programmes and modules to increase student engagement and satisfaction and improve student outcomes. The case studies highlight how the move from traditional learning and teaching spaces (e.g., lecture theatres and fixed seating) to social learning spaces both within and without the classroom, impacts on students' ability to meet the intended learning outcomes. The TBL framework also forces tutors to consider how to design and facilitate a blended learning experience by combining different features of 'the blend' (Armellini, 2019a) other than just

traditional notions of face-to-face and online learning in a way that is effective for the tutor and the student, and appropriate for the subject discipline (Shulman, 2005).

One interesting aspect of the discussion will focus on the advantages and the limitations of using technology to deliver the important 'readiness assurance' process that is used to ensure a baseline level of knowledge and understanding for all participants. Traditionally, this process is paper-based, but the advantages and challenges arising from a growing desire to use technology for this purpose will be considered from both pedagogical and technological perspectives.

Within the classroom, use of both ABL and TBL prompts a significant change to the role and purpose of tutors as they move away from delivery or transmission of content to facilitating discussion within and between groups and teams to support student application of the underpinning knowledge. The impact of this shift in practice has consequences for the depth of student learning and attainment. Ultimately, it is necessary to consider the impact of this on individual achievement – whether at University or within the world of work. This chapter will therefore seek to identify the characteristics of an effective TBL practitioner and explore associated staff development needs. It will also consider the data on student satisfaction and attainment.

Contextual Overview

The case studies that are featured in this overview are all drawn from the authors' experiences at the University of Northampton. Situating the case studies as part of the broader context at the University over the 6-year period between 2014-2020 is a fundamental prerequisite to the exploration of ABL through the lens of TBL which follows.

The University of Northampton, based near the heart of England about an hour north of London, is a teaching-focused higher education institution (HEI) with an on-campus population of around 11,500 (2018-19) undergraduate students. Around 7,700 are UK-based undergraduates typically studying a 3-year bachelor's degree. A significant proportion of these undergraduates are enrolled on education or nursing and other allied health-profession programmes, continuing the University's strong heritage in the education of key workers in these two employment sectors.

In 2014, the University commenced a radical redesign of learning and teaching across all subject areas. Building on a strategic drive to deliver a "unique learning and teaching … model" (University of Northampton, 2015, p. 3) and to compete "with the world on its own terms" (University of Northampton, 2015, p. 4), the new model moved away from didactic teaching methods typified by one-way transmission of 'content', to highly interactive learning opportunities that engendered student engagement through well-designed activities that engaged participants not only with content, but also in a two-way conversation with their tutors and their peers (see further Maxwell, 2020).

In the early stages of the (re-)design and development process, colleagues from the University's central Institute of Learning and Teaching in Higher Education (ILT) as well as faculty tutors, explored different pedagogies in use elsewhere within higher education (HE) with a view to learning from and implementing best practice insofar as it aligned with the new model. Over time, the underpinning principles of the new model emerged and were shared across the institution, along with lessons learned by early adopters of the model. At their most succinct, these principles expect students to be active in their learning through 'doing things and thinking about the things they are doing' (Bonwell & Eison, 1991, p. 19), and to undertake some learning in contexts outside of the standard classroom experience. This sense of 'blending of learning' is far broader than the standard 'face-to-face' and 'online' strands that typified early definitions of blended learning (Armellini, 2019a), and is expanded to consider several features across a range of continua which can each be blended in uniquely diverse ways (Table 1).

Table 1. Dimensions of the blend (Armellini, 2019a)

Dimensions of the blend	
Face-to-face	Online
Online teaching	Independent learning
Individual	Group-based
Synchronous	Asynchronous
'purely academic'	Employability-focused
Campus-based	Mobile
Tutor assessed	Peer-assessed
Placement-intensive	Few, or no placements

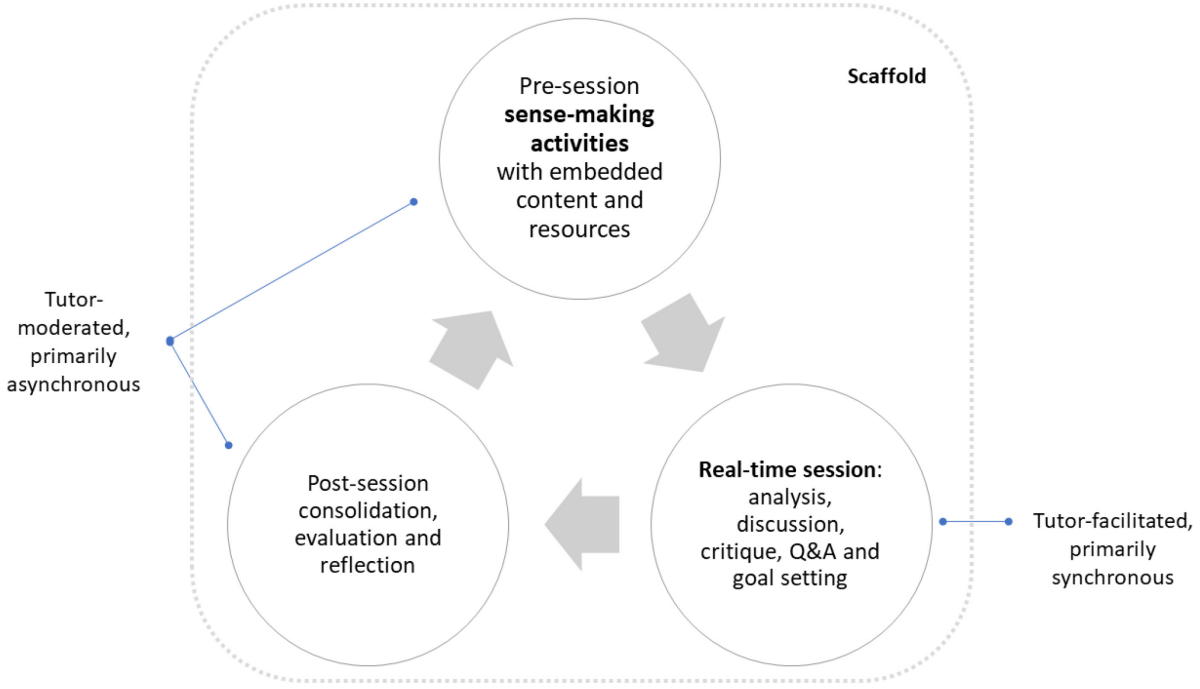
In ABL, non-classroom settings are not limited to individual private study, but can include placements, field trips and group study. The new model became known as 'Active Blended Learning' (ABL) and today is defined as:

