active
collaborative
learning

Addressing Barriers to Student Success

Scaling up Active Collaborative Learning for Student Success

Final report to the Office for Students

Project funded by the Office for Students

Project information	
Title	Scaling up Active Collaborative Learning for Student Success
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Summary	The project will increase the use of active learning pedagogies at three institutions, as a strategy to address attainment disparities.
Lead institution	Nottingham Trent University (NTU)
Partner institutions	Anglia Ruskin University (ARU) University of Bradford (UoB)
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Scaling up Active Collaborative Learning for Student Success

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Executive summary

This is the final report for *Scaling up Active Collaborative Learning for Student Success,* a project funded by the Office for Students (OfS) within the *Addressing Barriers to Student Success* (ABSS) programme. The goal was to increase the use of active, collaborative learning pedagogies at three institutions, as a strategy to address attainment disparities.

The project was led by Nottingham Trent University (NTU), using Student-Centred Active Learning Environment with Upside-down Pedagogies (SCALE-UP); partners were Anglia Ruskin University (ARU) and University of Bradford (UoB), both using Team Based Learning (TBL). Each institution had experience in using and evaluating the approaches, and a body of evidence for the efficacy of the pedagogies in terms of student engagement, satisfaction and outcomes.

The project aims were threefold:

1. Increase the extent and quality of adoption of defined active collaborative learning (ACL) pedagogies.
2. Test whether benefits for student success continue to be realised when these pedagogies are used at large scale.
3. Identify conditions needed for even greater institutional adoption.

Arguably, the focus on inclusive pedagogy by design will also move the sector's focus on 'add on' support for specific groups of students to structural curriculum changes that remove unintended barriers to student success.

The OfS funding enabled collaboration for educational development to expand adoption and for an extensive evaluation. The scope of the work was as follows:

- At NTU, SCALE-UP had begun as a strategically designed small multi-site project in 2012/13 and 2013/14, with 33 modules across six (of eight) schools. In 2017/18, there were 249 modules using SCALE-UP, across seven schools and all three colleges.
- TBL started in 2015/16 at ARU as a multi-site initiative, with 25 modules concentrated in two out of four faculties; in 2017/18, adoption was expanded to 38 modules across all five faculties.
- The UoB pioneered TBL at programme-level throughout one entire course in a faculty in 2012/13. In 2017/18, this increased to 26 TBL modules in 28 courses across all five faculties.

The project was initiated in March 2017 and completed in February 2019. The findings from the project are significant, evidencing the success that both approaches have in narrowing unexplained gaps in outcomes for students of target equality groups.

There are two main types of findings:

1. Those related to the impact of the use of SCALE-UP or TBL on student engagement, satisfaction, experience, progression and attainment, as well as on staff experience.
2. *What was learnt about how to adopt ACL at scale.*

The findings on impact are summarised in this report and advice on adoption at scale is appended.

Summary of findings on impact

1. The use of active collaborative approaches to learning provides benefits for all students (NTU, ARU, UoB).
2. Active collaborative learning reduces and, in some cases, removes gaps in student engagement and attendance, attainment and progression (NTU, ARU, UoB).
3. These benefits are magnified in contexts in which:
    a. there is a greater extent of use within a module (ARU);
    b. there is greater engagement with the pedagogic model and with the educational developer (UoB);
    c. students study three or more SCALE-UP modules in an academic year (NTU).
4. Adoption of active collaborative learning in an institution takes time to mature but benefits can be seen during the first year of adoption.
5. There were some common themes across the partner institutions:
    a. students and staff recognised that active collaborative learning is a more inclusive form of learning when compared with other pedagogies (NTU, ARU, UoB);
    b. staff expressed high levels of satisfaction using the pedagogies and the intention to continue with them (NTU, ARU, UoB);
    c. students and staff recognised that active collaborative learning enhances employability (ARU, UoB).

Summary of findings for Nottingham Trent University

Overall, use of SCALE-UP is associated with reduced progression gaps, reduced attainment gaps, improvements in attendance and improvements in engagement.

The analysis relates to undergraduate full-time students, comparing data over three academic years, where available, for SCALE-UP and non-SCALE-UP modules. In 2017/18, around 50% of courses contained at least one SCALE-UP module (based on timetabling data).

SCALE-UP modules had lower failure rates and higher grades for Success for All target groups, and improved attainment for all but gender. This benefit extended to course level, particularly where there was increased exposure to SCALE-UP. In short, the more SCALE-UP modules studied, the greater their impact on progression and attainment for disadvantaged students.

The tipping point for particularly positive outcomes was where students studied three SCALE-UP modules in a year. This phenomenon was observed in four schools where there was a higher prevalence of SCALE-UP overall.

SCALE-UP was associated with lower student satisfaction (4.9 percentage points (pp)) lower, averaged over three academic years), as measured in standard module evaluation surveys. This is discussed in more detail in the section on findings, pages 22-27.

SCALE-UP was associated with high levels of staff satisfaction.

Summary of findings for Anglia Ruskin University

TBL modules had 7-9 pp higher attendance than non-TBL modules. TBL students from all backgrounds had higher course-level attendance and engagement than students not taking TBL. TBL modules had slightly (1-3 pp) but consistently higher average marks, and up to 4 pp better pass rates. All groups of students benefitted from TBL, with the lowest performing students improving marks more than the average. In 2017/18

students who took TBL modules had 8 pp higher rates of good degrees, and gaps narrowed for gender and ethnicity. Other course level outcomes (progression from level 4 to level 5, successful degree completion and average overall course marks) were unchanged when students took TBL modules.

The analysis relates to undergraduate students at the Cambridge, Chelmsford and Peterborough campuses. Data is compared over three academic years, where available, between TBL modules and non-TBL modules on those related courses which had at least one TBL module during the three-year period. Students who experienced at least one TBL module are compared to students on related courses who did not take any TBL modules.

1. Overall, TBL is associated with improved attendance and engagement at both module and course level, and improved module marks and pass rates. Exposure to TBL in a small number of modules within a course does not consistently lead to improved course-level outcomes.
2. Students who graduated in 2018 had better rates of good degrees if they had taken at least one TBL module. Good degree attainment gaps were narrower for both gender and ethnicity.
3. TBL did not affect institutionally measured student satisfaction. Project questionnaire data for 2017/18 indicated that a two thirds majority of students were satisfied with their TBL experience. Three quarters of module leaders were satisfied with teaching using TBL.

Summary of findings for University of Bradford

Student attainment and progression was higher for all student groups who studied modules taught with TBL. Furthermore, attainment gaps were reduced or reversed in all target groups apart from gender, where the attainment gap for females outperforming males remained unchanged. Staff and students reported that TBL promoted inclusivity and increased student attendance, engagement and skills development. The vast majority of staff planned to continue to use TBL and the majority of students enjoyed learning this way.

The analysis relates to undergraduate full-time students, comparing data over three academic years, where available, for TBL and non-TBL modules. In 2017/18, there were 28 courses containing at least one TBL module. In summary, findings were that:

1. Using TBL as a strategy for active and collaborative learning and teaching appears to improve student outcomes and reduces, removes or reverses the attainment gaps seen in non-TBL teaching.
2. Greater levels of engagement with and strength of partnership between educational developers and academics led to better quality of adoption.
3. Scaling-up the use of active and collaborative learning pedagogies such as TBL at institutional level requires significant planning, management support, lead-in time, and initial staff development and support.
4. The full impact of adoption of TBL in an institution takes time to mature although the benefits of using the approach can be seen during the first year of adoption.

Introduction

Overview of the project

The aim of the *Scaling up Active Collaborative Learning for Student Success* project was to increase the use of active, collaborative learning pedagogies at three institutions, as a strategy to address attainment disparities. The project was led by Nottingham Trent University (NTU), using Student-Centred Active Learning Environment with Upside-down pedagogies (SCALE-UP). Partners were Anglia Ruskin University (ARU) and University of Bradford (UoB), both using Team Based Learning (TBL). The project ran from March 2017 to February 2019. Funding was provided by respective institutions and the Office for Students (OfS).

In addition to the main target groups for the *Addressing Barriers* programme – students from low socio-economic backgrounds and certain black and minority ethnic students – the project was intended to benefit all students for whom there were unexplained disparities in attainment at the three partner institutions. These further target groups are set out in Table 1.

This approach was selected for two main reasons:

1. There was some evidence in the literature on active collaborative learning (ACL) to indicate that these pedagogies could be used to address attainment disparities. This was supported by previous experience and evaluation results at each institution, as well as anecdote from practitioners.
2. Inclusive curriculum design shifts the focus from 'bolt-on' support for specific groups of students to core, structural change that removes unintended barriers to student success.

Before the project, each partner had experience of developing and evaluating specific active collaborative pedagogies (SCALE-UP at NTU; TBL at ARU and UoB). This had been in different contexts and at different scales. It was therefore useful to collaborate in broadening adoption and measuring impact.

The project goals were:

1. Reduce attainment disparities for target groups by expanding adoption of two active learning approaches: SCALE-UP and TBL in each institution.
2. Increase mainstream adoption, that is, beyond the innovators and early adopters; and strategic adoption, as part of whole course design, rather than simply adding more modules.
3. Address institutional barriers that prevent or delay widescale adoption and create a 'blueprint' for implementation at scale.

Definitions of terms and measures

Success for All target groups: student groupings by characteristics (Table 1) used in analysis of quantitative data, where the target group represents the group for which there are unexplained disparities in attainment.

Table 1: Definitions of student groupings used in the evaluation

Characteristic	Groupings
Age	Mature Young
Disabled/not-disabled	Disabled

	Not-disabled (No declared disability)
Entry qualification	A-Level only BTEC or BTEC+ other
Ethnicity	Black and Minority Ethnic (BME) White
Gender	Female Male
Widening participation status *At NTU, derived from postcodes matched to ACORN, where category 4 or 5 is flagged as WP.* *At ARU and UoB, based on POLAR4 Quintiles.*	Widening Participation (WP) Non-WP
Residency	Overseas Home

Courses with SCALE-UP/TBL   Programmes with one or more SCALE-UP or TBL modules
Module attainment   Overall grade achieved for a module
Progression   Progression to the next level of study
Course attainment   Final degree classification achieved

Table 2: Definitions of the factors and measures used in evaluation

Factor	**Definition and comments**
Extent of adoption	A count of modules and courses that have adopted SCALE-UP or TBL, in whole or in part. This factor was assessed to determine whether each institution had succeeded in increasing adoption, the extent of this, and the patterns within this. The list of modules and courses was used to generate data for other measures.
Quality of adoption	Described by module leaders in response to a survey and semi-structured interviews. 'Quality' was assessed in terms of three aspects: *Depth*: the extent to which tutors had adopted the features of the SCALE-UP or TBL pedagogy. Statements about teaching design and practice were grouped by researchers into 12 pre-identified SCALE-UP or TBL components. *Breadth*: the proportion of SCALE-UP or TBL sessions used in a given module. *Length*: the extent of experience of the tutors teaching on SCALE-UP or TBL modules.
Proximal outcomes	*Attendance*: comparison of student attendance on all SCALE-UP and all non-SCALE-UP modules or all TBL and all non-TBL modules. Analysed by student target groups.

	Engagement: comparison of course engagement for students experiencing one or more SCALE-UP or TBL modules and those experiencing none. Analysed by student target groups. Data generated in standard engagement tracking, where available at the partner. At NTU, engagement ratings are generated algorithmically from data on library use, virtual learning environment (VLE) logins, coursework submissions, card swipes, attendance and e-book usage.
	Satisfaction: comparison of reported student satisfaction on all SCALE-UP and all non-SCALE-UP modules or all TBL and all non-TBL modules.
	Experience: Reported experience of staff and students for SCALE-UP or TBL modules. Student experience data were generated through focus groups and a survey. Staff experience data were generated using semi-structured interviews, complemented by a survey.
Impact on student success	*Module attainment:* comparison of failure rates and grades for SCALE-UP modules and non-SCALE-UP modules or TBL and non-TBL modules. Analysed by student target groups. *Level progression:* comparison of progression to the next level of study, for students experiencing one or more SCALE-UP modules and those experiencing none or one or more TBL modules and those experiencing none. Analysed by student target groups. *Course attainment:* comparison of degree outcome, where relevant, for students experiencing one or more SCALE-UP modules and those experiencing none or one or more TBL modules and those experiencing none. Analysed by student target groups.

Summary of the pedagogic approaches

SCALE-UP—Student-Centred Active Learning Environment with Upside-down Pedagogies

SCALE-UP is an active, collaborative mode of learning which offers an alternative to didactic and discursive pedagogies like lectures and seminars. In SCALE-UP, lectures are replaced by problem-solving and enquiry-based activities carried out in strategically-assigned groups. To foster collaborative learning, the re-designed classroom environment incorporates circular tables and technologies to enable students to share their work in small groups and in 'public thinking spaces'. These elements are supported by 'upside-down pedagogies' such as flipped learning, peer teaching, and rotating group roles. The shift away from lectures frees up class time for students to focus on difficult aspects of the material, to work at their own pace, and to receive on-the-spot feedback on their work from peers and the tutor.

Team-Based Learning (TBL)

TBL is an active, collaborative learning and teaching strategy which uses a particular sequence of individual study, group work, immediate feedback and teacher-facilitated

discussion and debate to create a motivational framework for students' learning. TBL takes a flipped approach to learning, with students being provided with or directed to learning resources to engage with before formal classes. The incentive to engage with the pre-class content comes from a readiness assurance process (RAP), which includes a short summative individual readiness assurance test (iRAT) immediately followed by an identical team test (tRAT) to foster discussion, debate, and peer learning. Students and academic staff receive immediate feedback on team performance, allowing a focused class discussion on any troublesome course concepts. The majority of class time is dedicated to application exercises where students learn how to use their new knowledge to solve authentic, real-world problems, make collaborative team decisions, and justify their decisions to other teams during discussion and debate, all facilitated by an academic teacher.

