TASO Transforming Access and Student Outcomes in Higher Education

Final analysis report Institutional Data Use: Nottingham Trent University – Black Leadership Programme (BLP)

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The study was pre-registered on OSF registries: https://osf.io/hwt78

Table of contents

1. Summary

Background:

Staffordshire University were commissioned by the Centre for Transforming Access and Student Outcomes in Higher Education (TASO) to act as an independent evaluator of four post-entry interventions to address inequalities in student outcomes using institutional data and quasi-experimental designs. This report corresponds to the evaluation conducted for NTU's Black Leadership Programme (BLP).

Aims:

To explore whether the BLP impacts students' social and academic engagement, and whether there is a relationship with degree outcomes BLP participation that is mediated by academic engagement.

Intervention:

BLP is an intervention delivered during level 5 (2nd year undergraduate) for Black and Black heritage students that provides mentoring, social events, and a programme of workshops and development activities to support students' self-concept, social capital and skills, such that they begin to engage more at NTU and ultimately progress to succeeding in HE and in their lives outside HE.

Design:

This evaluation was a quasi-experimental design using available institutional data. A comparator group was developed using Propensity Score Matching using POLAR4 Quintile, UCAS entry points, Academic School, level of study, and academic year.

Outcome measures:

Three primary outcome measures were included in the analyses:

- Academic engagement – this was an amalgamated dataset of different types of academic engagement, including both structured and unstructured types of engagement.
- Structured social engagement – sports clubs and societies signed up to with the Students' Union
- Unstructured social engagement – whether students had signed up for a gym membership

There was one secondary outcome measure

- Level 6 grade – this was used in place of final degree classification

Analyses:

A combination of logistic regression, ANOVA, and structural equation modelling were used to address the research questions.

Results:

Results suggest limited effect of BLP on social and academic engagement across the academic journey. However, BLP students were found to have higher level 6 stage grades, which may be explained by factors other than academic engagement.

Conclusions:

BLP may have an impact on students that begins later than the year of the BLP programme, and is not through a direct relationship on students' academic engagement.

2. Introduction

2.1. Background

This project was a collaboration between the Centre for Transforming Access and Student Outcomes in Higher Education (TASO), Nottingham Trent University (NTU) and Staffordshire University to support the use of institutional data to implement an evaluation to deliver Type 3 evidence. Between November 2023 and March 2024:

- workshops were held develop an enhanced theory of change;
- ethical clearance was obtained;
- an analysis protocol was developed and quality assured;
- data were cleaned and analyses undertaken;
- the final report was completed.

The team from NTU was responsible for

- hosting and participating in the enhanced theory of change workshop
- achieving ethical clearance
- the provision of anonymised data

The team from Staffordshire University was responsible for

- designing and facilitating the enhanced theory of change workshop
- completing the trial protocol
- data cleaning and analyses
- completing the final impact evaluation report.

Table 1 details the project team and their roles and responsibilities.

Table 1. Project team roles and responsibilities

Organisation	Name	Role and responsibilities
TASO	Dr Rob Summers	Project/Contract Manager
TASO	Luke Arundel	Project Assistant
Staffordshire University	Dr Sally Andrews	Pedagogic Projects Development Manager

Staffordshire University	Reagon Alford	Research Assistant
Staffordshire University	Joshua Francis	Research Assistant
Staffordshire University	Juan Raman Mullor	Evaluation Officer
NTU	Mike Kerrigan	Head of Research and Insights
NTU	Peter Crowson	Research and Evaluation Coordinator
NTU	Reuel Blair	Collaborative Engagement and Retention Team Manager & BLP Coordinator
NTU	Laura Hope	Research and Data Coordinator

2.2. Aims

The objective is to evaluate whether BLP participation has a positive impact on student engagement across four primary dimensions: academic, structured social, unstructured academic, and unstructured social. The BLP consists of a core programme of activities in students' second year of study with complementary activities for students in their first year and third year of study. The evaluation aims and research questions are related to the core programme for students in their second year of study.

As part of this research, we also explore the relationship between BLP participation and degree attainment, end of level 6 attainment, and graduate outcomes. We have articulated the following research questions and testable hypothesis:

RQ1: Does BLP participation influence students' engagement at NTU?

H_0: Participation in BLP has no relationship with engagement at NTU.

H_1: BLP participants have significantly different engagement ratings across four domains of engagement (structured academic, structured social, unstructured academic, unstructured social), compared to those that did not participate in BLP.

RQ2: Does academic engagement mediate the relationship between BLP participation and degree outcomes?

H_0: Academic engagement has no relationship with BLP participation and degree outcomes.

H_1: BLP participation impacts student engagement which in turn impacts degree award.

RQ3: Does social engagement mediate the relationship between BLP participation and graduate outcomes?

H_0: Social engagement levels do not mediate the relationship between BLP participation and graduate outcomes.

H_1: BLP participation impacts employability and structured social engagement levels which in turn impacts graduate outcomes.

We will test these hypotheses through inferential statistical analysis of the variables and covariates outlined in the Table 2 and Table 3 below. The way in which the following variables and covariates will be used to meet the research aims and answer the core research questions will be discussed in the sections below.

Table 2. Predictor and outcome variables

Variable name	Type	Description within protocol	Data Received
Academic Engagement	Continuous	Course attendance	Different from the protocol specification
BLP Group	Categorical	Attendee, eligible applicant, eligible non-applicant, non-eligible	As specified in the protocol
Final degree classification	Categorical	Good degree outcome, Other degree outcome	Different from the protocol specification

Graduate outcomes	Categorical	Progressed to graduate outcome[1] as defined by the Graduate Outcomes Survey Did not progress to a graduate outcome as defined by the Graduate Outcomes Survey	Different from the protocol specification
Level of study	Categorical	The level of study of the student during the relevant academic year (level 4, 5, 6)	As specified in the protocol
Structured social engagement	Continuous	Attendance at extracurricular activities	Different from the protocol specification
Unstructured academic engagement	Continuous	Library attendance	Different from the protocol specification
Unstructured social engagement	Continuous	NTU gym usage	Different from the protocol specification

Table 3. Covariates

Variable name	Type	Description within protocol	Data Received
Academic Year	Categorial	The academic year that the data relates to	As specified in the protocol

[1] A graduate outcome is achieved if a student articulates they are in skilled employment or further study as part of a census taken 15 months after graduation.