> a pedagogical approach that combines sense-making activities with focused student interactions (with content, peers and tutors) in appropriate learning settings – in and outside the classroom. ABL focuses on engaging students in knowledge construction, reflection and critique, on the development of learner autonomy and of course, on the achievement of learning outcomes (Institute of Learning and Teaching in Higher Education, 2020).

Programmes and courses that have been designed following an ABL pedagogy expect learners to engage with their learning through completion of student-centred activities designed to produce a deep understanding of the subject matter. During the synchronous session, the focus will be on activities to support application of the learning, along with deeper analysis and discussion appropriate to the level of study, through engagement with peers and faculty. Learning is consolidated through subsequent activities that build

on prior learning ultimately in readiness for constructively aligned formative or summative assessment (Figure 1). Technology is positioned as a facilitator of learning within ABL and can be used both within and without the classroom setting. Engagement with content, so often the primary focus of a didactic approach to teaching, occurs through completion of learning activities that aid learners to attach meaning to what they have been studying where the 'content' is but a part of the larger activity (Armellini, 2019b). ABL is neither linear nor prescriptive. Rather, it is a conceptual approach that should be adapted appropriately by faculty depending on the needs of their student cohort, the requirements of the subject matter and their own pedagogic style to deliver an enhanced student experience, increase satisfaction and improve student outcomes. A learning cycle can start with a face-to-face introduction from tutors or be initiated outside of the classroom, whether in an online learning environment or on a placement or fieldtrip, for example.

Figure 1. Model of Active Blended Learning (Armellini, 2020)



Part of the work to engage faculty in exploring how ABL would influence and change their own pedagogic approach and to kick-start any consequent redesign and redevelopment work involved investment in opportunities for external research. Faculty explored how these principles of student activity and blending of learning experiences could work in their subject areas and received support from central teams to redesign modules and programmes and trial new approaches. This chapter considers how one of these approaches – a well-established pedagogic approach to active problem-solving known as Team-Based Learning™ (TBL) – was deployed at Northampton under the ABL banner, considering the lessons learned and identifying areas for future discussion and research.

Introduction to Team-Based Learning™

Team-Based Learning™ (TBL) was pioneered in 1979 by Larry Michaelsen when teaching at the University of Oklahoma (Sibley et al., 2014). The changes to his pedagogy were prompted by a need to manage a tripling in the number of students attending his class, while ensuring that those students attended class having engaged fully in the preparatory work. Michelsen's early approach is still evident in the current iteration of TBL in use across the world today (Team-Based Learning™ Collaborative, 2020).

This chapter is not intended as a full and detailed exposition of Team-Based Learning; however, it is necessary to provide an overview of the core components and how the instructional technique operates. As a broad overview, TBL comprises the following stages:

a) **Readiness assurance:** comprising pre-class preparation and the in-class diagnosis and provision of feedback on core learning; and
b) **Application activities:** designed to develop students' critical thinking skills.

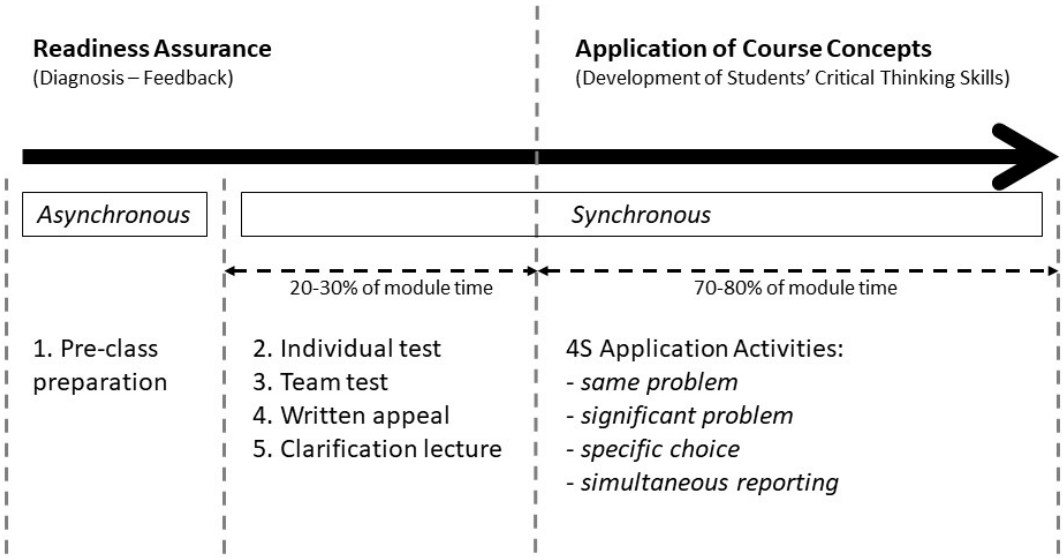
Teams are intentionally formed and should remain fixed for the duration of the module. Typically, there are between 5-7 members in each team. Fewer than this risks difficulties in getting sufficient discussion and engagement if members are absent. More than this, it becomes hard for individual voices to be heard. Understanding the differences between groups and teams is critical to a successful TBL experience (Michaelsen et al, 2004). One key advantage to a Team-Based Learning™ approach is that because the sequence is normally repeated between 5-7 times over the duration of a learning opportunity (module), students have time to learn how to work effectively together. In this way, they learn to become valuable team members, and their performance and attainment improve (Pineda & Lerner, 2006). Moreover, tutor time is focused less on the dynamics of supporting students to learn how to work in teams and more on actual teaching and learning.