Structure of this report

This report follows the guidance on structure for the *Addressing Barriers to Student Success* projects provided by Office for Students. The project rationale and approach are discussed in the next section, with an exploration of the use of active collaborative learning at NTU, ARU and UoB. The following section provides an overview of the evaluation, the activities that were undertaken, and the outputs by institution (quality and extent of adoption). This is followed by the findings, which are presented by institution, beginning with the proximal outcomes (student engagement, satisfaction and experience; staff experience) and then the distal outcomes (student progression and attainment — module and course). The report concludes with a reflection on what has been learnt from the project, including how to support active collaborative learning at scale.

Project rationale and approach

Background

Underpinning the application for this funded project was a considerable track record that partner institutions have in using active collaborative learning approaches in evaluated projects, combined with the body of evidence for the efficacy of these approaches in different contexts, levels of study and disciplines, in terms of student engagement, satisfaction and outcomes. At Nottingham Trent University, interviews in 2013/14 with academic colleagues delivering SCALE-UP modules reported 'wider' engagement with module material 'beyond the classroom', along with improved student attendance. Since the first pilots of SCALE-UP, NTU has developed a student learning analytics Dashboard and were keen to use data from this to support evaluation of the project. The University of Bradford found that using TBL from level 4 enhances early student socialisation, acclimatisation, progression and achievement, all of which are recognised to be linked to reducing attrition and the demands on, for example, their services for disabled students. Earlier evaluations at Anglia Ruskin University through student questionnaires and staff interviews found an increased student engagement in their learning, an appreciation of working in teams and consequent skills acquisition, high student satisfaction, and examples of improved performance and attendance.

There were a number of reasons that the partners decided to engage in this project:

1. *An opportunity to scale up active collaborative approaches*: Experiences at all partners had largely resided at discrete module level and the benefits observed so far (both quantitatively and qualitatively evidenced), derived from SCALE-UP/TBL

approaches, have not generally been embedded at course level. In order to do this, a 'shift' in the approaches was needed from uptake by the 'enthusiastic few' to whole course level implementation. In other words, 'scaling up' or 'delivery at scale' does not merely mean more modules across a wider range of disciplines or subjects but, rather, considering whole-course approaches which fundamentally shift the core teaching and delivery paradigms of a course.

2. *Focusing on learning approaches that allow all students to succeed:* All three institutions find common ground in their drive for sustainable educational practice, as well as a commitment to develop pedagogy that is responsive to the needs of all learners, addresses differences in attainment, and enables all students to succeed in academic endeavour. NTU's strategic ambition is captured in its five pillars for creating the *University of the Future*. Within this, the university has committed to value ideas and create opportunities that will challenge, surprise and inspire through innovative approaches to learning and teaching, and be a catalyst for the development, adoption, investigation and dissemination of innovation in pedagogy. ARU's eleven-strand strategic vision is captured under the themes of ambition, imagination and collaboration. Set out as the third key strategic goal, the university has committed to increase student engagement within the curriculum so as to enrich and support academic success. One of the ways in which they will achieve this is to focus the classroom experience on contemporary pedagogies which create stimulating interactions with academic content. UoB have four overarching strategic objectives, through which they strive for participation and openness, as well as creativity and innovation, alongside other core values of the institution.

3. *Active learning to address disparities in student outcomes*: The Higher Education Funding Council for England (HEFCE) report *Causes of Differences in Student Outcomes* (Mountford-Zimdars et al, 2015), and subsequent conference *Addressing differences in student outcomes: Developing strategic responses* (March 2016), articulated the clear and persistent unexplained differences in degree attainment, progression to postgraduate study and progression to graduate employment for particular groups of students.[1] The report identified four explanatory factors: curricula and learning; relationships between staff and students and among students; social, cultural and economic capital; and psychosocial and identity factors (p iii). It was considered that pedagogic practices in SCALE-UP and TBL had good potential to address these factors, by developing more inclusive learning and teaching, encouraging supportive peer relationships and network building, and engendering positive relationships with staff.

4. Studies show that collaborative, student-centred pedagogies have a positive impact on learning outcomes, which is increased for certain groups. Beichner et al. demonstrated that SCALE-UP improves attainment and reduces failure, particularly for 'at risk' students, while also narrowing gaps for gender and ethnicity. Koles et al. (2010) found that students in the lower performance quartile benefitted more from TBL than those in the highest.

With complementary expertise, experience of the introduction of active, collaborative approaches to learning and teaching, and a shared desire to use these approaches to address disparities in outcomes, a collaborative bid was an easy choice. The project has

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[1] *The Higher Education Funding Council for England is a predecessor to the Office for Students and awarded the first funding for this project.*

developed a good evidence base for strategic adoption of these approaches at scale and, importantly, across multiple contexts, cultures, levels, and disciplines.

Institutional and project contexts

Nottingham Trent University

Nottingham Trent is a teaching-intensive and research-active university in the East Midlands of England. The NTU student population of over 31,000 comprises predominantly UK undergraduate students who are studying full-time. The proportion of NTU undergraduate students from disadvantaged backgrounds has consistently been above benchmark and sector averages. In 2017, approximately 25% of NTU's UK undergraduate students were from homes with mean annual income of £15k or less. The university recruits a larger than sector average proportion of students from Black and Minority Ethnic (BME) groups, with enrolment of black students well ahead of the percentage in the regional and UK population (23% of full-time home undergraduate students in 2017/18). At NTU, gaps in good degree outcomes are most significant for ethnicity, entry qualification and residency. NTU is organised into nine schools, on four campuses.

NTU was the first UK university to introduce SCALE-UP across an extensive range of subjects. In an evaluation of 33 NTU SCALE-UP pilot modules in 2013/14 (McNeil et al., 2014), teaching staff reported greater student engagement with materials and more interaction between peers and the tutor, leading to increased conceptual understanding. Building on this initial success, NTU invested in new bespoke SCALE-UP rooms across two campuses and recruited further academic staff to the approach.

There are currently 15 bespoke SCALE-UP rooms and the approach is now used on 249 modules, across 50% of NTU undergraduate courses. It is used in subjects as diverse as Law, History, Physics, Business, and Architecture.

NTU has hosted an international SCALE-UP conference, hosted an expert class and shared pilot findings widely. SCALE-UP sits within the wider NTU Success for All programme, led by the Vice-Chancellor and within which we work closely with students.

Anglia Ruskin University

Anglia Ruskin University is a modern university with campuses located in the cities of Cambridge, Chelmsford, London and Peterborough. It received its university charter in 1992. ARU has a strong tradition of engagement and partnership with business and industry and serves a diverse population of approximately 15,000 students in the UK, including a high proportion of mature students, students from backgrounds with traditionally low participation in higher education, and with low prior academic attainment. 85% of ARU students have at least one characteristic of disadvantage, with one in six coming from the lowest participation POLAR4 neighbourhoods, above the average for England. 38% of ARU's student body are from BME groups.

ARU reports that institutionally, there is a 17.4pp gap in good degree outcomes between white and BME students, and a 7.9pp gap in good degree outcomes between female and male students. Reported institutional gaps for other disadvantaged groups, including disabled students relative to non-disabled students, are small.

ARU is organised into four faculties. A fifth faculty of Medical Science existed for part of the period of the study.

ARU is now in its fourth year using TBL, with six specialist Active Learning rooms in place. Over 2,700 students are involved in TBL in all four faculties and across all three campuses. TBL sits within ARU's wider work on attainment disparities, an area of increased focus since a 2013/14 audit highlighted marked differences for domicile, ethnicity and disabled/not-disabled. TBL is an integral part of ARU's focus on developing inclusive curricula and increasing student retention.

University of Bradford

The University of Bradford is a technology university in the North of England with a focus on the generation and application of knowledge. The university's mission is: to create knowledge through fundamental and applied research; to disseminate knowledge by teaching students from all backgrounds; and to apply knowledge for the prosperity and wellbeing of people. The university's mission is to be a high-quality, research-intensive, international, technology university with a primary objective to improve people's lives.

Bradford is located in a conurbation of relative social deprivation, and many of Bradford's students come from low-income backgrounds: 52% of the full-time UK-domiciled undergraduate students are in receipt of full state support; just over 9% receive Disabled Students' Allowance; and 72.6% are BME. The UoB has approximately 9,000 students and is organised into five faculties.

Bradford reports a 10.7 pp gap in outcomes for good honours degrees between BME and white students, an 11.1 pp gap in good degree outcomes between students reporting mental health disability and non-disabled students and a 9.7 pp gap between students from IMD1 and IMD 2-5. Reported institutional gaps for other disadvantaged groups are small.

Bradford has been using TBL for seven years; its adoption has now expanded beyond the initial innovators in Pharmacy into all faculties of the university. Bradford worked with their Estates and Facilities Team to change the specification for learning spaces to enable effective active and collaborative learning. Bradford currently employs two of the five accredited TBL Consultant-Trainers in the UK. Bradford hosted two TBL conferences and has shared practice in TBL module design in the UK and the Netherlands. This has led to TBL being used in over 30 institutions in Europe, including ARU.

Theoretical underpinnings to the pedagogic approaches

NTU introduced SCALE-UP in 2012/13, the first UK university to do so in a cross-institutional, multidisciplinary project. SCALE-UP was selected because of its potential as an introduction to enquiry-based learning, its suitability for large group teaching, and importantly, the evidence for its benefits for student engagement and outcomes. Studies of SCALE-UP in science, technology, engineering and mathematics (STEM) subjects in the US had demonstrated: increased conceptual understanding; improvements in problem-solving skills, improved engagement and attendance; a reduction in failure rates particularly for gender and ethnicity; and a tendency for 'at-risk' students to perform better in later modules (Beichner, 2014; Beichner et al., 2007). This evidence made the approach particularly attractive, given NTU's widening participation focus. Following further expansion at NTU, it was observed that attainment gaps for ethnicity and socio-economic factors were considerably lower for courses that included SCALE-UP modules, than for other courses. However, further work was needed and the Office for Students (OfS) funding provided an opportunity to generate evidence: to test whether

active, collaborative learning approaches could reduce attainment gaps when adopted strategically at large scale across an institution.

An analysis of the TBL literature (Haidet, Kublitz & McCormack, 2014) shows early evidence of positive educational outcomes in terms of knowledge acquisition, participation and engagement, and team performance; however, the authors also acknowledge that more research is needed. Koles et al (2010) reported higher scores (+5.9 pp) in examination results for students using TBL, with students in the lower quartile demonstrating a larger increase (+7.9 pp). Earlier evaluation of TBL modules at UoB indicated that whole-cohort assessment outcomes improved when compared to the previous year (results increased by as much as 13 pp, alongside an increase in students achieving distinctions). Additionally, tutors reported that TBL students required less pastoral support from their personal academic tutors. Although the evaluation focused on overall attainment, rather than unexplained disparities, a link was established between TBL and a noticeable reduction in the number of students accessing Disability Services.

Outcomes and findings

As previously noted, the aims of this project were the following: to increase the extent and quality of adoption of two particular active collaborative approaches—SCALE-UP at NTU and TBL at ARU and UoB; to test whether the positive impact on student outcomes continue to be realised when the pedagogy is adopted at a larger scale; and to identify the conditions needed for wider institutional adoption.

This section provides an overview of project activities across the partner institutions before summarising outputs and outcomes, by institution.

Overview of the evaluation

Evidence was generated to assess three areas:

1. The extent to which widescale adoption was achieved, the patterns of adoption within this, and the quality of adoption of the pedagogies.
2. The experience of students and staff, including satisfaction, engagement and perceptions.
3. The impact on students' module and course level outcomes, as a whole and by equality characteristic, particularly ethnicity and socio-economic groupings.

The evaluation took a mixed methods approach, generating quantitative and qualitative data. These can be summarised as follows:

1. Project key performance indicators (KPIs) were used as proxies to monitor the efficacy of the project implementation, alongside interviews with staff.
2. Surveys, interviews and focus groups with students and staff provided insights into the benefits and challenges of the approach. These data were used alongside standard institutional monitoring data for student attendance, engagement and satisfaction.
3. Student progression data were used to identify changes within and prior to the intervention. Higher Education Statistics Agency (HESA) data was used to identify outcomes for students from low socio-economic backgrounds and certain BME minorities in comparison to their peers; this analysis was extended to other groups for which attainment disparities have been observed at each institution.

4. Module and course attainment data were generated and analysed in a similar way to the progression data.

• The original proposal was to focus only on outcomes from level 4, but it was possible to extend this to level 5 and 6 outcomes.

To ensure a robust evaluation, the colleagues selected to undertake the evaluation were those with relevant research skills, qualifications and experience, particularly in the use of mixed methods. Scrutiny was provided by ethics governance, external consultancy, and by the project steering group. The evaluation plan was submitted for ethical approval at each institution, ensuring that the approach was appropriate, that standards were maintained across the project and that the work was conducted in an ethical manner. Several forms of triangulation were used: multiple methods (quantitative, qualitative); multiple sources of data (systems data, interviews etc.); and the perspectives of multiple investigators. This included the experienced external consultant to the project, who worked as a critical friend, providing input and guidance at several key points, strengthening the validity of the interpretation of findings and conclusions.

A full list of measures and indicators is provided in Table 3, below.