Age	Continuous/discrete	Age of student at enrolment	The final dataset had a grouped variable for age (under 18, 18-21, 21-25 25+)
Care leaver	Categorical	Care leaver, non-care leaver	Not present in final dataset
Commuter status	Categorical	Commuter, non-commuter	Not present in final dataset
Employability engagement	Continuous	Visits to employability services	The final dataset had a binary indicator if a student signed up for an employability scheme, not count of visits.
Programme	Categorical/ Nominal	Input based (unless provided to participant as a selection list)	Present in dataset, school information and other similar metrics as well
Programme mode	Categorical	Full time, Part time	As specified in the protocol
Race and ethnicity	Categorical	Black African, Black Caribbean, Black (mixed heritage), Black Other	As specified in the protocol
Sex	Categorical	Male, female, other	As specified in the protocol

2.3. Intervention

The BLP was developed in response to research on the ethnicity degree awarding gap and was produced by Nottingham Trent Students' Union (NTSU). One of the recommendations focused on increasing leadership opportunities for Black students. The programme's core participants are level 5 students, though undergraduate students at all programme years may attend events. There are three types of BLP activities:

1. Community focused

2. Development focused
3. Self-focused

Community focused activities

Community focused activities consist of the BLP launch event, the end of year Celebration and several social events scheduled within the academic year. The launch event is a celebration of black heritage where participants hear from inspirational speakers. Social events are delivered separately for the core second year participants which focus on networking with themed games and quiz nights organised for first year students. A celebration event is held at the end of each delivery year, with participants who successfully complete the programme (by attending a minimum of three mentoring sessions) are awarded a certificate and programme success stories celebrated.

Development focused activities

Development focused activities consist of a range of workshops to support BLP participants to develop leadership, confidence, resilience and employability skills. These activities provide participants with an opportunity to connect with leaders, experts and employers as part of the programme. Workshop sessions for this strand include:

- Employability module and workshop
- Grit personal development workshops
- Leadership workshops with inspirational leaders and experts

BLP participants also receive a skilled dedicated mentor who offers them support throughout the programme.

Self-focused activities

Self-focused activities are designed to enhance representation and increase a sense of belonging for BLP participants. Activities in this strand include Black studies sessions and Black Industry Connections and Empowerment Programme (BICEP) mental health support. Black studies sessions are designed to address gaps in Black representation in formal curricular study. BICEP Mental Health support (available to all BLP participants regardless of year of study) are offered to ensure Black students have a safe space in which to talk about mental health issues directly.

3. Methods

3.1. Design

We will apply a post-hoc evaluation approach to answer the research questions outlined in Section 2. The data is drawn from student records collected between 2019–23. This study will use matched administrative data with localised BLP engagement data from academic years 2019-20 to 2022-23.

3.2. Outcome measures

Table 4 lists the primary and secondary outcome measures identified to test our hypotheses.

Table 4. Outcome measures

Outcome measure	Type	Description within protocol	Data Received
Primary: Structured academic engagement	Continuous	Mean average of attendance to lectures, seminars, and workshops on their undergraduate degree	Daily engagement ratings from "very low" to "very high" (operationalised into a 1-5 scale) from a weighted average of seven data streams: • Attendance monitoring • Building access • Library loans • Online resource use • Online submissions • Virtual Learning Environment (VLE) logins • VLE learning rooms This score does not differentiate between structured and unstructured engagement.
Primary: Unstructured academic engagement	Continuous	Library resource use and/or library access	
Primary: Structured social engagement	Continuous	Count of extra-curricular and student union activities attended	Structured social engagement did not track a count of extra activities attended. Only a binary signed up or did not sign up for different social schemes.
Primary: Unstructured social engagement	Continuous	total count of attendance at NTU gym	Unstructured social engagement did not track a count of extra activities attended. Only a binary signed up or did not sign up for gym membership.
Secondary: Degree award	Categorical	Good degree outcome (1st, 2.1), Lower degree outcome (2.2, 3rd)	Degree award data was not sufficient to use due to the close time proximity of the dataset and the BLP programme initiating. As such level 6 grade was substituted (see Appendix F1).

Secondary: Graduate outcome	Categorical	Progressed to graduate outcome[2] as defined by the Graduate Outcomes Survey, Did not progress to a graduate outcome as defined by the Graduate Outcomes Survey	We did not receive graduate outcome data for enough of the sampled students.

3.3. Sample selection

The evaluation will use secondary data from current students or graduates of NTU between 2019-20 and 2022-23. Students should identify as having a Black or Black heritage background as part of BLP eligibility criteria. Participation is also subject to an application process due to interest in the programme and the limited spaces available. The application of Propensity Score Matching (PSM) will enable the creation of the treatment assignment variable. The groupings are as follows: eligible potential applicants and participants.

A breakdown of the current estimated sample size of eligible and non-eligible NTU students for participation in the BLP since its inception in 2020 is provided in Table 5. Data from 2019-20 Is included as it includes level 4 engagement data for those students eligible in 2020-21.

Table 5. Sample population breakdown

Sample group	Academic Year			
	2019-20	2020-21	2021-22	2022-23
Number of eligible potential applicants	N/A	1,086	1,362	1,570
Total number of eligible applications	N/A	104	103	132

[2] A graduate outcome is achieved if a student articulates they are in skilled employment or further study as part of a census taken 15 months after graduation.

Total number of participants	35	59	103	115

3.4.1. Power calculations

Within the trial protocol a power calculation was performed which found the recommended sample size for a small (n = 270, 0.02), medium (n = 42, 0.15) and large (24, 0.35) effect according to established thresholds (Cohen, 1988). The power calculation was computed on the basis of conducting 2 x 3 MANOVA with four outcome variables. On receiving the data, the analysis protocol was adapted to a 2 x 3 ANOVA and two logistic regressions. A subsequent power analysis was performed to find the effect size expected with the observed sample (the observed sample includes up to three years of data for each individual student included, n = 1147). This suggests sufficient power to observe an effect size of 0.13 given an alpha of 0.05 and power of 0.8. An effect size of 0.13 would constitute a small effect size.