Similarities with ABL are evident. Both contain a requirement for students to engage with the subject matter at a pace and place that suits, before engagement with peers and tutors that focuses on identifying and clarifying students' understanding of core concepts. Once a baseline learning level is reached, the focus shifts onto application and analysis of that learning through active problem-solving and subsequent evaluation aligned to formative and summative assessment. Unlike ABL however, TBL is a much more prescriptive approach with clearly defined stages that are less fluid than they are in a pure ABL experience.

The TBL Sequence

The core elements of a TBL sequence are visualized in Figure 2. The sequence is repeated for each of the conceptual subject areas within the course or module.

Figure 2. The Team-Based Learning™ sequence



Phase 1: Readiness Assurance

Through readiness assurance both learners and tutors become confident that learners are ready to proceed to the activities that follow. It comprises different elements that, for the purposes of the comparison to ABL, include the pre-class preparation. While this is the only element that explicitly takes place asynchronously, there is an expectation that asynchronous work can occur throughout the remainder of the sequence as appropriate.

Individual study is where students engage with the core concepts of the topic. Learning materials can be provided in a variety of formats, or students could source their own. This work helps students play an active and meaningful part within the team and makes individuals accountable for team contributions.

Individual and team multiple-choice questions follow. These tests must be thoughtfully and proactively integrated with subsequent activities to manage student expectations and avoid "the unhappy student cry of 'Testing before teaching makes no sense!'" (Sibley et al., 2014, p. 75). These authors go on to define the key elements that inform the design of good questions for the individual and team tests. Both tests seek to diagnose student understanding based explicitly on questions drawn from the preparatory study.

In the individual test, a total of four points are allocated per question, which can be distributed across the four answer options, depending on the level of confidence students have in their own understanding. Students can allocate all points to a single answer or distribute their points across the answers so long as they don't exceed four in total. A student can therefore allocate one point across each of the four options. The way in which

the student allocates the points provides the tutor with an evidence-based insight into the students' understanding. If one point is allocated to each answer, the tutor learns that the student did not know the right answer and can address this in the clarification tutorial. If a student is confidently allocating four points to the correct answer on a regular basis, then the tutor also has an insight into the level of that student's knowledge and understanding. It should be noted that students can be both confident and incorrect, which is again useful for the tutor. More interesting is the metacognitive benefit for students who, in real-time, can assess the depth and extent of their current understanding. As Sibley et al. (2014) observe: "if students notice that they are consistently spreading out their points across multiple possible answers, they may realize that their preparation for the test was not adequate" (p.78).

The team test follows immediately afterwards and before students receive the answers to the individual test. The questions are identical, only this time, students can discuss answer options with their team prior to agreeing an answer. Confidence marking is typically achieved through use of the Immediate Feedback-Assessment Technique scratch cards (IF-AT) (see further Epstein Educational Enterprises, n.d.). Individual scores equate to the number of points written in the correct answer box. Together, these techniques provide students with immediate and timely feedback on their learning.

Following the two tests, teams are encouraged to return to the preparatory work and consider it in the light of their results. If they are unhappy with their score, the team can submit a written appeal shortly after the team test is complete. There are two grounds for appeal: (1) the question was badly written; or (2) the provided answer does not align with the preparatory learning - a 'content' appeal. Appeals are considered off-line by the tutor to determine if there is precedent for allowing the appeal and to ensure consistency. If successful, the summative credit for that question is adjusted accordingly. In this way, tutors receive feedback on the quality of the questions and on how those questions and the associated content are understood by their students. Student understanding is clarified based on the outcome of the appeal.

Finally, the instructor can clarify any aspects of the testing process thereby ensuring that all students are clear on the core concepts in the topic. Achieving this is essential as it levels the playing field before the application phase that is designed to facilitate deeper learning commences.

Completion of all four synchronous aspects of the readiness assurance phase should comprise 20-30% of the total time allocated to that concept area. Once completed, tutors should be assured that their students are ready to apply their knowledge in practice through a series of focused learning activities.

Phase 2: Application of Course Concepts

Having reached this baseline in understanding, student learning is deepened through a series of well-designed activities that seek to explore whether their theoretical understanding of a concept translates into the making of an appropriate decision when the concept is situated within either a real-life or fictional case study context. Successful application activities are characterized by the 4S techniques:

- Teams all study the **same** problem at the same time.
- The problem is a **significant** one to students.
- They must make a **specific** choice as to the answer.
- Answers are reported **simultaneously.**

These application activities require participants to expand upon and deepen what they have learned and been tested on. All students have a vested interest in engaging with any subsequent discussion about the scenario which is again focused on core concepts. They are not able to free ride by picking an answer based on that given by another team due to the need to contribute to the discussion. By requiring the selection of a specific answer, the 4S application activities prepare students for subsequent employment where the making of specific decisions is required as part of professional working life.

The impact on learning that results through TBL can be summarised as a multiplying factor of individual pre-work combined with work within teams (readiness assurance) and then between teams (4S application activities).