Table 3: Summary of project evaluation factors and evidence

Efficacy of scaling up at each institution
a. *Extent of adoption*: this is a numerical count of modules and courses that have adopted either SCALE-UP or TBL, in whole or in part, categorised by depth and breadth of adaptation. b. *Quality of adoption*: A review of the literature on the characteristics that define SCALE-UP and TBL acted as a reference point for the baseline data; in addition to the use of an electronic survey, semi-structured interviews were conducted with module and course leaders. c. *Barriers*: Business readiness analysis and the identification of factors – including those based on previous experience at each institution with TBL or SCALE-UP.
Impact on disparities: proximal outcomes
Given the strong association between student engagement and outcomes, data on the following indicators were generated: a. *Attendance*: As generated in standard attendance monitoring at each institution; however generated, these data allow comparison between modules, courses, schools and to some extent institutions. b. *Engagement*: The existing measures used to understand engagement in each of the institutions were analysed to identify how they are related. c. *Satisfaction*: The headline 'overall satisfaction' measure used in general module evaluation forms for the three institutions was analysed. d. *Experience*: Data on the experiences of staff and students were generated in the following ways: 　　i. Staff experience was generated using semi-structured interviews to ensure high validity, complemented by an online survey. Both tools included a standard set of questions across institutions, to allow some level of comparability of responses and consistency in the overall thematic analysis of data. 　　ii. Student experience data were generated through focus groups and surveys. Again, questions were shared across institutions where

	possible to facilitate comparison of response.

Impact on disparities: distal outcomes

Progression: Progression from level 4 to 5 (and level 5 to 6 where appropriate) was analysed by student group.

Attainment: Attainment at module and course level[2]: analysed by student group.

As outlined in Table 3, the evaluation generated data and reported on two aspects: firstly, the efficacy of scaling up at each institution; and, secondly, the impact on disparities in student outcomes – both proximal and distal.

Logic chain

As part of the evaluation planning for the project, a logic chain (Table 4, below) was created. It summarises how the funding was used and lists the outputs and outcomes.

Table 4: Logic chain for 'Scaling up active collaborative learning for student success'

Inputs	Resources	Activities	Outputs	Outcomes
Office for Students (and previously HEFCE) Catalyst funding, £440,791 Partner in-kind funding, £845,481	3 project educational developers[3] 1 project business analyst. Subsequently, 1 business analyst based at ARU to support ARU and UoB, 1 external consultant hired at NTU.[4] Expertise and identified time of existing staff at each HEI: **1.** Project manager **2.** 8 educational developers **3.** Academic development team support **4.** Consultancy for Accessibility **5.** External reviewer /	Developmental support for academics' practice and curriculum development Analysis of barriers to wide scale adoption and strategies to remove them Evaluation Blueprint for adoption Symposium, webinar, 2 conferences	Approaches are successfully scaled up at each HEI in 2017/18 *a.* Extent of adoption: number of courses and modules adopting *b.* Quality of adoption: extent to which course teams use the pedagogies as modelled in the literature *c.* Barrier identification and removal: institutional barriers to adoption are addressed	Improved student engagement and satisfaction: • Attendance • Engagement • Satisfaction • Experience Improved outcomes for target groups: a. Progression b. Attainment at module and course level[5]

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[2] *These were not part of the original submission but are included in the report as they present crucial evidence of the impact of the approaches and data were available for analysis.*

[3] *Also referred to as Educational Development Consultant*

[4] *Additional roles were hired using funding made available when the project business analyst left the project.*

[5] *These were not part of the original submission but are included in the report as they present important evidence of the impact of the approaches and data were available for analysis.*

	critical friend **6.** Steering group			

Inputs and resources

The success of the project in achieving funding from the OfS (HEFCE at project initiation) not only brought funding for posts to support the work, but also other benefits resulting from being associated with a national project. The association with OfS brought externality and seriousness to the work, increasing the visibility of the project in each institution and more widely in the sector.

The posts that were funded to work on the project were invaluable in allowing each institution to scale up the use of active collaborative learning and to evaluate the results. Having educational developers at each institution provided peer support for the roles and the sharing of expertise across SCALE-UP and TBL and across partner institutions. There were, of course, also challenges involved in the cross-institutional collaboration that needed to be negotiated, for example although ethical approval was obtained at the lead institution, both ARU and UoB were required to gain ethical approval within their own institutions. The timing of GDPR also involved complex and lengthy discussions over access to data that meant sharing of data to facilitate analysis and interpretation was a challenge. This particularly impacted on the approach of the project business analyst who was initially located at NTU and hired to work across the project.

In each institution, educational developers employed on project funding played a major role in the scaled-up support for practice and curriculum development for SCALE-UP and TBL. At ARU and UoB, these roles were also extensively involved in the evaluation. At NTU the larger number of modules necessitated a division of labour, with the educational developer focusing primarily on pedagogic support and the evaluation largely being conducted by non-project staff.

Project activities

Scale of the work

The number of staff and students who were engaged in the project through their use of SCALE-UP and TBL across the three institutions was large:

1. NTU: In 2017/18, 249 modules used SCALE-UP, across 50% of NTU undergraduate courses, meaning that 47% of full-time undergraduates experienced at least one SCALE-UP module that academic year. This equates to over 16,000 students. SCALE-UP was used in seven of the nine schools.
2. ARU: In 2017/18, 38 modules used TBL across all five faculties, with the majority in Business and Science & Technology. The number of courses containing at least one TBL module was 101. A total of 2,676 students were registered on TBL modules.
3. UoB: In 2017/18, TBL was used in all faculties, up from one in 2016/17. The total number of TBL modules rose from 16 to 26 and courses using TBL from 2 to 28. This growth has continued at a similar level during 2018/19. The institutional Educational Developer worked with approximately 15 core academic staff across the institution and the project has resulted in approximately 950 new students using active and collaborative learning.

Developmental support

The educational developers employed at each of the three partners were responsible for providing developmental support for colleagues using SCALE-UP or TBL in addition to leading or supporting the evaluation.

At NTU in 2017/18, this involved providing support for 96 academics who were new to SCALE-UP and a further 28 tutors who were more experienced. This support included: termly induction events as well as bespoke inductions for specific teams; curriculum development, course design and activity design meetings including the whole team and individuals; onsite drop-ins to SCALE-UP rooms to establish contact and identify support needs; using the SCALE-UP typology with tutors to prompt reflection and discussion of key components; the active promotion of SCALE-UP, for example, developing a support video as well as running sessions at internal events such as NTU's annual course leader conference and SCALE-UP expert class; and serving as a named point of contact, connecting colleagues to wider support.

At ARU in 2017/18 and onwards, this involved providing staff professional development workshops in various formats, delivered in collaboration between the educational developer and other colleagues in Anglia Learning & Teaching. Introductory training was provided for all new academics taking the PGCert, and workshops were run at institution-wide events such as the annual Learning & Teaching conference and DigiFest. Bespoke training was developed and delivered for new course teams considering adopting TBL. Both new and experienced TBL tutors were offered support in developing and improving their course materials, and advanced workshops were provided on topics such as classroom management and student induction. The educational developer and the data analyst collaborated with TBL tutors to create tools to improve analysis of TBL assessments. Academics were encouraged and facilitated to carry out pedagogic research around TBL.

At UoB, the educational developer provided staff development and support for academics implementing TBL in their modules in 2017/18 and 2018/19. Additionally, this colleague provided support for student induction to TBL, supported the collection, management, analysis and interpretation of the research data and helped to manage the project. The OfS funding was also used to purchase a two-year institutional license for a student response system to collect assessment data and promote interactivity (PollEverywhere) and a series of Immediate Feedback – Assessment Technique (IF-AT) from Epstein Education to promote active discussion, engagement and immediate feedback. Finally, resources were also used to transcribe interviews and focus groups.

Blueprint for adoption at scale

Guidance on adoption of active collaborative learning at scale is appended to this report. This is a distillation of learning about implementation at scale and is intended to provide a road map for other higher education institutions (HEIs), as well as a reference point for project partners. Examples of topics included are how to provide support for curriculum development and academics' practice, as well as consideration of structural enablers, such as space design and timetable management. The guidance will be disseminated after the project as a 'Blueprint for adoption'.

Project events

Activities undertaken included several project-related events which have been held or are planned for the near future:

1. ARU hosted an Active Learning Conference, 12 September 2017, which included masterclasses on TBL and SCALE-UP, presentations and workshops by partners as well as a range of other non-project contributions including from international delegates.
2. NTU ran a one-day Expert Class on the SCALE-UP approach, 14 September 2018. This was attended by 138 delegates from 41 different organisations, including HEIs, secondary education institutions, industry and the OfS.
3. An end-of-project conference will be held on 28 June 2019, hosted by NTU and involving all partners.

Efficacy of scaling up at each institution: summary of findings

Nottingham Trent University

NTU has achieved sustained growth in the adoption of SCALE-UP since it was introduced in 2012. Funding from the OfS Addressing Barriers to Student Success (ABSS) programme supported further growth, to 249 modules in 2017/18, as well as large-scale evaluation activity and development of an operational model to support institution-wide adoption. This equates to 50% of NTU undergraduate courses using at least one SCALE-UP module. The overall number of courses with SCALE-UP is relatively evenly distributed across the three NTU colleges. However, the number varies considerably between schools within those colleges, with the highest adoption in: School of Social Sciences, School of Science and Technology, School of Arts and Humanities, Nottingham Business School and Nottingham Law School, in that order.

In the evaluation, the *quality* of SCALE-UP adoption at NTU was assessed from three perspectives, using evidence provided in surveys and interviews with staff. The findings evidenced a consistent picture of adoption across the institution:

1. *Breadth*: the *proportion* of SCALE-UP sessions used in a given SCALE-UP module. Approximately half the respondents reported using SCALE-UP sessions for most or all of their SCALE-UP module.
2. *Depth*: the extent to which tutors had adopted the features of the SCALE-UP pedagogy, self-reported by staff and grouped into 12 pre-identified core components. The majority of respondents reported using 6-9 core components, and the mode was 7. Although respondents using 7 components were not necessarily using the same 7, the overall profile indicated high adoption of the components *enquiry-based learning*, *public thinking* and *SCALE-UP activities*, and low adoption of the component *strategic group formation* and use of a named *problem-solving framework* such as GOAL.
3. *Length*: the extent of experience of the tutors teaching on SCALE-UP modules. Survey respondents divided into three broadly equal sized groups: just over one third were teaching SCALE-UP for the first time; another third had had either one- or two-years' experience teaching SCALE-UP; and the final group had three or more years' experience. This picture on 'length' does have the caveat that the study utilised a cross-sectional, rather than longitudinal, approach to the generation and analysis of data.

Given that considerable congruence in the components adopted was observed, the number of tutors using each component was plotted to provide 'profiles' of SCALE-UP core pedagogy adoption. The radar chart (Figure 1 below) gives an overall picture of SCALE-UP core pedagogy adoption for respondents to the staff survey (n=76). The higher the number of respondents who reported using a given component, the closer the

relevant node sits to the outer edge of the circle. Profiles were also produced for length of experience. These profiles proved very useful when reflecting on strategies for adoption. It was not possible to test whether one or another adoption profile was more effective in addressing barriers to student success, but further work is planned to investigate this.

Figure 1: Radar diagram showing adoption of SCALE-UP components

SCALE-UP Depth: "NTU Profile"

N=76

Percentage of respondents using each key component
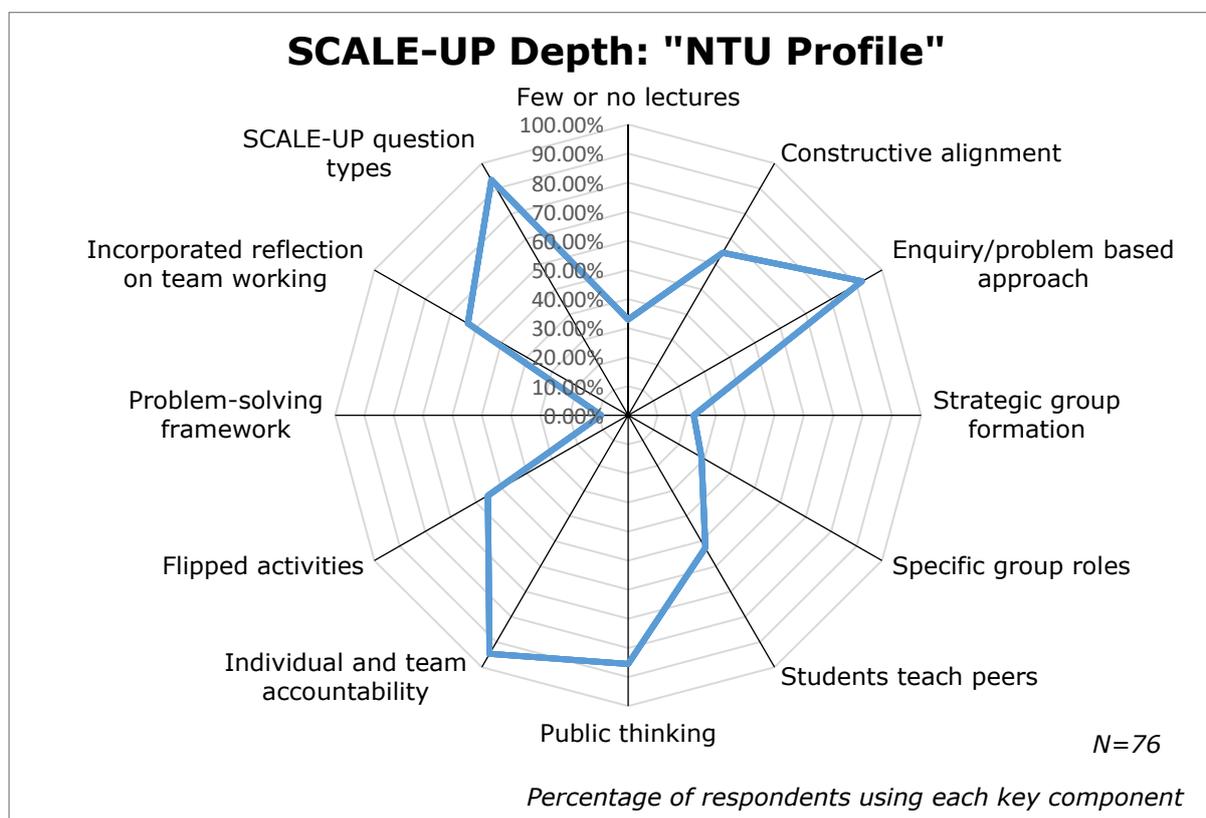
In analysing the three perspectives together, it was found that:

1. The proportion of a module that is classed as SCALE-UP does not change with length of experience.
2. Individual tutors' adoption of core components does not appear to be affected by prior SCALE-UP teaching experience.