4. Analytical strategy

Five analyses were conducted; four primary analyses and one exploratory analysis. The first analysis addressed research question 1 through a 2 x 3 mixed-design ANOVA. BLP participation (BLP, non-BLP) and level of study (level 4, level 5, level 6) were entered into the model as predictors of academic engagement. Academic engagement is calculated as the modal academic engagement value for each student for each individual academic year. Within this model, level of study is a repeated-measures variable and represents each academic level in the student's degree (level 4, 5, 6), where, respectively are the students' first-, second- and final-year of their undergraduate programme. BLP variable is a categorical factor with two levels; whether a student took part in the BLP during level 5 (BLP) or whether the student is a matched control from the PSM (non-BLP). Level of study is a within-subjects factor, while BLP participation is a between-subjects factor. This analysis enables the exploration of the extent to which BLP leads to improved academic engagement (between-subjects), and whether any observable difference at level 5 would be sustained into level 6. The 2 x 3 linear mixed model (including random effects slopes) was chosen as the effect of BLP attendance can be inferred by comparing the change in engagement for BLP participants relative to non-BLP participants. This is possible as BLP begins at level 5, enabling level 6 engagement to be used as a comparator with non-participants. This model will be used to address the first research question.

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{1i} X_{2i} + e$$

- Y_i is the outcome (response) variable (modal academic engagement) for the *i*th student
- β_0 is the intercept
- β_k is are the regression coefficients.
- X_{1i} is BLP participation (accepted applicant or matched control group)
- X_{2i} is level of study (4, 5, or 6)
- e is a matrix of residuals.

The model was built sequentially, with the first model predicting academic engagement by level of study. The second model significantly improved on the first by adding the random intercept of level of study in place of the random slope then included the following predictors: BLP participation, and the interaction effect of BLP and level of study. The second model was a significant improvement (see Appendix C1). This confirms that the model significantly fits the data observed better than no model at all.

The second analysis is a logistic regression to investigate the impact of BLP on unstructured social engagement. A logistic regression model was fit predicting whether students' unstructured social engagement (gym membership) is predicted by BLP participation or level of study. Unstructured social engagement is a binary variable of whether a student had signed up for a gym membership at the university within the 2022-23 academic year. BLP is a categorical variable of whether the student was a BLP participant or a matched comparator. Level of study is a categorical variable of students' level of study during the 2022-23 academic year. Level 4 students were removed from this analysis as there were not enough within the dataset within the 2022-23 academic year. As the analysis only uses a single year of data (2022-23) the analysis is a between-subjects analysis.

$$log\left(\frac{\theta_i}{1-\theta_i}\right) = \beta_0 + \sum_k \quad \beta_k$$

Where:

- $log\left(\frac{\theta_i}{1-\theta_i}\right)$ is the logit function, or in other words, the natural logarithm of the odds ratio.

- θ_i is the probability of the outcome variable occurring for the *i*th student (e.g. the probability of the binary outcome variable being 1) (Unstructured Social Engagement).
- β_0 is the intercept term
- β_k are the corresponding coefficients for each predictor variable x_{ki} (BLP participation, Level of study (4,5 or 6).

The third analysis is a logistic regression, which involved fitting a model to investigate the impact of BLP on structured social engagement. Structured social engagement is a binary variable of whether a student had signed up for any clubs and societies within the 2022-23 academic year. BLP is a categorical variable of whether the student was a BLP participant or a matched comparator. Level of study is each student's level of study during the 2022-23 academic year. Level 4 students were removed from this analysis as there were not enough within the dataset within the 2022-23 academic year. As the analysis only uses a single year of data (2022-23), the analysis is a between-subjects analysis.

$$log\left(\frac{\theta_i}{1-\theta_i}\right) = \beta_0 + \sum_k \quad \beta_k$$

Where:

- $log\left(\frac{\theta_i}{1-\theta_i}\right)$ is the logit function, or in other words, the natural logarithm of the odds ratio.
- θ_i is the probability of the outcome variable occurring for the *i*th student (e.g. the probability of the binary outcome variable being 1) (Structured Social Engagement).
- β_0 is the intercept term
- β_k are the corresponding coefficients for each predictor variable x_{ki} (BLP participation, Level of study (4,5 or 6).

The fourth analysis was a path-analysis to answer the research question of whether the relationship between level 6 grade (in place of degree outcome) and BLP participation is mediated by academic engagement. Only students' level 6 data was included. The reason for limiting to level 6 data is that the core BLP program is conducted through level 5 with the intention that it will boost engagement and attainment in students'

remaining university journey. As such, effects of BLP should be observable at level 6, but may not be observable throughout level 5.

The path analysis had four variables: BLP participation, academic engagement, UCAS tariff points, level 4 grade, and level 6 grade. See Figure 1 for a path diagram.

$$Y_i = \beta 0_i + \beta 1_i + \beta 2_i + \beta 3_i + \beta 4_i + e$$

- Y_i is grade attained at level 6 for the *i*th student
- β_0 is the intercept,
- β_k are the coefficients
- X_{1i} is BLP Participation,
- X_{2i} is Academic Engagement,
- X_{3i} is UCAS tariff score,
- X_{4i} is grade attained at level 4,
- e is a matrix of residuals.