Any good TBL sequence is designed using a reverse-engineering, or backwards-design, approach (Sibley et al., 2014). Tutors start with the end in mind (Wiggins & McTighe, 2005), focusing on student learning and understanding and how students demonstrate that learning and understanding. At the design phase, it is important for those designers (probably the tutors themselves) to be thinking about what learners would be doing to demonstrate that they had achieved the module learning outcomes if they were observed engaging in activity connected with the module after it has been completed. This enables tutors to identify what it is that students need to be assessed on and, working backwards, what they therefore need to learn. Identification of appropriate questions for the readiness assurance tests is thus possible. This contrasts with a design approach that seeks to follow the structure of a core textbook by focusing on content, activities and instruction.

Synergies between TBL and ABL

As you might expect from a chapter about Team-Based Learning™ in a book about Active Blended Learning, there are obvious synergies between the two pedagogic approaches. These can be mapped as follows (Table 2):

Table 2: Mapping of TBL phases to ABL stages

ABL Phase	Pre-session sense-making activities with embedded content and resources	Analysis, discussion and goal setting	Post-session consolidation and evaluation
Corresponding TBL phase	Readiness Assurance	Application of Course Concepts	*No direct mapping*

While TBL is a far more tightly prescribed methodology than ABL, it is easy to see that the former still aligns to the broad conceptual basis of ABL even though the latter can comprise many other non-TBL pedagogies.

Although there is no TBL phase that directly maps to the post-session consolidation and evaluation stage within ABL, it is easy to see how this might be achieved should it be considered necessary. Students could, either individually or in their teams, and whether invited to do so by the tutor or as an independent action, take some time following the end of the formal teaching session to consolidate their learning, fill in any remaining gaps in their knowledge and ensure they feel confident in their learning and understanding before commencing the preparatory work for the next topic.

Having compared the different stages of both ABL and TBL, it is useful to explore these synergies more deeply. Both ABL and TBL expect students to engage in asynchronous pre-work. During the main ABL development phase at Northampton (2014-2018), preparedness, or rather the lack of it, was consistently identified by staff as one of the main challenges they faced in the classroom. Although ABL enhances the traditional flipped classroom by situating content as part of a wider learning activity prior to the synchronous session to help learners contextualise the content, the preparatory work and the associated sense-making activity remain the hardest part for ABL practitioners to 'manage' primarily because of their inability to directly control or mandate engagement (Teixeira Antunes et al., in press). Suggestions to encourage completion of these activities include inviting those students who have not engaged with the preparatory work to do so at the start of the synchronous session or being explicitly clear at the start of those sessions that the preparatory work will be used but not repeated. Setting and managing student expectations regarding these core components of their learning is essential. The explicit addition of summative credit to a low-stakes test based upon that preparatory learning activity, as is the case with TBL, can provide enough extrinsic motivation to learners to prompt their engagement with this core part of a valuable ABL learning experience by making them accountable for engaging with the pre-work in order to function as an effective member of the team.

The discussion on encouraging students to engage with the pre-work highlights another similarity between ABL and TBL, namely the importance of 'sense-checking'. Not all

sense-checking activity in ABL needs to happen through use of a test, whether credit-bearing or not. It could occur through summarising key learning points on a discussion board, wiki or blog or through self-identification of areas where students feel their learning is insecure. Within TBL, sense-checking occurs as part of readiness assurance and is a mandated part of the learning sequence that always occurs to ensure all students cross a baseline threshold of understanding prior to application of the subject knowledge through the 4S activities. However conducted, the importance of sense-checking lies in the deeper learning it aims to engender by providing assurances to tutor and student that the core learning is secure.

Finally, both pedagogies have a strong emphasis on contextual application of knowledge and students are expected to actively participate in any learning activities to consolidate and assess learning. Within TBL, perhaps unsurprisingly, these application activities are highly structured, although as with ABL there is lots of creativity in the design of these activities. Often there is also a high degree of authenticity with activities designed to reflect real-life situations.

Summary of the Three Case Studies

Adoption and implementation of TBL at the University of Northampton has primarily occurred in 3 main ways, two of which are within undergraduate teaching in the allied health professions subject area: Case 1 - a first year, undergraduate module on anatomy and physiology as part of the BSc Occupational Therapy programme (Functional Human Sciences – FHS); Case 2 - as a 'spine' to deliver teaching on research methods within the allied health professions subjects across the three years of undergraduate teaching. The third example (Case 3) is where TBL has been used to support the facilitation of an academic staff induction workshop on assessment and student policy. Included below is a summary of the three cases.

Case 1: Functional Human Sciences

The purpose of this module is to enable students to explore how anatomical and psychological components contribute to everyday functional activity within a service user's personal home, work and social environments to cope with impairment, activity limitations and participation restrictions in relation to disease processes. The module was traditionally lecture-based with a series of practical sessions in each lecture delivered to 60-70 students each year. TBL was used to transform the module. The readiness assurance process (Phase 1) was used to engage students with the relevant theoretical knowledge while Phase 2 of TBL was used to enable students to apply the theoretical concepts to real life scenarios relevant to everyday professional practice. Technology i.e., the use of mobile applications, online workbooks, wikis and discussion boards, were embedded to facilitate the engagement with the theory in Phase one and the application

of theory in Phase 2. All lectures were replaced with teamwork in seminars and workshops.

Case 2: Research Methods

This module introduces the student to the components and process of research and evaluation within healthcare in all contexts. This module was delivered using face to face lectures and includes 40-50 students in each cohort. As in Case 1, TBL was used to change the focus from transmitting theory to active application of theoretical principles to identified research studies. The focus on the active application of theory shifted ownership of learning from the tutor to the student.