These findings seem to contradict an early assumption that tutors will adopt more SCALE-UP components as they become more experienced in, and comfortable with, the approach.

Additional data from the staff experience interviews indicated that there may be further factors associated with successful adoption, in particular:

1. The introduction of SCALE-UP in a context where there is already a culture supportive of active learning.
2. Individual intent and commitment to make it work.

Together, these suggest that use of the approach cannot simply be mandated as an institutional strategy for adoption.

Anglia Ruskin University

ARU piloted TBL in 2015/16. 25 modules in 92 courses adopted TBL as part of the pilot, most of them in two faculties, Business and Science & Technology. In 2016/17, there was no formal process of auditing TBL uptake. TBL adoption increased slightly from 2015/16, with 32 modules claiming to use TBL in up to 120 courses across four of the five faculties. However, the data on TBL adoption for 2016/17 may have some inaccuracies, where modules are recorded as using TBL when they did not do so, or some modules which did use TBL omitted.

In 2017/18, the OfS Catalyst project promoted scaling-up of TBL across the whole institution. Project funding paid for a dedicated educational developer who identified new module leaders and increased existing capacity for training and support. Participation in a national project raised the profile of ACL within ARU. University senior management were represented on an internal steering group and promoted ACL at strategic level. As a result, 38 modules used TBL in all five faculties, with the majority still in Business and Science & Technology. 2,676 students were registered on TBL modules. The number of courses containing at least one TBL module was 101, slightly lower than 2016/17 due to the removal of several large shared modules which had been incorporated into multiple courses. This represents a quarter of all undergraduate courses offered at the main ARU campuses (Cambridge, Chelmsford and Peterborough). We identified TBL champions who will continue to promote and expand TBL once the OfS project is complete.

The three partner institutions developed a typology of ACL based on a maturity model with the most mature adopting a fully supported student-centred independent learning approach. Elements of TBL were classified as absent, present at an introductory level, developing, or established. An online questionnaire was used to ask module leaders about their TBL practice. 19 module leaders out of 30 surveyed (68%) filled in the questionnaire covering 30 modules of the 38 using TBL (79%).

Findings were that standard TBL application exercises are widely used across the institution, in most cases conforming to the TBL 'Four S' structure.[6] There was variation in the use of TBL teams, with an unexpectedly high number of modules not forming permanent teams for the duration of the module. There were also a number of modules where TBL was separated from a full flipped learning approach, with the pre-session learning activities replaced by traditional methods such as lectures or general subject reading. A new development in 2017/18 was that some academics used TBL for just a few sessions in the module. This is likely to be an effect of scaling-up from pioneers to early adopters. Finally, TBL assessment was implemented inconsistently, with several modules using iRATs, tRATs and peer evaluation formatively only, and a small number omitting the individual and team assessments.

University of Bradford

This project has resulted in a significant increase in use of TBL across the UoB. By the end of the 2017/18 academic year, TBL was being used in all faculties, up from one in 2016/17. The total number of TBL modules rose from 16 to 26 and courses using TBL from 2 to 28 during the 2017/18 academic year. This growth has continued at a similar level during 2018/19.

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[6] 'Four S' activities are those where teams work on the Same problem, which should be Significant, make a Specific decision, and report Simultaneously.

The institutional educational developer has worked with approximately 52 core academic staff across the institution to help educate them about TBL and actively supported 15 of these to design or redesign their modules and learning resources to promote ACL using the TBL structure. This included ongoing coaching and mentoring, formal peer review and teaching observations, student orientation and skills development. The project has resulted in approximately 950 new students using active and collaborative learning across the institution. The educational developer has also helped to induct students to TBL to help them understand the process and the advantages of and benefits to their learning and development of using ACL.

The quality of adoption of TBL is important, as is the consistency of approach used by different teachers. Identifying and categorizing the quality of adoption using a specifically designed typology showed that the greater the level of engagement with and strength of partnership between the educational developers and academics, the better the quality of adoption. This highlighted the importance of educational developers to the success of the implementation of new ACL methodologies. Consistency of approach was best when either individual module leaders or small formal course teams delivered the module. Consistency varied more when large, more informal module teams delivered the module.

Impact on disparities at each institution: summary of findings

Nottingham Trent University

   Proximal outcomes: attendance, engagement and satisfaction

Use of SCALE-UP slightly improves attendance for all student groups.[7] However, attendance data are available for only 70% of undergraduate modules in 2017/18 and so the findings on this factor should not be interpreted in isolation.

Attendance data are generated by monitoring the percentage of sessions attended by individual students. When comparing all SCALE-UP and non-SCALE-UP modules in 2017/18, average attendance is similar. However, attendance data are also banded, to show the percentage of students on a module whose attendance is 90% or over, 80–89%, 70–79%, and so on. Comparison of these bands indicated that SCALE-UP modules overall have slightly fewer students in lower attendance bands (bands below 60%).

1. This holds for all student Success for All target groups.
2. BME students in particular have notably improved attendance when participating in several SCALE-UP modules within the academic year.
3. Attendance on individual modules is higher where the students experience three or more SCALE-UP modules in that academic year.

To provide some examples on attendance, for BME students, taking the highest and lowest attendance categories (90-100% and <40% respectively), the difference between attendance for BME students who have no SCALE-UP modules and those who have 3+ modules in 2017/18 improves by 13 pp and 16 pp respectively. The comparable numbers for white students also show an improvement (5 pp improvement in both attendance bands for 0 versus 3+ SCALE-UP modules); however, as the improvement is not as marked as for BME students, there is a positive impact on the attendance difference between these two categories. The picture is similar when considering widening participation (WP) and non-WP students, although not as dramatic. For WP

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[7] *Compared with non-SCALE-UP modules in 2017/18*

students the improvements are 9 pp and 10 pp and 7 pp and 8 pp for non-WP respectively, again evidencing improvements for both groups but greater improvements for the WP students.

Student engagement with their course is higher, where students study more SCALE-UP modules, with the greatest difference for cohorts studying at least three.[8]

SCALE-UP is associated with lower student satisfaction.[9]

- A lower percentage of students reported 'overall, I am satisfied with this module' in the standard module survey for SCALE-UP modules, compared with that for non-SCALE-UP modules (4.9 pp difference).
- This is concomitant with the findings reported in wider literature on ACL: that these pedagogies have benefits for retention and learning, but, even so, students report lower satisfaction with them. For example, Rienties et al (2016) found that the use of a socio-constructivist approach – that is, pedagogies which focus on social learning – had a neutral to positive effect on academic retention but a negative effect on students' perception of their experience. It has been proposed elsewhere that students may resist active learning, and that this resistance can lead to lower satisfaction scores.
- Student focus groups in this study explored satisfaction with aspects of SCALE-UP that are not evaluated in standard module surveys. Students indicated that they valued peer learning and support in SCALE-UP, as well as high levels of tutor contact. There were mixed views on group work: some students saw the benefit of this, even if it had been difficult to negotiate; other students' experience of the challenges of working with peers led them to reject the idea of group work entirely. Students also commented that consistent structure to the classes helped them, because they knew what was expected of them. This was especially the case where the tutor explained links between pre-work, in-class tasks and post-work or assessment, and where they included structured reflection on group roles.

Staff teaching SCALE-UP report satisfaction with the decision to use it (91%) and 76% consider that it promotes deep learning. In open comments and interviews many staff commented that SCALE-UP was a more satisfying experience than other teaching approaches. One reported that:

> '[SCALE-UP teaching] went really quickly, far quicker than most teaching that I do, because it was more interactive, more participatory, more active on the part of the students, I enjoyed it more.'

Another tutor who was teaching SCALE-UP for the first time reported a similar transformational experience:

> 'My heart used to sink when I thought about teaching the following year and it doesn't sink anymore because I know [the new module] works and it's better and we're all benefitting from it.'

In addition to comments around deeper learning and conceptual development, themes emerged from staff data around the impact of the participatory nature of SCALE-UP. Several staff spoke of the peer-to-peer support that was evident in their SCALE-UP sessions. One commented that SCALE-UP teaching 'build[s] communities of learners'

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[8] *As measured by the NTU Student Dashboard and compared with non-SCALE-UP courses in 2017/18*

[9] *Compared with non-SCALE-UP modules over 2015/16, 2016/17 and 2017/18*

while another felt that students got 'a chance to shine by working together and creating a practical output that they have designed themselves'.

As well as seeing peer interaction as supporting engagement with content, respondents commonly referred to the building of team-working skills as a benefit of SCALE-UP. In the staff survey: 97% agreed or strongly agreed that 'students learn and practise skills such as group working and communication, leadership, decision-making, and conflict management'. Open comments made clear that SCALE-UP creates a distinct dynamic in the teaching and learning environment as it 'gets the students to work together in a way that [they] may not have done in traditional seminar settings'. A significant majority (86%) of tutors also consider that it is an inclusive pedagogy.

When asked to reflect on what they had learned from SCALE-UP, two tutors suggested that the use of extended, enquiry-based group projects places a responsibility on students which can be empowering, and which allows staff to see students' enthusiasm, commitment, and ability: 'When students are empowered to shape their projects and to take decisions, they do so and thrive'. A second respondent commented:

> 'I have learned that students are keen to use their own knowledge, life experiences and critical thinking to engage with the SCALE-UP activities. Most of the students are adept at… accessing knowledge on the internet and are ready to apply this knowledge in class. They are keen to share this knowledge in class and hear what other students have to say'.

Distal outcomes: progression and attainment

SCALE-UP modules were associated with lower failure rates and higher grades, in comparison with non-SCALE-UP modules.

1. Statistical testing[10] confirmed strong evidence that SCALE-UP modules had higher pass rates, and higher rates of 2:1/first class grades.
2. The lower rate of failures was apparent across all student groups.
3. All student groups achieved higher grades on SCALE-UP modules.

Module attainment

The findings on module attainment evidenced improvements for most students, including those from Success for All target groups: ethnicity, WP, entry qualifications, age, disabled/not-disabled and residency. Results for several of these groups showed statistically significant improvements: BME, disabled, overseas and WP. The only group which did not have a positive attainment boost when using SCALE-UP was male students.

The resulting impact of improvements in attainment was that attainment gaps for Success for All target groups tended to be lower across SCALE-UP modules.[11] Across data for 2015/16 to 2017/18, gaps reduced with exposure to SCALE-UP: by -4.2 pp for ethnicity, -3.3 pp for disabled/not-disabled, -1.9 pp for residency, and -1.7 pp for WP/socio-economic. Gaps for three groups widened: +0.6 pp for age, +0.3 pp for entry qualification (because younger students and 'A' level students also improved) and,

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[10] *Statistically controlling for other factors, such as pre-entry qualification, academic school, undergraduate level, academic year and students' Success for All characteristics. See Appendix 1 for summary of statistical testing.*
[11] *Negative numbers indicate a narrowing of the gap, i.e., they represent a beneficial effect of the use of SCALE-UP.*

notably, +4.6 pp for gender – because males did not improve, while females showed statistically significant improvement.

Gaps in failure rates for Success for All target groups were lower across SCALE-UP modules than non-SCALE-UP. Across data for 2015/16 to 2017/18, gaps reduced with exposure to SCALE-UP: by -0.7 pp for gender, -2.3 pp for ethnicity, -1.3 pp for disabled/not-disabled, -3.7 pp for age, -1 pp WP/socio-economic, -3.3 pp for entry qualification and -2.9 pp for residency.

Table 5: Changes to module attainment gaps – negative numbers indicate narrowing of the gap, representing a beneficial effect of the use of SCALE-UP

Success for All factor	Percentage point difference	Number of students	
		Non–SCALE-UP	**SCALE-UP**
Ethnicity	-4.2	253,756	16,460
Disabled/not-disabled	-3.3	254,407	16,499
Residency	-1.9	276,047	17,594
Widening participation	-1.7	252,462	16,366
Age	+0.6	254,671	16,503
Entry qualification	+0.3	254,671	16,503
Gender	+4.6	254,590	16,449

Course level progression

The findings on progression also evidenced improvements for most students, including those from Success for All target groups. Results for several of these groups showed statistically significant improvements: overseas and mature; and BME, male, WP and BTEC at 3+ SCALE-UP modules. The results for three groups stayed broadly the same: white, 'A' level and non-WP. No groups had progression that was worse.

As a result of these patterns, the progression gaps at course level reduced considerably for Success for All target groups where students experienced a higher number of SCALE-UP modules.

1. Ethnicity: the progression gap almost disappeared when students took multiple SCALE-UP modules: the gap between BME and white students for no-SCALE-UP modules was 12.9 pp, decreasing to 1.2 pp for those taking 3+ modules.
2. Socio-economic: the progression gap was eliminated for students taking three or more SCALE-UP modules: the gap between WP and non-WP for no-SCALE-UP modules was 9.6 pp, becoming -1.2 pp for those taking 3+ modules.
3. Entry qualification: the progression gap for students taking none or one SCALE-UP module was 15 pp, for two SCALE-UP modules it was 9 pp, and for three or more modules, it was 4.9 pp.
4. Gender: the progression gap for students taking no SCALE-UP modules was 9.5 pp, for one SCALE-UP module was 8.6 pp, for two SCALE-UP modules it was 8 pp, and for three or more modules, it was 5.6 pp.
5. Progression gaps were also reduced for age (12.3 pp to 10.2 pp for 3+ modules) and residency (6.9 pp to -2.9 pp for 2 modules).