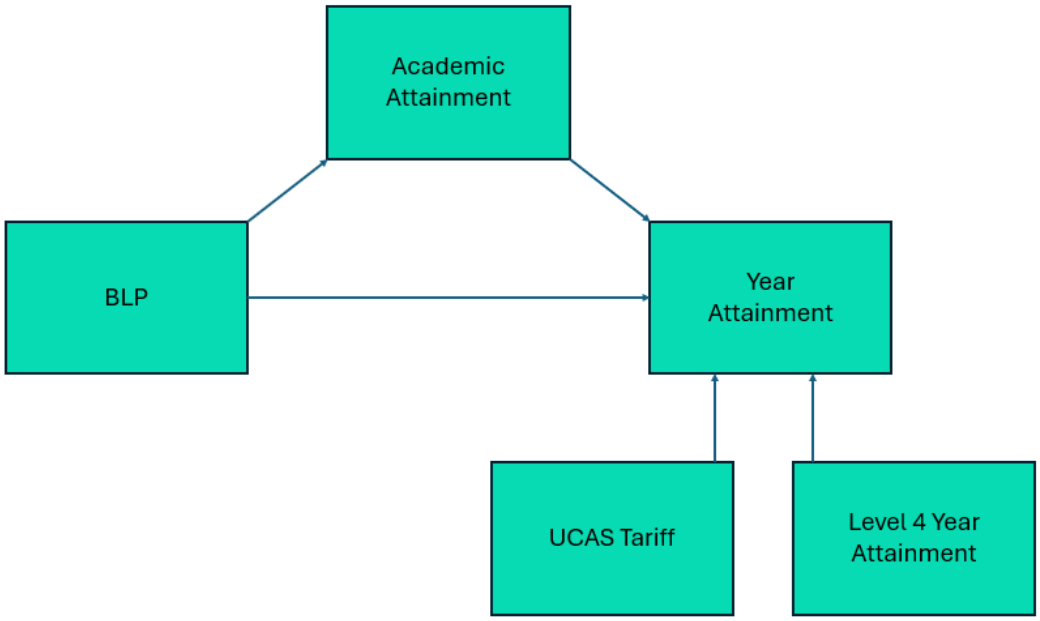

Figure 1. Proposed pathway for mediation analysis with covariates

4.1. Deviations from Trial Protocol

After inspection of the data availability, several deviations from the original trial protocol were required. The differences can be found in Tables 2, 3 and 4 with the additional 'data received' columns. The primary methodological difference between this study and the prespecified trial protocol is that the original MANOVA was split into one ANOVA and two logistic regressions. This is because academic engagement was a single unified measure (rather than separate structured and unstructured academic engagement measures), and social engagement measures were binary outcomes (rather than continuous variables) in the final dataset and therefore needed to be analysed in separate models. The first path analysis became a mediation, as academic engagement was a single measure, and the second path analysis could not be performed as graduate outcome was a difficult measure to obtain within close time proximity to the BLP being conducted. However, all bar one of the research questions have been addressed.

5. Results

5.1. Participant flow

The analysis used secondary data of 70,930 Nottingham Trent University students with admission years dating back to 2015. The BLP began in 2019-20, and continues to-date. The analysis drew from students who had taken part in the BLP between 2019-23, and matched comparison students from the same academic years. The 2022-23 cutoff date is because data for the 2023-24 academic year is incomplete at the time of the evaluation.

The dataset was filtered to only retain individuals who matched the BLP eligibility criteria (those who are black or black heritage as defined by the ethnicity variable), and those studying during the academic years between 2019-20 and 2022-23. PSM was used to create an artificial control group of students who were eligible for the BLP but did not participate (non-BLP). This group was used to compare against students who had participated in the BLP. Figure 2 shows this participant flow. Note that this figure represents each student as a single data point, however, where students have completed multiple academic years, they will be represented by multiple data points in the analyses.

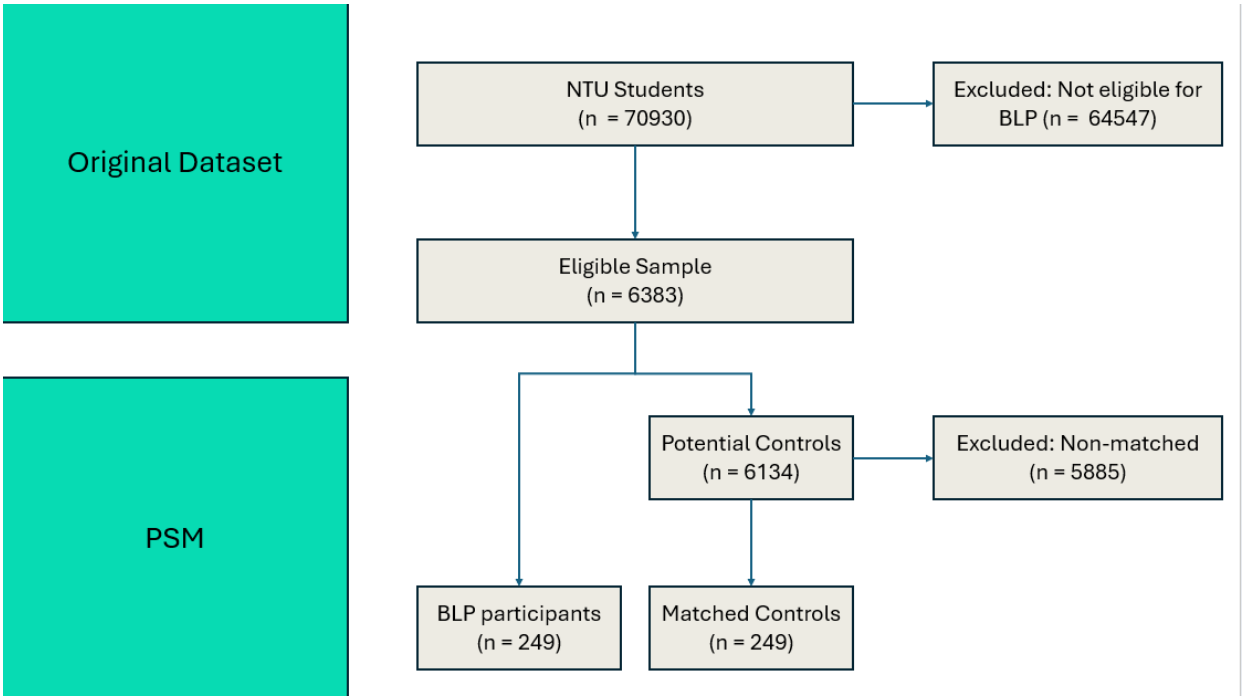

Figure 2. Participant flow chart

PSM should be achieved by selecting as few variables as possible and selecting those that form characteristics prior to the intervention (level 5; Randolph, et al. 2014; Zhao, et al. 2021). As part of creating the comparable control group a range of covariates need to be selected to base the matching process on. Recommendations point to covariates that are correlated with outcome variables and are established before the intervention commences (Harris & Horst, 2019). As such, covariate variables that concerned their trajectory into university were included, in addition to level 4 academic engagement. This resulted in the following variables being used to generate a control group: level 4 modal academic engagement, POLAR4 quintile, Academic School, academic year, level of study. Level of study was included to ensure that the matching provided a balanced spread across all years. Distribution plots of BLP, PSM matched control students, and unmatched students show the BLP and non-BLP matched groups to be comparable in pre-treatment characteristics (see appendix A1 & A2 Figures 4 and 5). The PSM matched control group will subsequently be referred to as non-BLP.