Case 3: Assessment and Student Policy for Academics new to Northampton The Academic Induction Workshop on Assessment and Student Policy

Since 2015, new academic staff at the authors' University have participated in an 'Assessment for Academics new to Northampton' workshop as part of the mandatory academic staff induction process. Staff are invited to complete the preparatory work prior to the session, before undertaking the individual and team 'quizzes' as they are known in this context, discussing grounds for appeal and then generating discussion points for clarification by the facilitators. The session then moves on to a series of 4S application activities that explore the intricacies of the regulatory framework for assessment and student policy at the University through the lens of common scenarios faced by staff. The TBL cycle is replicated once, in full within a three-hour session. However, as a one-off interaction, participation in the workshop cannot mirror a true TBL experience, primarily because the opportunity to develop team skills over the duration of an academic module does not exist. Typically, 15-20 'students' participate in each session and the workshop is run approximately six times a year.

DESIGNING A TBL MODULE

This section explores the key considerations that informed the design and delivery of the TBL case studies in this chapter. It is not intended to be an extensive list of all considerations, but rather an exploration of issues that the authors faced and addressed in their specific context.

The first two case studies offer an insight in how to use TBL to design and implement a constructively aligned module. Whilst learning and teaching activities should always be explicitly linked to both learning outcomes and assessment, there are some identifiable differences in how this is achieved with TBL. As an example, the readiness assurance process within TBL has an important role in ensuring all students have a baseline understanding of essential content to support a larger focus on application of that knowledge to real-life scenarios.

By way of a contrast, our third case study considers whether the claims to support use of TBL are evident when this highly structured approach is used to facilitate one-off interactions. This innovative use of TBL has proved successful in supporting new staff to understand the regulatory and policy framework operating within their new institution, even though participants only ever experience one TBL cycle. Lessons from this adaptation of TBL will therefore be extrapolated to prompt further discussion amongst TBL practitioners about the broader value arising from using TBL in this way.

This chapter draws primarily on the authors' reflections of their use of TBL in relation to the cases mentioned, as well as on student feedback from standard module evaluation questionnaires, module assessment grades and, for the third case study, information from workshop evaluation forms.

Technology: To Use or Not to Use?

Although originally envisaged as a fully face-to-face, paper-based learning methodology at the time of its development in the late 1970s, it is not surprising that academic colleagues around the globe have been exploring ways in which to replicate TBL in the online environment. One of the earliest reports of online TBL comes from Palsolé and Awalt (2005) describing their experiences of implementing asynchronous TBL strategies in a fully online course at the University of Texas at El Paso. Their lessons and experiences were useful in informing the design of the first TBL module at Northampton – Functional Human Sciences (Case 1), although this module would still be delivered primarily in a face-to-face environment. During the design phase, it was only the readiness assurance process that was sought to be delivered online.

This first TBL module started in September 2015. The staff team were keen to make effective use of technology to transform their teaching to facilitate active learning from the outset, positioning the academic team as facilitators of learning rather than information providers. Intentional use of technology enabled engagement with a larger variety of resources, sought to address the technology gap between staff and students and encouraged students to use mobile devices and mobile applications to prepare them for their future careers. With large cohorts, integrating technology into learning activities also meant the staff could engage with students with different learning preferences. The tutors wanted to encourage team collaboration using technology in and outside of the classroom to ensure learners developed social skills essential for their future careers. Using technology safely and correctly was fundamental to develop digital literacy and to highlight use in a professional and responsible way. The staff also wanted to use technology to empower students to be more creative and take ownership of their own learning. Ensuring a digitally rich and stable technological infrastructure and access to devices for all students was therefore vital.

Pedagogic Use of Technology

One of the challenges of using technology to facilitate the readiness assurance tests is the impact on confidence marking. In the context of the case studies on TBL at the University of Northampton, the technological capabilities of the Virtual Learning Environment (VLE) software used in 2015, were such that while the Tests and Surveys functionality could be used to facilitate the readiness assurance process online, it was only possible to identify one potentially correct answer. The ability to allocate the total number of points for the question across the different answer options depending on the extent of the individual student's confidence was lost. Equally, although the Groups functionality within the VLE could facilitate the group test in a face-to-face teaching context, groups could only have one attempt at selecting the right answer. In practice, both these issues impacted on the real-time level of insight for staff and students in respect of the level of understanding possessed by the individual or team. Without confidence marking, students and tutors can only see if answers are right or wrong. The richer appreciation of just how 'close' the student/team were to the correct answer is lost. Team dynamics are also adversely impacted: for example, confident yet wrong students can persist in reinforcing errors in themselves and in other members of the team.

Since the Functional Human Sciences (FHS) module (Case 1) was first introduced in 2015, other tools that can accommodate confidence marking in a TBL context have come to market. Possibly the most well-known of these is InteDashboard, an all-in-one TBL tool developed by TBL educators at Duke-NUS Medical School in the United States (CognaLearn, 2019). Clearly the costs of additional, specific software like InteDashboard do need to be considered based on factors such as the extent and use of TBL within the institution and whether a fully technical (synchronous or asynchronous) solution is required. While VLEs typically offer functionality to accommodate online discussions, debates, co-creation and collaborative sharing and development of resources, they may not have the capacity to accommodate confidence marking.

Structural Implications

Key considerations explored by the module team when designing the Functional Human Sciences module (Case 1) included the use of technology for learners with additional learning needs, poor access to devices or Wi-Fi and digital literacy. The challenges were examined in-depth to ensure that appropriate mitigation was implemented. Significant mitigation occurred when the University decided, before the move to its new digitally rich Waterside campus in 2018, to supply a laptop to all new learners to ensure that no student was marginalised when engaging in ABL. Current literature highlights the impact of differing device capabilities as one of the key reasons for failure to engage in blended learning (Adekola et al., 2017). Learners come from diverse backgrounds and it was important not to assume that all have access to devices or Wi-Fi. Also, provision of a standard laptop overcame the need to prepare different instructions for the same virtual learning activity depending on the participant device.