An exception to this reduction in progression gap was found with disabled/not-disabled. In this case, the gap increased with the number of SCALE-UP modules taken.

Table 6: Changes to gaps between groups for likelihood of progressing from level 4 to level 5. Changes shown dependent on number of SCALE-UP modules taken.

Success for All factor	Percentage point gap				Number of students			
	0 SCALE-UP modules	1 SCALE-UP module	2 SCALE-UP modules	3+ SCALE-UP modules	0 SCALE-UP modules	1 SCALE-UP module	2 SCALE-UP modules	3+ SCALE-UP modules
Ethnicity	12.9	14.4	9.2	1.2	18,895	1,999	672	212
Disabled/not-disabled	2.2	-2.3	5.9	6.1	18,963	2,003	675	213
Residency	6.9	17.7	-2.9	[12]	20,272	2,076	694	[14]
Widening participation	9.6	8.2	8.3	-1.2	18,838	1,983	669	212
Age	12.3	5.7	-1.6	10.2	18,991	2,004	676	213
Entry qualification	14.7	15.3	9.1	4.9	17,629	1,837	589	203
Gender	9.5	8.6	8.0	5.6	18,984	2,004	676	213

Course attainment

The findings on course attainment evidenced improvements for most students, including those from Success for All target groups (ethnicity, WP, entry qualifications, mature, disabled/not-disabled and residency).[13] Results for several of these groups showed statistically significant improvements: BME and overseas; and mature, WP and disabled were significant at 3+ modules. The only group which did not have a positive attainment boost when using SCALE-UP was male students, whose results worsened with increased exposure to SCALE-UP.

As a result of these improvements, gaps were reduced for Success for All target groups, with greater exposure to SCALE-UP. Comparing gaps for students with no SCALE-UP exposure to those with 3+ modules: ethnicity, from 15.7 pp to 1.7 pp; disabled/not-disabled, 4.8 pp to -1.7 pp; age, 11.7 pp to -6.3 pp; WP, 10.5 pp to 6.5 pp; residency 36.2 pp to 24.1 pp. This latter group saw a significant impact with exposure to just one module of SCALE-UP.

Gender and pre-entry qualification were exceptions to this pattern and the gaps increased with exposure to SCALE-UP. For gender, this was from 3.1 pp with no SCALE-UP to 11.3 pp for those taking 3+ modules; the increased gap was due to both higher female attainment *and* lower male attainment. For entry qualification, the gap increased from 15.9 pp to 20.7 pp, due to improved attainment for *both* BTEC and 'A' level participants – however, the latter group outperformed the former.

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[12] *Data is only available for two modules of SCALE-UP for the Residency factor.*
[13] *For 2017/18 final degree qualifying students*

Table 7: Changes to course attainment gaps. Changes shown dependent on number of SCALE-UP modules taken.

Success for All factor	Percentage point gap				Number of students			
	0 SCALE-UP modules	1 SCALE-UP module	2 SCALE-UP modules	3+ SCALE-UP modules	0 SCALE-UP modules	1 SCALE-UP module	2 SCALE-UP modules	3+ SCALE-UP modules
Ethnicity	15.7	19.9	23.7	1.7	2,976	1,473	727	291
Disabled/not-disabled	4.8	6.0	1.1	-1.7	2,980	1,479	727	291
Residency	36.2	24.1	24.1	N/A[14]	3,233	1,568	765	N/A
Widening participation	10.5	12.9	10.0	6.5	2,955	1,468	717	290
Age	11.7	12.4	10.4	-6.3	2,981	1,479	727	291
Entry qualification	15.9	18.9	22.2	20.7	2,692	1,378	694	243
Gender	3.1	8.7	15.1	11.3	2,978	1,479	726	291

Anglia Ruskin University

Proximal outcomes: attendance, engagement and satisfaction

Based on automatically collected institutional data, TBL modules had substantially higher (7-9 pp) attendance than non-TBL modules on related courses, namely those which contained at least one TBL module during the three years of the study. Students who took at least one TBL module had 6-9 pp higher attendance measured across all modules of their courses.

Students who took TBL modules also had 7-8 pp higher automatically calculated engagement scores. While attendance makes up 60% of the Anglia Ruskin University (ARU) engagement score, improvement in engagement scores was greater than improvement in attendance, indicating that TBL students may also use the virtual learning environment (VLE) and library resources more often.

All groups of students showed improved course attendance and engagement if they took TBL modules. Female students had higher attendance and engagement scores than male students and this gap widened for female students who took TBL. The attendance gap by gender was 2-5 pp for students who did not take TBL, and 10-15 pp for students who took TBL modules. Similarly the engagement gap by gender was 3-5 pp for students who did not take TBL modules, versus 8-9 pp for TBL students. BME students had higher attendance (3-7 pp) and engagement (2-5 pp) scores than white students, and both groups improved equally when they took TBL. Non-disabled students had slightly higher attendance (4 pp) and engagement (2 pp) scores than disabled students. Disabled students showed more improvement if they took TBL, meaning that the already small gap narrowed to 2 pp and 1 pp. A consistent effect on disparities in proximal outcomes

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[14] *Data is only available for two modules of SCALE-UP for the Residency factor.*

for other comparisons (age on entry, socio-economic status, prior qualifications) was not observed though all groups had better scores if they took TBL modules.

236 students from all faculties filled in an online questionnaire about their TBL experience, during Semester 2 of 2017/18 and Semester 1 of 2018/19. This represents a 6% response rate for 3,587[15] students surveyed.

Of these, a two-thirds majority were satisfied with their TBL experience (Figure 2) and agreed that TBL had advantages over other learning approaches, including promoting employability and inclusivity (Figures 3 and 4). Free text comments indicated that many students appreciated working in teams and having regular input from their tutor. Several comments indicated that they found the structure of TBL, with regular feedback, helpful for their learning.

One fifth to one quarter of respondents were critical of or neutral towards TBL. The most common reason for complaint was that they did not like working in teams or experienced problems with team dynamics, reflecting the fact that nearly half of respondents indicated that they preferred to work on their own rather than in a team. Other complaints related to learning design and delivery, most of which are not specific to TBL. A minority of comments expressed dissatisfaction that there was too much work or not enough time for independent study (pre-session learning) for their TBL modules.

There were no measurable differences in satisfaction scores for TBL modules compared to non-TBL modules on related courses, based on the standard Module Evaluation Survey used across the institution.

Figure 2: Students' overall satisfaction with their TBL modules

Overall, how satisfied were you with this TBL module?

- Very Satisfied - Satisfied - Neutral - Dissatisfied - Very Dissatisfied

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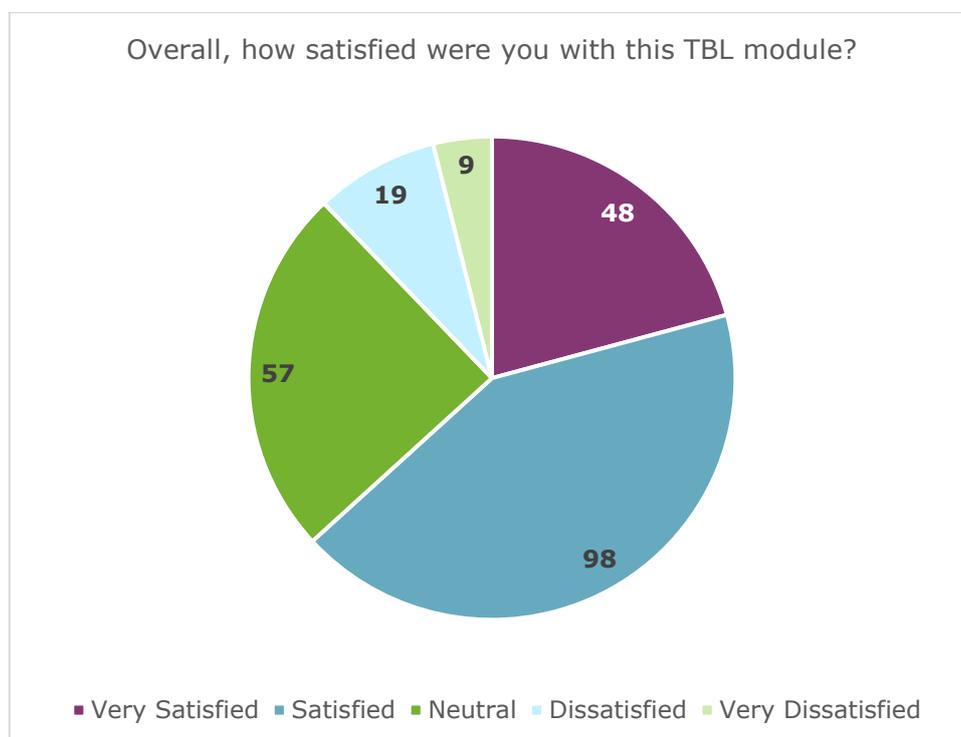
[15] *During a repeat of the questionnaire in 2019, an additional 911 students were targeted, who were not included in the main phase of the project in the academic year 2017/2018.*

*Figure 3: Students' agreement that TBL promotes employability*

TBL helped me to develop skills I will use throughout my life

64

13

15

35

103

■ Strongly Agree ■ Agree ■ Undecided ■ Disagree ■ Strongly disagree
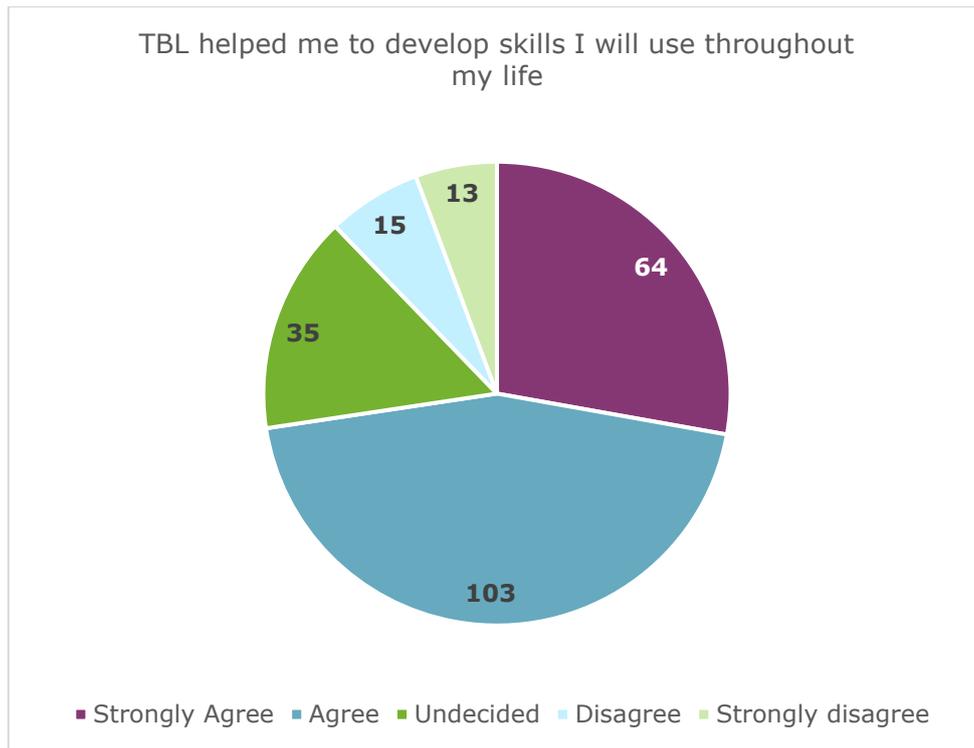
Figure 4: Students' agreement that TBL is inclusive

TBL was welcoming to all students irrespective of their background

58

20

20

14

118

■ Strongly Agree ■ Agree ■ Undecided ■ Disagree ■ Strongly disagree
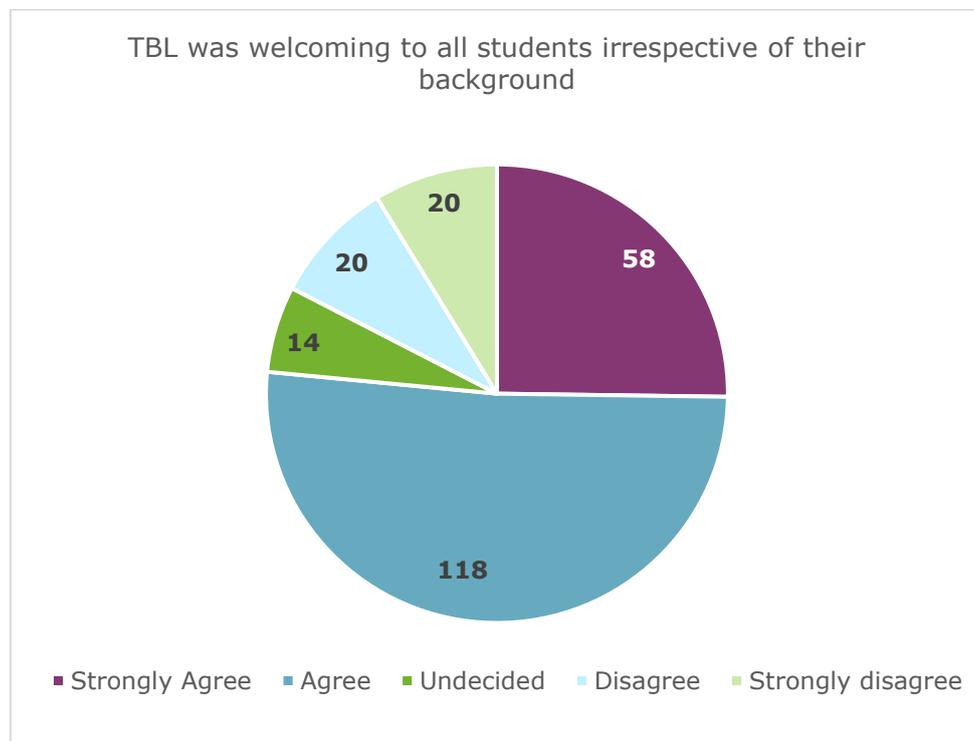
Distal outcomes: Progression and attainment at module and course level

Based on automatically collected institutional data, TBL modules had slightly (1-3 pp) but consistently higher average marks than non-TBL modules in related courses. In 2017/18, modules which used TBL for most or all taught sessions showed the greatest

improvement in marks, by 6 pp on average, while those that used TBL only occasionally, or combined TBL with other teaching approaches, also showed improvement, but to a lesser extent (1-4 pp).