5.2. Description of data

Table 6 shows the baseline demographic characteristics for BLP and non-BLP. The baseline demographics include data from each academic year for which an individual was in the dataset (after filtering and PSM). As such, an individual may be included up

to three times, as they have a separate point of data for each level of study at the university. Table 6 provides descriptive statistics for the populations split by BLP participation.

Table 6. Demographic characteristics for BLP and non-BLP samples

Admission Year[3]	**BLP**	**Non-BLP**
2015-16 to 2018-19	42	45
2019-20	58	58
2020-21*	91	92
2021-22*	81	79
2022-23	4	2
Gender	**BLP**	**Non-BLP**
Female	189	161
Male	87	115
Age	**BLP**	**Non-BLP**
Under 18	7	2
18-20 years old	237	234
21-25 years old	15	20
Over 25	17	20

[3] Students from admission years between 2017-18 and 2019-20 would have had part of their university experience directly impacted by the Covid-19 pandemic, while students in admission years shortly afterwards would have been indirectly impacted. It is likely each year had different degrees of disruption, and that this disruption affected students differentially.

Ethnicity	BLP	Non-BLP
Black/Black British – African	211	221
Black/Black British – Caribbean	54	46
Other Black background	11	9
Level of study[4]	**BLP**	**Non-BLP**
4	224	251
5	248	222
6	123	79

5.3. Outcome of analyses

Table 7 presents the estimated average effects of BLP participation in comparison to non-BLP students on the relevant outcome variables (the full regression tables are in Appendix B1). Figures 4-8 visualise the effects.

Table 7. Outcome means, estimates and associated *p*-values

Outcome	Mean for non-BLP students	Estimate	Standard error	p-value	Interpretation
Linear Mixed Model results					
RQ1: Academic engagement	3.16	-0.07	0.17	.688	No significant effect of BLP on academic engagement.
Logistic Regression Results					

[4] Level of study tracks students across their university career within the data, as such one student may be represented in level 4, 5 *and* 6 of this table.

RQ1: Unstructured social engagement	11%	-2.18	2.03	.284	No significant effect of BLP on unstructured social engagement.
RQ1: Structured social engagement	18%	3.10	1.34	.020	Significant effect of BLP on structured social engagement. 17% more BLP students participated in structured social engagement compared to non-BLP.
Mediation Analysis Results					
RQ2: Level 6 grade	6.64	0.79	0.4	.005	Significant effect of BLP on level 6 grades. BLP participation increases grades by 0.79. In NTU's linear grade-based assessment, this equates to almost one grade boundary difference (e.g. mid 2.1 to high 2.1). This increase in grades is not caused by changes to academic engagement.

3.4.2. RQ1. Does BLP participation influence students' engagement at NTU?

3.4.2.1. Academic engagement

BLP students had similar academic engagement to non-BLP students, which was consistent across academic years. Academic engagement increased for both groups after their first year (level 4). Figure 3 shows the mean academic engagement for BLP students and non-BLP. While small differences in mean engagement are evident at level 5 and level 6, these differences are not significant and will not be discussed further (see Appendix C for full model statistics).

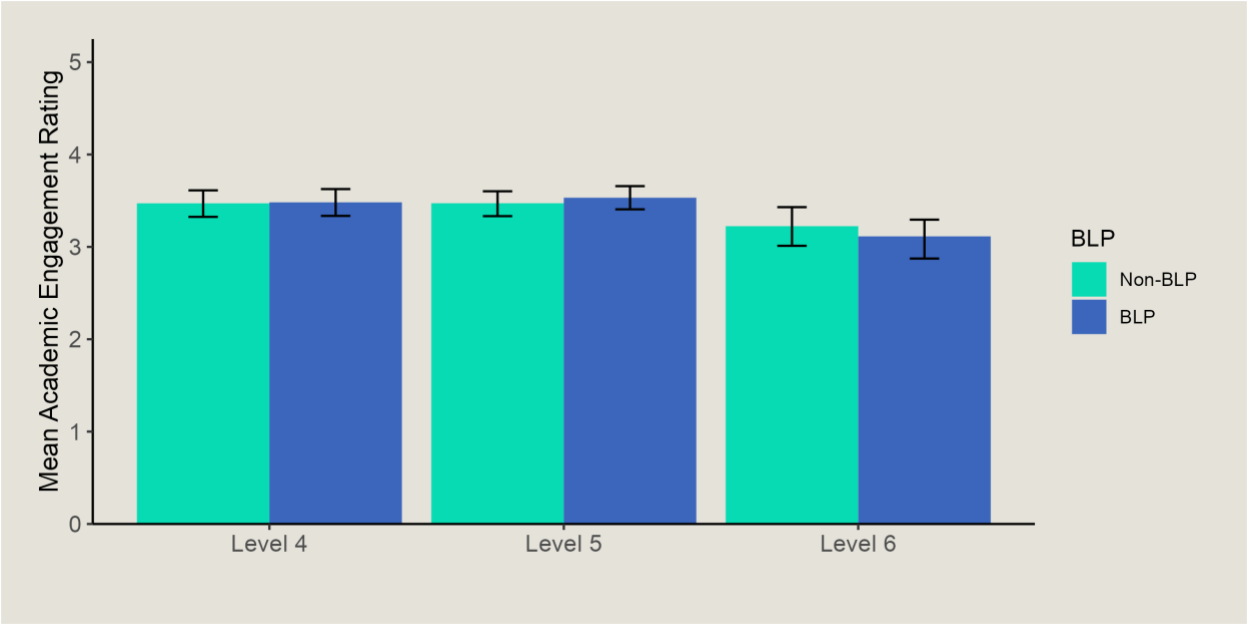

Figure 3. Mean academic engagement ratings for the groups across all levels of study (error bars show 95% confidence interval)

This analysis included students who may not have all three years of level of study data available (i.e. may not yet have completed level 6, or may have started at NTU in level 5 and therefore only have one or two years' data). This results in a between-subjects comparison that represents more students, but is less robust than a within-subjects design. As such an additional exploratory analysis was conducted for the trajectories of students for whom level 4, 5, and 6 data were available (see Exploratory Analysis).