Ensuring learners have the right digital literacy skills to engage fully with any ABL module is key to successful student engagement (Palmer et al., 2017). The Functional Human Sciences team achieved this with an induction to ABL and TBL and a mock session to ensure that learners were aware of the expectations and process being used, thereby reducing time wasting and disruption of sessions (Jaspers, 2009). The University also invested heavily to ensure adequate IT support and infrastructure both prior to the move to the new campus and as part of the new campus design itself. Time to develop well designed learning activities was provided through the University's Learning and Teaching Innovation Fund which provided staff with additional development time to trial TBL and reflect on the lessons learned (Khatri & Siddons, 2015a).

Resources

Staff Development

Supporting staff to develop ABL activities that realise the pedagogic shift from didactic content transmission to facilitating student-centred learning in online virtual environments is both vital and challenging. It is vital if the ABL vision is to be realised and the pedagogic shift to be completed in a meaningful way. But it is challenging for staff, some of whom reported feeling adrift with the loss of the familiar lecture approach, irrespective of the value, or otherwise, of the learning opportunities it provided (Teixeira Antunes et al, forthcoming). Exploring the nature of the uncertainty and the reasons behind the feelings of being adrift helped staff reconceptualize their role and continue to find value in being an educator (see, for example, Maxwell, 2015). The degree to which staff are ready and able to make the shift directly impacts on the quality of the ABL activities developed and implemented as well as on student learning (Adnan, 2018). Teaching colleagues needed to develop their own skills for creating ABL activities, for example in using mobile applications or online platforms as well as becoming facilitators of learning in a virtual environment. Many studies have shown that if staff are not ready to make the shift, adopt and upskill using contemporary technology tools and become competent virtual facilitators, the learning experience is often negative and ineffective (Haidet et al., 2014; Teixeira Antunes et al., in press). In preparation for the delivery of the Functional Human Sciences module (Case 1) the team spent time with learning technologists developing their own technology skills, virtual learning activities, trialling sessions and problem-solving any complications. Once developed, these skills were easily transferable to other TBL and ABL contexts.

Time

While the use of TBL and ABL has had very positive outcomes for learners, it is important that the initial investment of time to plan, develop, implement and evaluate the ABL approach used in academic modules that use TBL (Cases 1 and 2) is recognised and accommodated. Planning and developing pre-class workbooks was particularly time-

consuming as staff needed to ensure that the content was explicitly mapped to the learning outcomes. Development of the readiness assurance tests are equally time consuming, however, there are many high-quality Open Educational Resources available to support their development (Camilleri et al., 2014). Executing both the preparatory and readiness assurance phases well is key to maximising the amount of in-class time available for application of theory to practice. The initial investment of time to develop teaching resources has long-term benefits as they only require some modification and updating each academic year to ensure currency and relevance. Good TBL learning and teaching activities are reflective of the subject matter (for examples, see Sibley et al., 2014; Shulman, 2005).

Learning Spaces

During the design phase of the Functional Human Sciences module (Case 1) it became clear that learning would also occur outside of the classroom e.g., in learner's homes, the café, library, etc. The VLE was used to record learning and share resources. Staff experimented with learning spaces for synchronous sessions which included the traditional classroom, social learning spaces within University buildings or off-site. Both physical and virtual learning spaces are an important part of ABL and TBL and require careful consideration to ensure that all spaces are appropriate for both individual and shared learning to encourage discussion and collaboration. The new campus was intentionally designed to ensure that learning spaces supported all types of active and blended teaching and learning approaches.

Engaging Content

During the design of TBL learning activities, the Functional Human Sciences team (Case 1) experimented with various technology tools to ensure that they best suited the learning process. As theory content on the module influenced future professional practice, it was important to use tools from which learning activities could be downloaded and kept for future, scaffolded learning in their second and third year at university and then as graduate professionals. Xerte, a free online software used for interactive learning, was scoped as a potential tool. However, at the time students were unable to download interactive activities for future use. The team therefore created interactive preparatory workbooks using Microsoft® Word which were easily downloaded from the VLE, saved and repurposed when needed. Wikis, blogs and other free software were also considered and used in the application activities. The team learnt that student engagement was maximised when tools befit the learning activity, are both intuitive and small, and are accessible on all devices. More importantly, consistent use of the same tools led to increased technological skills and confidence in the TBL learning process. The learning was used to develop the Research Methods module (Case 2).

EFFECTIVE ASSESSMENT FOR TBL

The Importance of the Final Deliverable

A successful TBL experience relies upon a final deliverable that ensures all team members are accountable and that final module grades honestly reflects individual contributions. This is where the 4S techniques, particularly making a specific choice, and the adoption of a backwards design approach are particularly powerful.

In both the readiness assurance tests and in the 4S application activities, it is common for options to be provided to students. An effective final deliverable tests the student learning further and, in so doing, is more reflective of the world of work. An effective final deliverable is open-ended. This matters if graduates are to be effectively prepared to make professionally-grounded specific-choice decisions in the work environment.

The Impact of the Early Summative Assessment (Readiness Assurance)

Weekly use of readiness assurance gives students timely feedback on their ability to understand and apply theory to real life scenarios. The process shifts from individual to social learning as, through discussion and exploration of theoretical concepts, individuals in the team benchmark their learning with that of others, thereby developing the baseline for knowledge acquisition prior to subsequent application activities. Many ABL practitioners who are not using TBL use a similar approach to readiness assurance to encourage engagement with pre-work, supported by pre-class formative knowledge testing.

Peer Evaluation

The final element of TBL is peer evaluation (Sibley et al., 2014). Peer evaluation can be overlooked as staff can find it challenging to effectively vary the grades of team members based on apparently nebulous and subjective observations and reasoning. However, peer evaluation in TBL substantiates expectations of preparedness and accountability, extending the differential in students' final summative grades after the individual test. The extent of the differentiation will vary significantly between modules depending on how summative credit is awarded. As Sibley et al. (2014) observe, even the TBL community are not in agreement over whether 4S application activities should be graded. Either way, ensuring that students only receive credit for the work that they have contributed to matters if TBL is to overcome allegations faced by other forms of group and teamwork that giving all members the same final grade is fundamentally unfair.