The pass rate for TBL modules improved more than the average mark (e.g., 4 pp improvement in pass rate with only 1 pp improvement in average module mark) indicating that the lowest performing students benefitted the most, while all students improved their marks. All disparity groups improved equally so there was no effect of TBL modules on the attainment gap.

This small improvement in module marks did not translate to improved progression rates from level 4 to level 5, or improved completion of degrees at level 6. There was no difference in overall degree marks for those students who graduated after taking at least one TBL module, compared to students who graduated without taking any TBL modules.

In 2017/8 only, 626 graduates who had taken at least one TBL module were more likely to achieve good degrees (First or 2:1) than the 860 graduates included in the study who had not taken any TBL modules (8 pp improvement). In 2017/8, the disparity in proportion of good degrees narrowed between male and female students, and between BME and white students. Male students showed greater improvement than female if they took TBL modules, narrowing the good degree gap from 20 pp to 10 pp. BME students also showed greater improvement than white students if they took TBL, narrowing the good degree gap from 36 pp to 21 pp.

University of Bradford

Proximal outcomes: Attendance, engagement and satisfaction

Quantitative data relating to student attendance and satisfaction were collected and compared for TBL modules and non-TBL modules across the institution (horizontal comparison) across 2017/18 and, for TBL modules new in 2017/18, a vertical comparison was made with module data from 2016/17.

The horizontal findings showed that mean attendance at TBL modules was significantly higher (6 pp) than non-TBL modules across the institution and that the difference was greater still for male students (9 pp), BME students (10 pp), younger students (9 pp) and students from a traditionally lower higher education participation area (9 pp).

Like-for-like vertical comparison showed a smaller 1 pp increase in attendance suggesting that improvements take time to take effect.

A vertical comparison of module student satisfaction data from 2016/17 before the intervention and 2017/18 after the intervention was inconclusive with some rising and some falling. This was not unexpected as change often takes time to take effect. This is supported by a recent study that showed that student resistance to curriculum innovation decreases over time. Data from the two established courses using TBL showed a dip in student satisfaction in the first year of implementation and a subsequent significant rise the year after.

Staff satisfaction

Semi-structured interviews with academic staff and subsequent thematic analysis identified four main themes. There were *resourcing, pedagogic design process, student outcomes* and *staff experiences.* The key findings are:

1. There is a correlation between resourcing and quality of adoption which mostly takes the form of on-going staff development needs when introducing or transitioning to active collaborative learning methods such as TBL.
2. Staff benefited from working with an educational developer skilled in the use of TBL.
3. Staff perceived there to be significant benefits relating to the pedagogical design of TBL in terms of student engagement, promoting inclusivity, and academic and skills outcomes.
4. Challenges included managing the change/transition, ensuring there was sufficient time for planning and developing the resources, managing the technology and integrating systems.
5. Staff generally enjoyed teaching using TBL with the majority (92%) planning to continue to use it in future teaching and wanting to develop their TBL practice further.

'You'd be mad not to because it's so much fun. It's so much better seeing students talking to each other and arguing with each other and arguing with you than standing at the front telling them what's what while they try not to fall asleep'.

Student experiences

Analysis of the student focus groups and student surveys suggest that students enjoyed learning using TBL and they recognized that it increased their engagement in their learning and that is has the potential to help their skills development.

'You start seeing the benefits of it over time. So, for the first couple of packs… it was just, we've got to read this. And we're going to have to do this to try and pass the test, and as a group we'll do it and see if we can pass that also. But then, as the months have gone on with it… and we've… gone out… for placement… it's shown that it has really been beneficial to learning. And not just like, not just the university, academic side of passing it, but practically as well'.

'Once we got into it… it was completely different, like it was engaging for us all. And it was something to look forward to, to be honest'.

Students found it to be an inclusive pedagogy and shared perceived benefits, particularly for those with Specific Learning Disabilities or who spoke English as a second language:

'English is not my first language, and for me it was much more easier to learn by reading, and in a home environment, than at school, when you get stressed, and I forget everything straight away because I get anxious… even when the exams came… I just had to think of the answer and I already knew the answer'.

Almost all students commented on the various ways TBL promoted a more supportive learning environment for everyone:

'When we've got assignments coming up… even though we help each other, you're on your own doing it. Whereas in the team-based learning, you just supported each other, didn't you?'

'University work can be a bit isolating at times like, you think you've just got to do it all yourself, but I think TBL really makes you appreciate what you can learn from peers… sometimes you learn better from your peers'.

Many students shared that they were initially sceptical until the experience of learning this way helped to persuade them of the benefits:

> X: 'When we kind of heard there was going to be an exam every two weeks, at first I was like, what? I can't do this!'

> Y: A lot of us were, just absolutely, mental[ly] shocked....

> Z: Like, I can't do it… but when it came to that, like, an exam; but then we got feedback afterwards, so… the stress level totally decreased'.

> 'You had to be prepared before you came in, and I was quite; oh, I don't know if I'm going to like this, is it going to work; but I did, I preferred it. And I thought if the whole year was like that… it would keep you more interested'.

Some students would have liked to have chosen their own teams. Most students understood the benefits to themselves and their teammates of incorporating peer assessment; some objected to the way this was conducted and expressed a preference for more timely, dialogic approaches.

Distal outcomes: Progression and attainment at module and course level

Quantitative data relating to student attainment and progression were collected and compared for TBL modules and non-TBL modules across the institution (horizontal comparison) across 2017/18 and, for TBL modules new in 2017/18, a vertical comparison was made with module data from 2016/17.

The horizontal findings showed that students on TBL modules had a higher level of attainment (6 pp) compared with non-TBL modules across the institution

The data were then analysed by gender, ethnicity, age, level of higher education participation area (WP), and disabled/not-disabled to identify any impact on disparities and the attainment gap. The data showed that:

1. The attainment gap for gender remained unchanged at approximately 3 pp in both non-TBL modules and TBL modules; however, attainment was higher on TBL modules (6 pp higher for males and females).
2. The attainment gap for ethnicity was eliminated in TBL modules (Figure 5); attainment for those taking TBL modules was 7.3 pp higher for BME students and 2.8 pp higher for White students (Table 8).
3. The attainment gap for age was eliminated in TBL modules; attainment for those taking TBL modules was 2.1 pp higher for mature students and 7.1 pp higher for young students
4. The attainment gap for disabled students was eliminated in TBL modules (Figure 6); attainment for those taking TBL modules was 7.8 pp higher for disabled students and 6 pp higher for non-disabled students (Table 9).
5. The attainment gap for level of higher education participation (POLAR4 Quintile 1–3 compared with POLAR4 Quintile 4–5) was eliminated in TBL modules. Attainment for those taking TBL modules was 3.6 pp higher for Quintile 4–5 students and 7.5 pp higher for Quintile 1-3 students.

Like-for-like vertical comparison for new modules in 2017/18 showed a smaller improvement in attainment of 2.2 pp, again suggesting that larger improvements may require time to become embedded.

The horizontal data showed that students on TBL modules had a higher level of progression (6.6 pp) when compared with non-TBL modules across the institution.

Figure 5: Mean percentage attainment by ethnicity at UoB1[16]
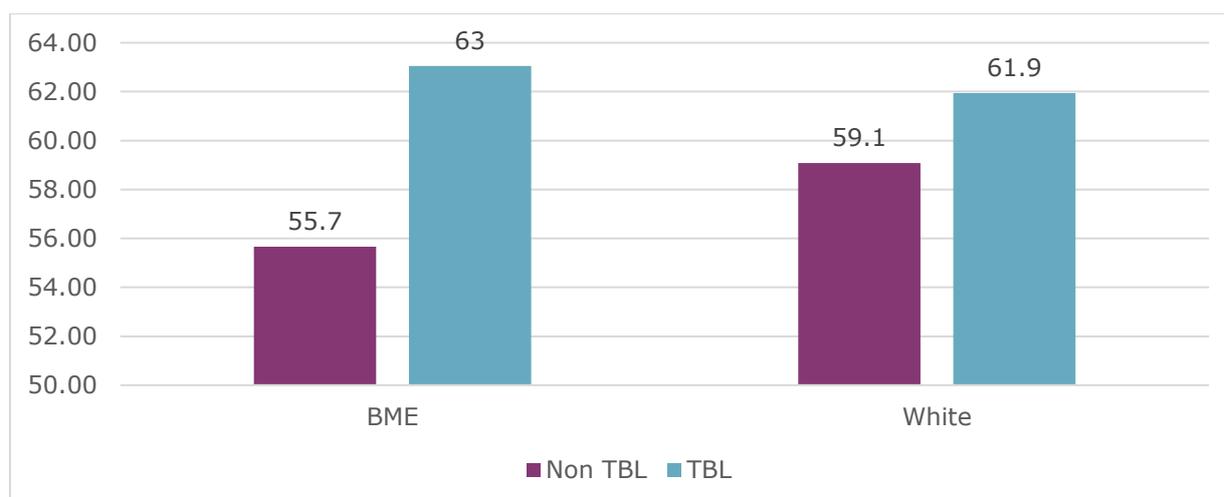
Table 8: Attainment by ethnicity at UoB

Ethnicity	No TBL	TBL	pp difference
BME	55.7	63	7.3
White	59.1	61.9	2.8
pp gap	3.4	-1.1	4.5

Figure 6: Mean percentage attainment by disabled/not-disabled at UoB
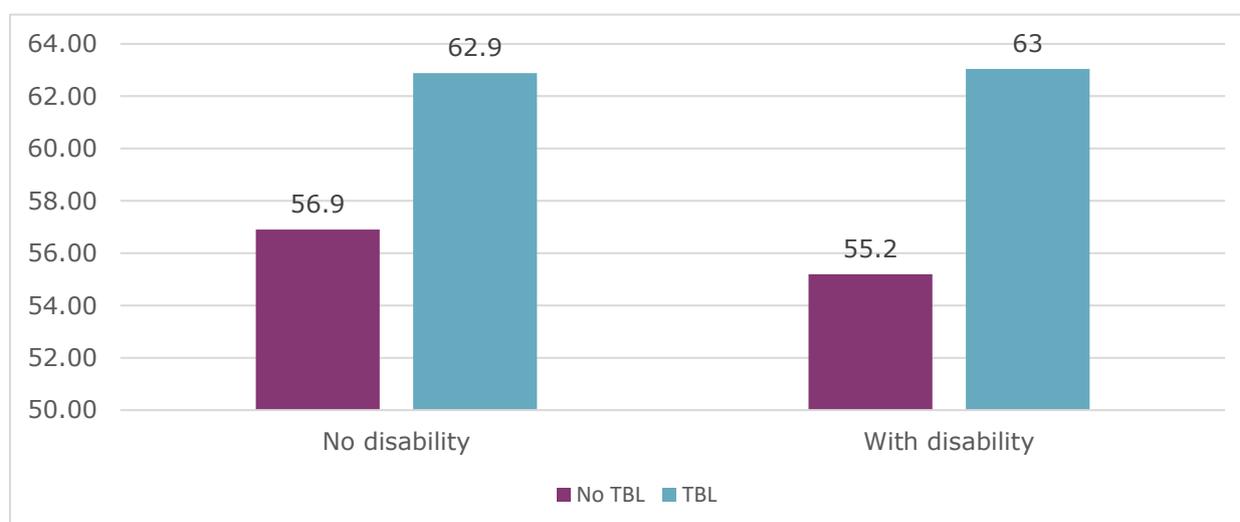
Table 9: Attainment by disabled/not-disabled at UoB

Disabled/not-disabled	No TBL	TBL	pp difference
Disabled	56.9	62.9	6
Not-disabled	55.2	63	7.8
pp gap	1.7	-0.1	1.8

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[16] *TBL count over three years = 8,100 sets of marks (6%), NON-TBL count over three years = 122,327 sets of marks (94%). Applicable to Figures 5 and 6, and Tables 8 and 9.*

33

The data were then analysed by gender, ethnicity, age, level of higher education participation area (WP), disabled/not-disabled and entry qualification to identify any impact on disparities and the progression gap. The data showed that:

1. The progression gap for gender reduced from 6.9 pp in non-TBL modules to 3.8 pp in TBL modules; progression on TBL modules was 5.5 pp higher for female and 8.6 pp higher for male students on TBL modules.
2. The progression gap for ethnicity was eliminated in TBL modules; progression on TBL modules was 8.6 pp higher for BME students and 1.9 pp higher for white students.
3. The progression gap for age was eliminated in TBL modules; progression on TBL modules was 0.5 pp lower for mature students and 8.2 pp higher for young students
4. The progression gap for disabled students increased from 1.6 pp in non-TBL modules to 2.6 pp in TBL modules; progression on TBL modules was 5.7 pp higher for disabled students and 6.7 pp higher for non-disabled students.
5. The progression gap for level of HE participation (POLAR4 Quintile 1–3 compared with POLAR4 Quintile 4–5) was reduced from 1.3 pp in non-TBL modules to 0.6 pp in TBL modules. Progression on TBL modules was 6.8 pp higher for Quintile 4–5 students and 7.5 pp higher for Quintile 1–3 students.