3.4.2.2. Unstructured Social Engagement

BLP students were no more likely to engage in unstructured social activity than non-BLP students, at any level of study. Figure 4 shows the probability of students engaging with unstructured social engagement (gym membership); while non-BLP students had slightly more unstructured social engagement than BLP students, this difference was not significant (see Appendix D for model statistics).

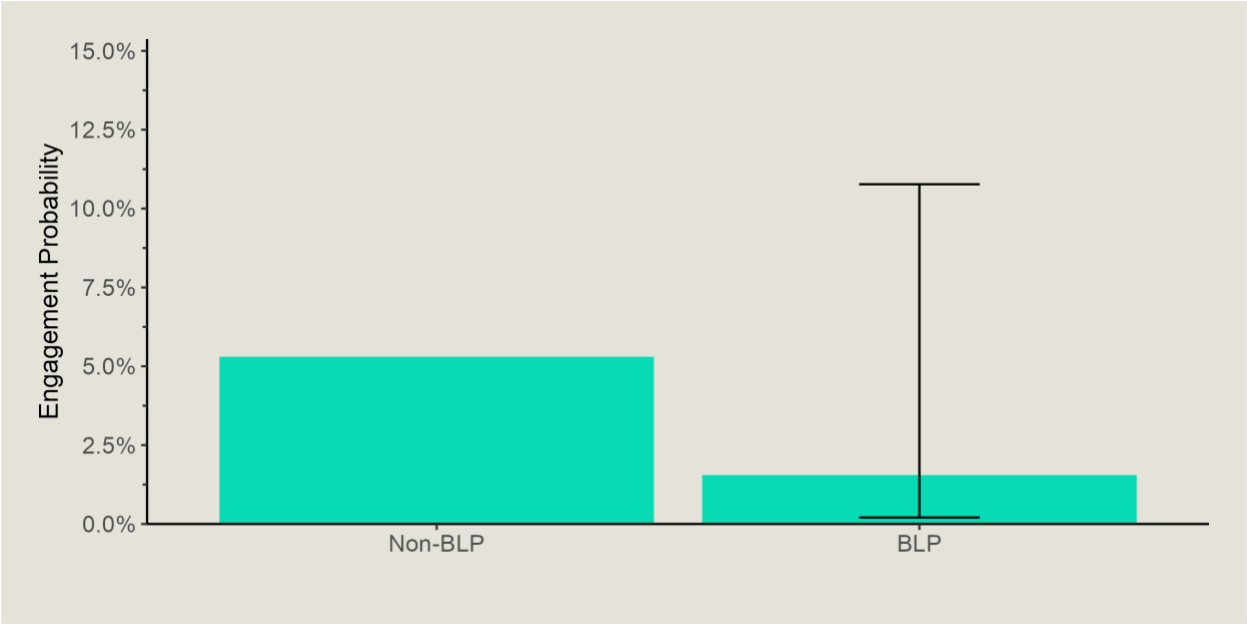

Figure 4. Probability of students engaging with unstructured social engagement (gym membership; error bars show 95% confidence interval)

3.4.2.3. Structured Social Engagement

BLP students were more likely to sign up for structured social engagement than non-BLP students, and this effect was most pronounced at level 6. This effect is shown in Figure 5, which displays the probability of students engaging with structured social engagement (see Appendix E for model statistics).

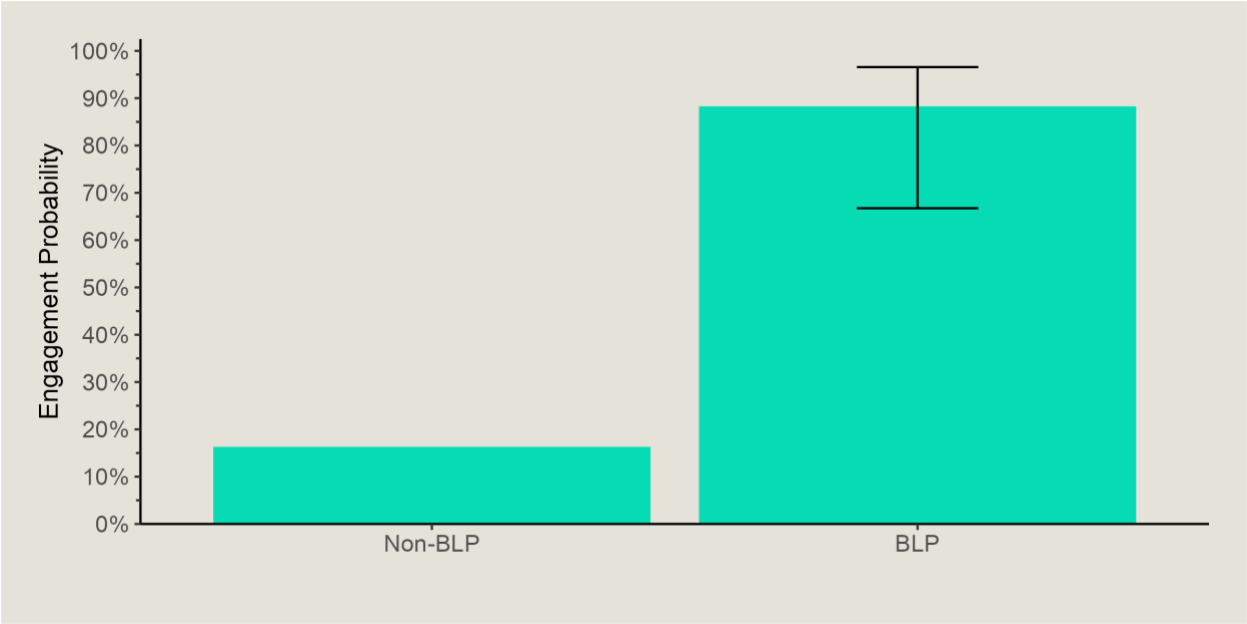

Figure 5. Probability of students engaging with structured social engagement (student union society membership; error bars show 95% confidence interval)