Peer evaluation centres on the contribution of the individual to the team. One tool that supports effective assessment of peer contributions is SPARK^{PLUS}, a self and peer assessment tool that enables students to rate their own and their peers' contributions to team activities. It offers a way to overcome the potential inequities that arise when all

members of the group or team receive the same final grade. Not only are group members "responsible for negotiating and managing the balance of contributions", they are also responsible for "assessing whether the balance has been achieved" (SPARKPLUS Hosting and Support, 2020). Team grades are changed into individual marks based on a weighting factor that is determined both by the self-rating of a student's contribution and the rating they receive from their peers.

QUALITATIVE EXPERIENCES OF TBL STAFF PRACTITIONERS

Benefits

TBL practitioners at the University of Northampton have consistently commented to the authors on the value and impact of collaborative working when redesigning modules using TBL. Collaborative working supports staff to develop competencies and confidence as TBL facilitators and apply this in the classroom. Developing appropriate teaching materials requires discussion and problem-solving to ensure that learners have opportunities to develop critical thinking skills. The experience within the Functional Human Sciences team was that staff collaboration in development of the module led to a strong sense of increased and shared ownership of the module and successful delivery by the team (Hunter, 2006). Staff also supported each other to develop themselves as facilitators of learning rather than information providers. The changing role of the tutor is a key feature of TBL and for some is daunting as content is owned by the learner not the lecturer. The shift to facilitator requires discussion, support and development of the key features of the new role (Drummond, 2012). Staff are required to manage multiple groups with differing levels of learning both as an expert on the subject area and a facilitator who can ensure that theory learning can be applied to practical scenarios.

Lessons Learned

An investment of sufficient time leading up to the delivery of modules is needed to ensure successful implementation of TBL using the ABL approach. This time is needed to develop preparatory learning materials, in-class teaching materials and constructively aligned practical activities. Initial investment in support services is also vitally important as input from learning technologists and librarians is vital to ensure that the tools being used are accessible, compatible, and best suited to the content being shared. Management guidance is essential to facilitate staff development and provision of the technology infrastructure to support learning activities being created.

Past experiences of implementing new strategies with second- and third-year learners has demonstrated that they can be reluctant and resistant to change, even rejecting changes to a familiar learning and teaching strategy. For that reason, introducing TBL in first year makes learners more likely to accept the method and engage with their peers. Learners require a thorough induction to the process and expectations of each stage of

TBL and need time to cohere effectively as a group and ensure their collaborative, synchronous learning time is well spent. This can be aided through the setting of clear expectations of the need for collaboration, peer support and social learning. Further investment of time in setting up mock sessions to familiarise learners with the technology tools, mobile applications and online etiquette is also required. The initial investment of time and effort in these areas gives students confidence in the tools required and process for learning so time is best used to engage with the course content and materials.

OUTCOMES

The Learning Experience: High Cognitive Functioning Thinking, Meta-cognition

Michaelson and Sweet (2012) outlined four conditions to ensure that critical thinking occurs, namely

1. a critical thinking attitude.
2. the ability to use specific thinking skills.
3. the ability to apply those skills to new contexts.
4. habits of reflection upon one's own thinking.

Staff had many discussions as to the expectation for first year learners to engage in critical thinking. However, examination of the evidence to support the use of TBL suggested that there was a significant increase when the learning activities were well developed and constructively aligned (Drummond, 2012). During the design phase, basic cognitive skills were mapped to theory-based tasks embedded in the pre-class preparation activities while higher cognitive skills were expected in the application activities. Learners needed to problem-solve case scenarios and apply theory and research evidence to develop sound intervention strategies. The use of a consistent format for the TBL sequence provided weekly opportunities to learn theoretical concepts and apply them to real-life scenarios. The level of discussion, quality of questions and performance on assessments clearly showed that learners were developing higher cognitive skills and learning.

Staff's qualitative evaluation of both the FHS and Research Methods modules (Cases 1 and 2) conducted as part of the annual quality enhancement review found that there were significant changes from passive learning to active learning. The quality of questions asked by students supported the strides made in their learning and learners' confidence in asking questions was clearly visible. The evaluation project also found that learners were more likely to read and had an enhanced understanding and application of course material (Khatri & Siddons, 2015a). Their interpersonal and team skills showed their respect for each other and development of a more mature professional approach to learning despite working in using a blended learning environment (Dwyer & Walsh, 2020). Active learning was also more fun for learners and staff and allowed the teaching team to give their large cohort a small group active experience that promoted teamwork and peer feedback. The team felt strongly that the approach enhanced problem-solving skills and

in the long run was less faculty intensive than traditional small group experiences (Khatri & Siddons, 2015b).

Data from Functional Human Sciences (Case 1)

Data analysis of student achievement in the first year of the redesigned Functional Human Sciences module (2014-15) showed a 22% increase in students achieving the highest grades and a reduction in fails from 5 learners in the previous academic year to 1 learner (Nie et al, 2015). Fifty-five percent of learners 'strongly agreed' and 35% 'agreed' that they spent time studying before class. Eighty-one percent of learners also agreed that TBL activities are an effective approach to learning. While results were positive, poor team cohesion or dominant team members often posed challenges to the learning experience. These challenges needed quick resolution by the module teaching team to ensure that learning was not unduly compromised. When learners were asked to compare their experiences of TBL with their experience of traditional lectures, 32% of respondents 'strongly agreed' and 36% 'agreed' that they were more likely get bored during traditional lectures than during team-based learning activities, with a further 19% neither agreeing nor disagreeing (Nie et al., 2015).