The progression gap by entry qualification is reduced from 6.9 pp in non-TBL modules to 3 pp in TBL modules; progression on TBL modules was 4.1 pp higher for A-Levels and 8 pp higher for those with other Level 3 qualifications. Analysis of degree outcomes is inconclusive at this time due to the fact that changes have been made only in single modules in 2017/18. Such limited exposure to TBL throughout the degree programme is unlikely to have a significant impact on the overall award. Exploring how much TBL to include within a programme to have a significant impact is work that should be explored in the future.

Learning and recommendations

Benefits of participation in the ABSS programme

The OfS funding itself has made a significant impact on the work of the three partners, allowing each to support scaling up of adoption of the pedagogies, as well as to undertake a substantial evaluation. Additionally, all three partners have observed benefits from participation in the OfS ABSS programme, as well as from the collaborative nature of the project itself:

1. Participation in the ABSS programme has meant access to a wide network of institutions committed to understanding and addressing barriers to student success. The networking events and programme workshops have been particularly valuable in this regard.
2. The award of external funding has ensured high visibility within each partner of the potential of a pedagogic approach to addressing barriers. This visibility has already begun to extend beyond the three institutions, as the findings are disseminated.
3. Collaboration between the partners has increased colleagues' and institutional learning, providing, for example, understanding of different contexts, peer support to overcome challenges, shared lessons about data management, and peer debriefing on emerging findings and their significance.

4. The variation in context of each partner has added value to the work, in terms of relevance of the findings to the sector. Differences in our approaches and context will allow other HEIs to more readily identify a context like theirs, thus supporting the transfer of learning.
5. The project has allowed the partners to make a significant contribution to the evidence base for effective strategies to address barriers to student success. The evidence, along with the guidance on adoption at scale, will support other institutions to introduce active collaborative approaches.

In reflecting on the project, the partners noted the following learning for future collaborations:

1. Face-to-face meetings and workshops were extremely valuable, in addition to time-efficient online meetings.
2. Timescales to recruit project staff and for collaborators to meet to plan the implementation of the project were optimistic; a longer period between learning of the success of the bid to the project commencement would be one way to address this.
3. Working across institutions took more time than anticipated for some tasks, such as ethical approval of the evaluation and access to data; this was due to differences in processes and the need to obtain permission from each institution involved.

ARU and UoB shared learning about their experience of extending adoption of TBL:

1. An investment of advance resource is useful, such as for educational development, equipment, infrastructure and academics' time.
2. The willingness and desire of academic staff to change and management support for the initiative is important.
3. Significant lead-in time is required for academics' personal development, planning and writing learning resources that require significant one-off time allocations in workload models.
4. Integration of systems and technological solutions is needed, to manage what is likely to be a significant amount of assessment data.
5. A flexible assessment framework supports TBL approaches to assessment and feedback.

Reflection on the findings

Within and across the three institutions, it is clear that the ways in which module and course teams adopted the two approaches showed considerable variation, with, for example, some practitioners using many of the core components, and others, considerably fewer. Despite this diversity in the depth of adoption, benefits are still observed for both SCALE-UP and TBL. The evaluation does, however, provide evidence that *greater* benefits are associated with particular patterns of adoption.

1. *Course-level adoption*: there are distinct advantages in adopting SCALE-UP or TBL as part of a course learning and teaching strategy. This does not mean that every module on the course uses the approach. Rather, there is evidence that course teams should plan to provide students with more than one SCALE-UP or TBL module in a year, with the tipping point found to be 3+ modules at NTU. Why this is the case will require further investigation, but the benefits may include:
   o multiple exposure to the approaches may allow students to practise skills, particularly in enquiry and group working, and to build their confidence;

- o it may also consolidate students' understanding of what is expected of them, a factor cited as important in student focus groups;
- o for staff, course planning may provide a greater sense of how the approach fits into learning and teaching on the course, and may provide opportunities for progressive strategies for independent learning through levels;
- o it may also support peer staff development and confidence-building, as tutors can learn from colleagues; a supportive culture was cited as useful by staff in interviews;
- o ARU also noted that adoption at the level of a course would reduce the time commitment needed for module revision as the course team would work together to create and review new TBL materials. (Allocation of time in staff workload models for revision remains important).

2. *Focus on strategic formation of teams*: while this is particularly crucial for TBL, some sort of managed teamwork is also valuable for SCALE-UP, as is the opportunity for built-in reflection on experience in groupwork.
3. *Stick to the model and deepen use:* evidence from evaluations at ARU and UoB indicate that this will bring greater benefits. At NTU, there are indications that the depth of adoption may be important although evidence is less clear. The focus for educational development in 2018/19 will be on deepening adoption and there are plans to explore this further.
4. *Develop strategies to work with students as adoption grows:* the findings suggest that high student satisfaction is more difficult to maintain as growth expands beyond early adopters. Students at NTU provided useful insights into what creates a good experience in active collaborative learning. UoB and ARU have focused on staff development aimed at enhancing student orientation to ensure that students understand the benefits of the approach.

At NTU, it was hoped that it would be possible to determine whether certain components of SCALE-UP are more important than others in addressing barriers to student success. However, while the picture is not clear cut, there were patterns of high/low adoption of components, and these will be used as the basis for further investigation. A similar picture emerged at ARU.

A significant amount was learnt about supporting pedagogic development at scale, in particular:

1. *Pre-session learning activities* for flipped learning approaches should be considered across the level of study, rather than only for a given module. This not only aids students' workload planning, but also more readily affords course team collaboration to create high quality resources – which have a much higher chance of engaging all students. Focus groups in this project suggested that students value bespoke and varied resources. ARU report that staff development around collaborative activity design and facilitation and group management strategies can also assist with successful team behaviours; they are creating a bank of resources and templates for learning design.
2. Educational developers are key in helping staff to adopt the pedagogies. They also serve an important mediating role with colleagues in other parts of the university, such as estates, information systems and timetabling, student services and the student unions. These areas are all crucial for successful adoption at scale. Educational developers serve as boundary operatives who can connect the needs, experiences and priorities of tutors, students, managers and professional

services. At NTU, in moving to institution-wide adoption, it is proposed that the informal network of professional services supporting SCALE-UP is given formal shape and status with twice yearly meetings at critical decision points.

3. At a smaller scale of adoption, *Communities of Practice* had emerged amongst academics working together to learn and use the pedagogies. In part, this had been a deliberate strategy for early adoption at the three institutions, and particularly at NTU, where it was believed that the facilitation of boundary encounters would aid deeper development across disciplines. This close community aspect became more challenging to sustain when adoption increased to encompass hundreds of staff. It is proposed, therefore, to adapt the strategy to one of a constellation of communities. In this case, educational developers will help to keep the communities connected, but the communities themselves should be self-sustaining.

4. Staff motivation and commitment is crucial for successful adoption. This project found strong positive feedback from colleagues using SCALE-UP and TBL. Tutors indicated that, while adopting the pedagogy required significant work, it was worthwhile, because of the benefits they witnessed for student engagement and learning. Importantly, the decision to adopt was made locally. All the partners have concluded that this is an important consideration: mandating that colleagues use the approach is likely to lead to poor implementation.

5. At ARU, in order to find sufficient *learning spaces* where student teams can sit together, and tutors can freely circulate and facilitate discussions, the project team collaborated with Estates and Timetabling to achieve 'quick win' solutions. This involved increasing the numbers of rooms laid out in café style rather than rows by default (in addition to the six active learning rooms with specialist collaborative technology and furniture). Longer term, the team is working with staff and students to develop learning space designs which support ACL, to be implemented as part of the regular upgrade and maintenance cycle and for new builds.

6. ARU also noted the need to review institutional assessment regulations to ensure that TBL assessments could contribute to module marks.

ARU noted that the project evaluation provided good quality research evidence for the benefits of ACL, supporting buy-in to TBL within disciplines that have little experience with ACL. For them, working with Professional Statutory Regulatory Bodies (PSRBs) should help with the (often incorrect) perception that PSRBs take a negative view of ACL methods. Encouraging a Community of Practice for TBL practitioners enables academics to support each other across disciplines and participate in national networks such as the European TBL Community.

Student satisfaction

Early adoption at NTU was associated with high levels of student satisfaction, as measured in standard module surveys (for 2013/14). At that point, 33 modules were using SCALE-UP. This higher satisfaction is concomitant with the findings and scale at ARU and UoB in this ABSS project. The *lower* student satisfaction observed in much larger scale adoption at NTU is interesting. It had been anticipated that maintaining high satisfaction might be more challenging at scale, given that the early adopters had been staff who generally had very high student satisfaction scores in any case. The average lower satisfaction figure seen at scale masks variation in responses, including modules which have very high satisfaction. The student focus groups provided important data for

understanding this variation, particularly as they explored aspects of SCALE-UP that are not assessed in standard module surveys. Five focus groups were held, with 14 students from a range of subjects. The implications for strategies to improve student experience and satisfaction were as follows:

1. Ensure the benefits of peer learning and support and high levels of tutor contact are emphasised and evident.
2. Manage group work according to the conventions of the pedagogy and include structured reflection on group roles.
3. Vary tasks, but use a consistent structure to the classes.
4. Ensure students know what is expected of them.
5. Explain links between pre-work, in-class tasks and post-work or assessment.

Where students are acclimatised to more passive/less active approaches to learning, they may exhibit a resistance to, and dissatisfaction with, the requirement to participate in collaborative activities. This may be more difficult to manage than a disinclination for collaborative learning due to personal experiences of problematic small group dynamics. Indeed, a cohort may experience a strong negative emotional response to active collaborative learning (Stover & Holland, 2018). While being challenged and having opportunities to make mistakes – with feedback and support in place – can be crucial for student retention and learning, some students may not perceive these experiences as pleasant (Kirschner et al., 2006; Koedinger et al., 2013).

These findings have provided a basis for further work, to ensure that all colleagues using SCALE-UP are aware of the strategies used by those whose students expressed high satisfaction with the approach.

Reflection on the evaluation process

As with any large-scale evaluation there were a number of challenges, some being particular to individual contexts, some related to the scale of the work and some to the cross-institutional nature of the work.

Using data at scale, ARU

Using institution-wide data to evaluate teaching interventions at scale is a relatively new practice and is increasingly an expected part of decision-making at universities. The process of obtaining ethical approval for relatively established approaches such as questionnaires and focus groups required considerable negotiation and attention to detail due to the institution-wide focus of the project.

Another challenge to evaluation was obtaining and interpreting automatically captured student data in a format useful for large-scale analysis. It is critical to communicate data requirements very clearly, because the mapping between requirements for educational analysis and the way data are recorded in university systems is not straightforward. It also became clear over the course of the project that some data relevant to the attainment gap are either not collected at all or are collected inconsistently. For instance, it was not possible to accurately identify the socio-economic backgrounds of most students at ARU.

Reflection on the typology, NTU

Based on an earlier experience of a pilot of SCALE-UP at NTU, partners discussed how to develop a typology that would allow the identification and categorisation of the ways in which the pedagogies were adopted. The intention was to use a typology in the analysis

of outcomes, for example, to assess whether certain features of the pedagogies were more important for student success. Discussions focused on whether the two ACL approaches, SCALE-UP and TBL, were sufficiently similar to allow a common approach to a typology. Agreement was reached to have separate SCALE-UP and TBL typologies but to use a common framing.

At NTU, a typology had worked very well in an evaluation in 2013/14, assisting in the understanding of results and facilitating a comparison of outcomes with the way SCALE-UP had been adopted. The initial typology was simple, based on the extent to which modules adhered to two sets of features (an essential core set of principles and a wider set of features): the terms 'SCALE-UP' and 'SCALE-UP lite' indicated how features were adopted with the latter group adhering to the core set but only some of the wider features; the term 'SCALE-UP hybrid' was used for those modules in which SCALE-UP teaching featured in some rather than all sessions.

In 2017, the same approach was adopted. However, mindful of a larger group of participants than the 33 modules of 2013/14, a more sophisticated typology was created. It was hoped that this would allow the identification of any components that were more critical than others, and answer the question of whether strategic adoption at course level had an effect. The more sophisticated typology and the larger number of modules (around 250), however, meant that this was a challenge. The typology, while useful as a developmental tool to prompt discussion, proved too complex to function well for the evaluation. A pragmatic solution was found, and a simpler typology was developed, to sort survey respondents into adoption groups for interview (survey responses were scored on three features, as an indicator of extent of adoption). As a result, data from the survey and interviews was rendered more useful not only for understanding staff experience, but also to inform operational considerations for adoption at scale. However, insufficient numbers meant that it was not possible to conduct a statistical analysis of student outcomes by adoption pattern, once modules were sorted against the typology. Fortunately, patterns are discernible in the quantitative outcomes data, without the need to do this analysis by adoption type. This may, however, be a desirable next step.

Challenges associated with working across institutions

A major challenge for the early stages of the evaluation was a change in the law on data protection in the form of the General Data Protection Regulation (GDPR) which came into effect in the middle of the project. To ensure compliance, clear justifications for all uses of student data for research were required and the sharing of data between partners had to be strictly controlled. The newness of the regulation meant that wide and careful consultation was needed in each institution and there was an impact in limiting collaboration at the analysis stage. However, ARU noted that the project set a precedent for using system data to inform strategic decision-making with an impact on learning, teaching and assessment – this experience has fed into the development of standard university procedures and policies informing the use of learning analytics.