3.4.3. RQ2. Does academic engagement mediate the relationship between BLP participation and end of level outcomes?

BLP students received a significantly higher level 6 grade than non-BLP students, after accounting for variance explained by level 4 grades. It was hypothesised that this would occur because students engage more with their studies (see Theory of Change model). However, our results suggest that BLP students' higher grades is not accounted for by increased academic engagement.

That is, results suggest that students who engaged more received higher grades. However, BLP students did not have higher academic engagement than their non-BLP peers, which is consistent with findings in our earlier analyses. This is modelled in Figure 6 with the associated estimates (Appendix F shows the model statistics).

A notable observation is that BLP participation had a bigger impact on level 6 grades than did academic engagement.

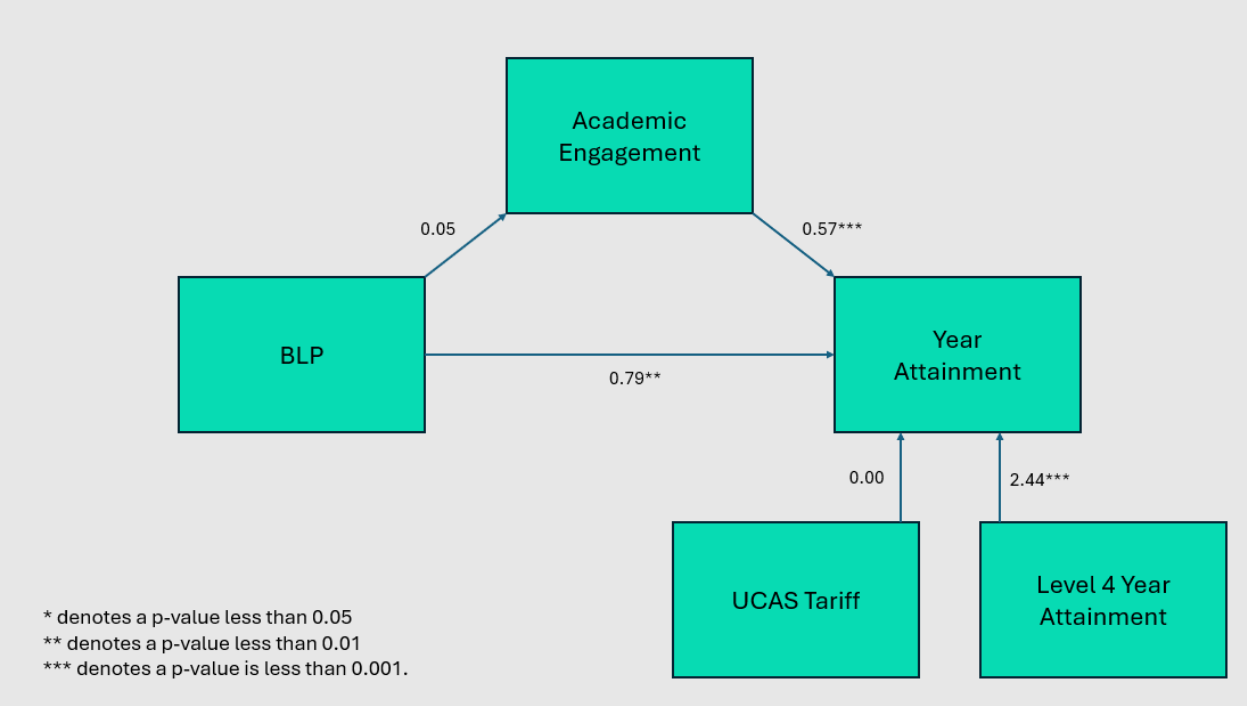

Figure 6. Mediation analysis paths with coefficients

3.4.4. Exploratory Analysis

RQ1 explored whether BLP participation affects academic engagement using a between-subjects design. To explore whether between-subjects variance masked any effects of academic engagement, the analysis was run again this time only retaining students who had data for level 4, 5, and 6. Doing so allowed students' trajectory across the three levels to be plotted, shown in Figure 7. That is, we would expect that students would have similar academic engagement at level 4, as they have not yet participated in BLP, but that BLP students have greater academic engagement as the programme progresses. As students are highly variable in their academic engagement, this approach also accounts for this individual variability.

Results show that BLP students do not have higher academic engagement, and their trajectory of academic engagement does not differ from non-BLP students (see Figure 7).