Data from the Research Methods Module (Case 2)

Following on from the success of embedding TBL in the Functional Human Sciences module, staff converted a second-year Research Methods module to incorporate the TBL sequence using ABL. The student cohort for the first iteration of this module (n=60) were the same cohort who had completed the FHS module the year previously. Focus groups were held with 18 learners from the cohort to explore their experiences of TBL. Learners reported that they felt motivated to complete the preparatory workbooks, indicating that it increased their engagement with the topic. They felt strongly that they learnt more from the workbook than they would have from lectures (Khatri & Siddons, 2015a). However, removal of summative credit from the readiness assurance process was perceived as detrimental. Participants reflected that they did not work as hard on the workbook in preparation for readiness assurance and felt a lesser degree of ownership of their learning as a result. While learners still wanted to 'do well for the team', they felt that group discussion was not as in-depth and meaningful as they had not engaged as deeply with the pre-learning activities. These reflections highlight the value and importance learners place on assessment as not only part of the learning process but also as part of lifelong learning.

It was clear that the application tasks helped to make sense of the new terminology and highlighted its' relevance to their own research studies. Learners found that the systematic approach to each research methodology provided a clear structure that helped them understand translate theory to practice in relation to their own projects. Use of TBL

and ABL in this module resulted in a 95%-100% pass rate in the first year, when compared to the 84% pass rate the previous year.

Data from the Assessment and Student Policy Workshop (Case 3)

Feedback on the *Assessment and Student Policy* induction workshop was independently gathered by the University Staff Development team using a standard feedback questionnaire as part of their on-going quality enhancement processes. Feedback specifically pertaining to this workshop was received from 38 participants across 12 different iterations of the workshop. Respondents were invited to provide additional free-text information to supplement their tick-box answers as well as offered an opportunity at the end of the survey to add any final comments. Of most relevance is the question that asks participants whether the trainer's delivery style suited their needs. Eighty-nine percent of respondents either 'strongly agreed' (50%) or 'agreed' (39%) that it did, with only one respondent (3%) disagreeing. Additional comments identified how the delivery style guided participants without lecturing and on the engaging nature of the workshop. The comments identify three key features that should be present in any well-designed and delivered ABL session: minimal, pedagogically appropriate use of lectures; individual discussion; and increased student engagement. Other general comments pick up on the engagement theme, identifying how the Team-Based Learning™ approach 'brought the subject matter to life through discussion'.

One interesting observation relates to the number of staff participants in the *Assessment and Student Policy* workshop who engage with the preparatory work. Typically, only a handful of staff complete the preparatory work, with time pressures being the most common 'excuse' cited. Yet many of these same practitioners' report that they struggle with managing students who turn up to their own ABL sessions unprepared (Palmer et al., 2017; Teixeira Antunes et al., in press).

TBL tackles this challenge head-on. As Sweet (2010) explains, the TBL approach to small group learning creates a "motivational framework in which students increasingly hold each other accountable for coming to class prepared and contributing to discussion". The truth of this insight becomes increasingly clear to the staff 'students' in this workshop as it progresses. Participants who have not prepared, are identifiable to the tutor or workshop facilitator and to the rest of the team primarily through the individual part of readiness assurance. However, as the team test enables them to learn from the wider team discussions and from the provision of immediate feedback, all students should possess a basic or foundational understanding of the core topics under examination before the application activities commence, albeit some of them are less secure in their knowledge. Those who were initially unprepared should, through the process, quickly see the value of engaging in the pre-work and the need for accountability, particularly if summative credit is awarded for the readiness assurance tests. Feedback from staff participants at the academic induction workshop highlights that they recognise the ability of TBL to

achieve the overall learning goals even if some participants have not engaged with the pre-work. TBL also addresses concerns expressed by some colleagues about the appropriateness of removing those who have not prepared from the class.

CONCLUSION

In this chapter, we have reflected on Active Blended Learning through the lens of Team-Based Learning™. We have considered the similarities and differences between the two pedagogies and identified areas for consideration for other ABL, or indeed, TBL practitioners to consider when designing their academic teaching programmes. In our experience, there are both affordances and limitations with using technology to facilitate a TBL learning experience – often engendered not by what is possible, but by what is affordable or available to tutors within an institution. As is often the case, until there is sufficient demand or need, some of the technological possibilities remain 'nice to have' rather than falling into the category of essential technology for academic staff and thus workarounds must be developed and employed. While TBL purists might baulk at some of the adaptations made to the TBL sequence in the case studies identified above, the synergies between ABL and TBL have served to improve the student experience in the first two case studies which feature academic modules as part of a programme of study, and to increase satisfaction and outcomes. For the third case study – the academic induction session on *Assessment and Student Policy* - use of TBL has turned a potentially dry and content-heavy session into a highly interactive one that is well-received by the academic practitioner 'students', some of whom expressly stated that there were aspects of TBL that they would seek to incorporate as they develop their own pedagogic practices around ABL.

A second aim of this chapter has been to identify where additional research would be beneficial. Longitudinal studies would help us identify those factors that needed to be enhanced to improve the student learning experience in the areas of module design, staff facilitation practices, classroom delivery and the advantages and uses of different technology platforms. Another area for consideration would be to explore whether the allocation of summative credit to the readiness assurance process increases student preparedness for their face-to-face sessions through functioning as an extrinsic motivator. While TBL practitioners emphasise the outcome of readiness assurance as being preparedness for the application activities rather than testing per se, allocating some summative credit to the individual and team tests may well function as a sufficient extrinsic motivator that results in engagement for some learners. Alternatively, it may be that including a 'readiness assurance' type of test, whether conducted as part of a wider TBL sequence, or simply made optionally available to students in the VLE before the face-to-face session provides an opportunity for students to assess their own progress and understanding and take self-directed action to improve based on their intrinsic motivation to succeed.

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