Conclusions

Summary of key messages

1. The use of active collaborative learning approaches does address barriers in student outcomes.
    a. SCALE-UP and TBL provide benefits for all students (NTU, ARU, UoB).
    b. SCALE-UP and TBL reduce and, in some cases, remove gaps in student engagement and attendance, attainment and progression (NTU, ARU, UoB).
    c. These benefits are magnified in contexts in which:
        i. there is a greater extent of use within a module (ARU);
        ii. there is greater engagement with the pedagogic model and with the educational developer (UoB);
        iii. where students study three or more SCALE-UP modules in an academic year (NTU).
2. Adoption of SCALE-UP and TBL in an institution takes time to mature but benefits can be seen during the first year of adoption.
    a. In addition to improved student outcomes, there were other in benefits common across the partner institutions:
        i. students and staff recognised that active collaborative learning is a more inclusive form of learning when compared with other pedagogies (NTU, ARU, UoB);
        ii. staff expressed high levels of satisfaction using the pedagogies, and the intention to continue with them (NTU, ARU, UoB);
        iii. students and staff recognised that active collaborative learning enhances employability (ARU, UoB).
3. Using pedagogic change as a strategy to address barriers to student success complements other approaches, such as additional student support. Additionally, the adoption of an inclusive pedagogy addresses structural disadvantage directly.
4. Large scale pedagogic change does not simply emerge from practice sharing; professional expertise, in the form of specialised educational development, is needed to accomplish it. This requires sustained engagement with practitioners to deepen and extend their understanding and use of the approach – an initial stand-alone staff development session is unlikely to be sufficient.
5. Innovation cannot be mandated, as, if poorly implemented, it is less likely to be successful. Adoption is most likely to be successful where there is already a culture of active learning and where a sense of genuine ownership can be engendered in a course team.
6. Despite different contexts in the three partner institutions, a clear pattern emerged that active collaborative learning is more successful where it is adopted at course level. This does not mean that the approach is used on every module, but rather, that it is used strategically on a course. This requires purposeful team-working and decision-making and may be more challenging to do in an environment with strong modularity and weak course ownership.
7. Student satisfaction with active collaborative approaches to learning must be considered, particularly with adoption at larger scale. Course teams should weigh the risk of a dip in reported satisfaction against the benefits for student outcomes. They should also prepare strategies to ensure a good student experience during adoption.
    a. Course teams should articulate the benefits of active collaborative learning to students, developing their pedagogic literacy and the way they engage with

their learning. This should also aid them in judging the value of SCALE-UP or TBL in comparison with more didactic models of teaching.

b. Standard satisfaction surveys, such as the National Student Survey, may not be useful in understanding student views of active collaborative learning and more comprehensive local surveys may be needed.

Next steps in the work

Further embedding active collaborative pedagogies

All of the partners are committed to the continued use of SCALE-UP and TBL and, further, in light of the significance of the findings, intend to grow the pedagogies both in terms of breadth of adoption and the depth of adoption. Therefore, the intention is to consider how the pedagogies are adopted in team-taught contexts, working on improving consistency and how to enhance student feedback and perceptions by better informing learners of the value of SCALE-UP and TBL for their outcomes. Additionally, at NTU, there will be a focus on understanding the implications for course design of the particular benefits observed where 3+ SCALE-UP modules are used. At UoB and ARU, there will be a focus on the impact of TBL on employability and consideration of whether there is evidence that TBL is supportive of students with autism and students with other disabilities.

The evaluation of this project and concomitant work on barriers and solutions will inform the development of future active learning spaces, will feed into a new curriculum framework (at ARU) and will be built into the criteria for approval for new courses (at NTU).

Continuing to evaluate impact

All three institutions involved in this work intend to continue to evaluate the impact of the use of active collaborative pedagogies, albeit at a smaller scale. This will be important as the lessons learnt are taken on board and the use of the approach in each institution is broadened and deepened. As an example, the gap that was most resistant to change across all institutions was gender. Further investigation will be needed, perhaps considering the results from an intersectional perspective. Consideration may also be needed of elements of the pedagogies that might help, for example around team formation and structure. Structured, observational research into team interaction and dynamics might provide valuable insights.

Sharing findings

The findings from the project are significant and this is recognised in the project dissemination plan which is designed in order to ensure achieve maximum impact. Broadly, the project partners have agreed:

1. Dissemination of findings from the project as a whole are subject to consideration and agreement by all partners. The intention is to have a phased approach with larger, impactful outlets and outputs early on, moving through to wider dissemination, particularly on more nuanced aspects or to niche audiences later.
2. Each institution may share its own findings –external dissemination of findings for the whole project were officially shared at the project's conference in June 2019.
3. Dissemination will not be restricted to the higher education sector, given the importance of the findings. Opportunities to engage with those outside of sector

will be identified, for example in further education, local employers and organisations concerned with social mobility.

A project dissemination plan will target a range of opportunities, including conferences, blogs and journals. Recent or future outputs of note are summarised below:

1. A conference to launch findings was held at NTU on 28 June 2019. In addition to providing an interactive plenary of findings to which all three institutions will contribute, there were workshops on strategic and pedagogic considerations of scaling up pedagogic innovation.
2. Findings from the project were presented at the Office for Students Addressing Barriers to Student Success conference at Birmingham on 18 November, and at the Staff and Educational Developer Association (SEDA) autumn conference in Leeds on 14–15 November.
3. An edited collection of chapters, including several relating to the project, was published in November 2020 (Pratt-Adams, Richter and Warnes).
4. The reputations of the partner institutions for innovative pedagogy have been further enhanced by engagement in this project. Dissemination and visibility has included:
   o SCALE-UP at NTU won the Guardian University Award in the category of *Course and curriculum design* in April 2019.
   o 15 delegates from Utrecht University, The Netherlands (Feb 2019) visited NTU for a two-day development programme on active learning.
   o JISC published a case study of SCALE-UP at NTU: *SCALE-UP active learning: improving outcomes for students and staff at Nottingham Trent University* (2018).
   o NTU was invited to speak at AQ Austria (Sept 2019), and to give keynotes at the University of Roehampton (Jun 2019), the Annual PedRIO Conference (Apr 2018), and the Annual SEDA Conference (Nov 2017). Papers were presented at the Advance HE Teaching and Learning Conference (Jul 2018), RAISE Conference (Sept 2018), the Association of University Administrators Annual Conference (2020).
   o ARU ran TBL expert classes in Genoa (May 2019) and in Dundee on behalf of the European TBL Community (Jun 2019); and presented two papers at Active Learning Conference, Brighton (Jun 2019), and one at European Conference on Education, London (Jul 2019).
   o UoB was invited to speak at the University of Glasgow (Jan 2019), University of Greenwich (Jan 2019), Waterloo University, Canada (Feb 2019), University of Genoa, Italy (May 2019), Brunel University (May 2019), Athlone Institute of Technology, Ireland (Jun 2019); presented at the European Association for Practitioner Research on Improving Learning conference in Slovenia (Nov 2018), Staff and Educational Development Association conference (Nov 2018), and the Team Based Learning Collaborative conference in Tampa, Florida (Mar 2019); and ran TBL workshops in Dundee on behalf of the European TBL Community (Jun 2019).

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Appendix 1: NTU – summary of statistical testing

Statistical testing, comprising logistic regressions of main effects of pass/fail rates and degree classifications on student characteristics and mode of learning, confirmed strong evidence that that SCALE-UP modules were associated higher pass rates, and higher rates of 2:1/First class grades. The models are shown in Tables 10 and 11 below.

Table 10: Summary results of logistic regression of module pass rates on SCALE-UP v non-SCALE-UP module, academic year and school (only includes modules that have been SCALE-UP)[17]

Independent variable	Regression co-efficient	Standard error	p-value
SCALE-UP v non-SCALE-UP	**0.31**	**0.03**	**<0.001**
Academic year 1617 v 1516	-0.23	0.02	<0.001
Academic year 1718 v 1516	0.05	0.02	0.005
School of Art and Design (A&D) v Nottingham Business School (NBS)	-0.18	0.04	<0.001
School of Arts and Humanities (A&H) v NBS	-0.30	0.03	<0.001
School of Architecture, Design and the Built Environment (ADBE) v NBS	-0.42	0.03	<0.001
School of Animal, Rural and Environmental Studies (ARES) v NBS	0.33	0.04	<0.001
Confetti Institute of Creative Technologies v NBS	-0.14	0.05	0.004
Nottingham Law School (NLS) v NBS	-0.40	0.03	<0.001
School of Social Sciences (SSS) v NBS	0.13	0.02	<0.001
School of Science and Technology (SST) v NBS	-0.23	0.02	<0.001
Tariff Zero points v >360	-0.89	0.05	<0.001
Tariff <120 points v >360	-0.90	0.05	<0.001
Tariff 120-239 points v >360	-0.79	0.03	<0.001
Tariff 240-299 points v >360	-0.52	0.02	<0.001
Tariff 300-360 points v >360	-0.28	0.02	<0.001
Clearing applicant Yes v No	-0.20	0.02	<0.001
Disabled v Not-disabled	-0.53	0.02	<0.001

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[17] *In this model, when controlling for the other known and available influential factors (assuming cohort is BTEC only with 300-360 points and in year one of their undergraduate course, with all the other characteristics the same as the reference level), the probability of a student passing their module (i.e. not failing) was $e^{4.58-0.94-0.28-0.89}$ / $(1 + e^{4.58-0.94-0.28})$ = 92.2% for non-SCALE-UP modules and $e^{4.58-0.94-0.28-0.89+0.31}$ / $(1 + e^{4.58-0.94-0.28+0.31})$ = 94.2% for SCALE-UP modules.*

BTEC only v A-Level only	-0.94	0.02	<0.001
BTEC + A-Level v A-Level only	-0.66	0.02	<0.001
Other quals v A-Level only	-0.53	0.05	<0.001
Male v female	-0.40	0.01	<0.001
UG Level 1 module v Level 3	-0.89	0.02	<0.001
UG Level 2 module v Level 3	-0.36	0.02	<0.001
Mature v Young	-0.20	0.02	<0.001
Full Time v Sandwich	-0.26	0.02	<0.001
TTaccom home v NTU maintained	-0.37	0.04	<0.001
TTaccom own residence v NTU	-0.37	0.04	<0.001
TTaccom private sector halls v NTU	-0.24	0.02	<0.001
TTaccom other rented v NTU	-0.14	0.02	<0.001
Black and Minority Ethnic (BME) v white	-0.43	0.02	<0.001
Widening participation (WP) v non-WP	-0.29	0.01	<0.001
Constant	4.58	0.03	<0.001

Table 11: Summary results of logistic regression of module attainment (equivalent of 2:1 or First class versus 2:2 or lower) on SCALE-UP v non-SCALE-UP module, academic year and school (only includes modules that have been SCALE-UP)[18]

Independent variable	Regression co-efficient	Standard error	p-value
SCALE-UP v non–SCALE-UP	**0.15**	**0.02**	**<0.001**
Academic year 1617 v 1516	0.09	0.01	<0.001
Academic year 1718 v 1516	0.10	0.01	<0.001
A&D v NBS	-0.42	0.02	<0.001
A&H v NBS	-0.25	0.02	<0.001
ADBE v NBS	-0.38	0.02	<0.001
ARES v NBS	0.02	0.02	0.34
Confetti Institute of Creative Technologies v NBS	-0.12	0.04	0.002
NLS v NBS	-0.57	0.02	<0.001
SSS v NBS	-0.03	0.01	0.02
SST v NBS	-0.20	0.01	<0.001

[18] *In this model, when controlling for the other known and available influential factors (assuming cohort is in year one of their three year undergraduate course, and achieved 220 tariff points from A-Levels, with all the other characteristics the same as the reference level), the probability of a student achieving the equivalent of a 2:1 or first Class grade in their module was $e^{2.17-0.71-0.92-0.47} / (1 + e^{2.17-0.71-0.92-0.47})$ = 51.8% for non-SCALE-UP modules and $e^{2.17-0.71-0.92-0.47+0.15} / (1 + e^{2.17-0.71-0.92-0.47+0.15})$ = 55.5% for SCALE-UP modules.*

Tariff Zero points v >360	-0.65	0.04	<0.001
Tariff <120 points v >360	-0.82	0.04	<0.001
Tariff 120-239 points v >360	-0.92	0.02	<0.001
Tariff 240-299 points v >360	-0.60	0.01	<0.001
Tariff 300-360 points v >360	-0.30	0.01	<0.001
Clearing applicant Yes v No	-0.04	0.01	0.003
Disabled v Not-disabled	-0.24	0.01	<0.001
BTEC only v A-Level only	-1.15	0.01	<0.001
BTEC + A-Level v A-Level only	-0.79	0.01	<0.001
Other quals v A-Level only	-0.68	0.01	<0.001
Male v female	-0.29	0.01	<0.001
UG Level 1 module v Level 3	-0.71	0.01	<0.001
UG Level 2 module v Level 3	-0.52	0.01	<0.001
Mature v Young	0.12	0.02	<0.001
Full Time v Sandwich	-0.47	0.01	<0.001
TTaccom home v NTU maintained	0.03	0.01	0.03
TTaccom own residence v NTU	-0.05	0.03	0.06
TTaccom private sector halls v NTU	-0.12	0.01	<0.001
TTaccom other rented v NTU	-0.05	0.01	<0.001
BME v white	-0.52	0.01	<0.001
WP v non-WP	-0.19	0.01	<0.001
Constant	2.17	0.02	<0.001

Appendix 2: Abbreviations

ACL   Active Collaborative Learning

ABSS   Addressing Barriers to Student Success

ARU   Anglia Ruskin University

BME   Black and Minority Ethnic

GDPR   General Data Protection Regulation

HEFCE   Higher Education Funding Council for England

HEI   Higher Education Institute

HESA   Higher Education Statistics Agency

IF-AT   Immediate Feedback – Assessment Technique

iRAT   Individual Readiness Assurance Test

KPI   Key Performance Indicator

NTU   Nottingham Trent University

OfS   Office for Students

pp   percentage point

PSRB   Professional, Statutory and Regulatory Bodies

RAP   Readiness Assurance Process

SCALE-UP   Student-Centred Active Learning Environment with Upside-down Pedagogies

STEM   Science, Technology, Engineering and Maths

TBL   Team-Based Learning

tRAT   Team Readiness Assurance Test

UoB   University of Bradford

VLE   Virtual Learning Environment

WP   Widening Participation