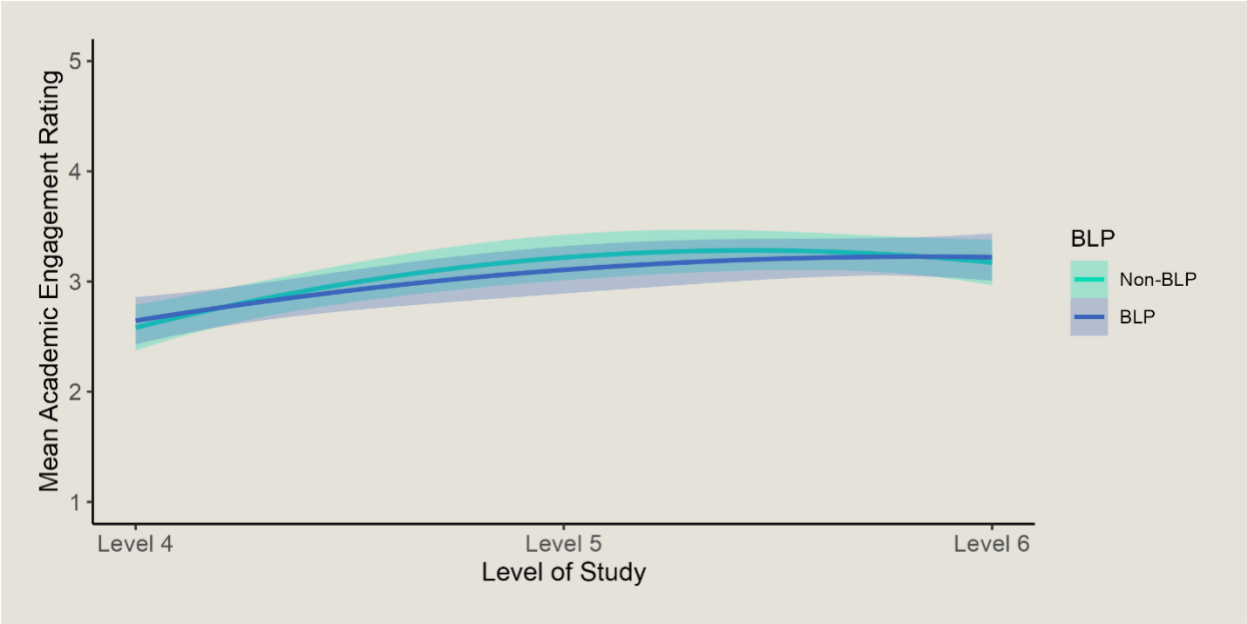

Figure 7. Trajectories of students' academic engagement ratings from level 4 to 6

6. Discussion

6.1. Interpretation of Results

Through these analyses we observed that BLP did not impact students' academic engagement or their likelihood of signing up for unstructured social engagement, as measured by university gym membership. However, students who took part in BLP *were* more likely to engage with structured social engagement than non-BLP students, as measured by sign-ups to social activities including clubs and societies. Structured social engagement saw a drop for all students at level 6, however this is to be expected given the additional perceived course pressures of level 6, and is consistent with academic literature (Chapman et al., 2022).

We identified that BLP students received higher level 6 (final year undergraduate) grades than non-BLP students, however, this was not because these students had higher academic engagement. That is, BLP students had comparable academic engagement with non-BLP students, even though academic engagement is known to predict grades directly (as observed here as well).

One suggestion might be that BLP students are more engaged or were already more likely to get higher grades as they have received higher grades in the past. However, the analysis took account of students' prior academic engagement and grades, which means that BLP students' higher grades cannot be attributed to these factors.

It is notable that BLP participation had a bigger impact on level 6 grades than did academic engagement. This suggests that BLP students' higher grades may be caused non-behavioural factors (e.g. those not measured by the academic engagement variable), which may include motivation, social capital, mattering, and other factors not captured in these data. This would be consistent with other mechanisms of change captured in the BLP Theory of Change model.

These results show partial support for the Theory of Change model, in that BLP does increase students' grades, but that this is not through increasing academic engagement. Students developing their academic skills, social capital, confidence, leadership, and employability skills may account for this increase in grades, and this is something we hope that future evaluations will explore.

6.2. Limitations

The analysis conducted was performed using secondary datasets that were not specifically collected for this analysis. As such, some variables were proxy variables that may not wholly account for the intended outcomes. A good example of this is the academic engagement variable. The theory of change model predicts that BLP will increase student success in part through increased academic engagement. The academic engagement metric accounts for seven components accounting for behavioural engagement, but is not able to capture emotional and cognitive engagement, which explains some of the relationship between grades and academic engagement in the literature (e.g. Martínez et al., 2019). Although the practicalities of such bespoke data collection is difficult, and would take facilitating on top of the data collection that universities already do for day to day running.

The structured social engagement analysis revealed large confidence intervals. This suggested that while we have confidence that a significant relationship is observed, we have reduced confidence in the precise extent of BLP's influence on structured social engagement.

6.3. Generalisability

These findings are based on data from one higher education institution during the period of 2019-23. The findings suggest that BLP is effective within the context of NTU. Given that higher education providers differ in their institutional contexts and infrastructure, it is unclear from these findings whether another provider would observe comparable effects of BLP, even if the programme were implemented in the same way. As NTU did, prior to the BLP, we would encourage providers to consider whether a similar programme would meet the needs of their black students, and whether it would work within their institutional context.

The time period should also be considered when generalising these findings; Covid-19 had a significant impact on students' higher education (and wider) experiences during this time. In the higher education space, this included universities switching to online and/or hybrid learning before eventually increasing face-to-face learning as government-imposed restrictions eased. While the long-term impacts of Covid-19 continue to play out, the impacts of the pandemic on the BLP and students' experience of it are likely to be distinct from future iterations, as such, the inclusion of the Covid-19 pandemic period within the data may impact generalisability and cause engagement figures (especially social engagement) to be lower than expected.

7. References

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8. Appendices

8.1. Appendix A. Propensity Score Matching

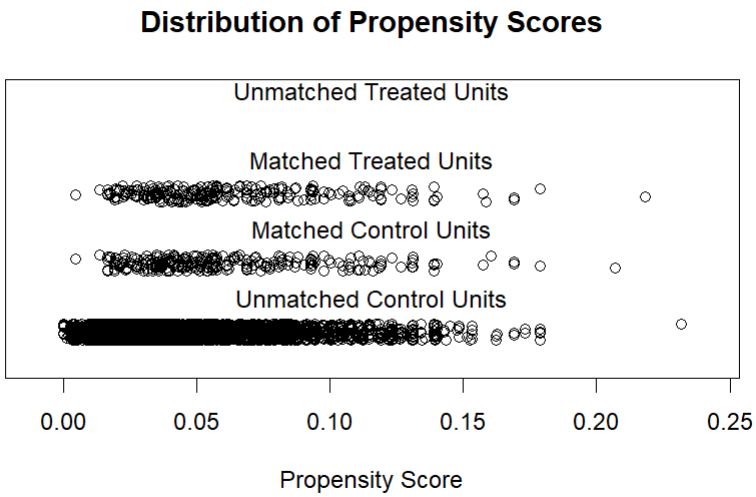

Figure A1. Distribution of Propensity Scores

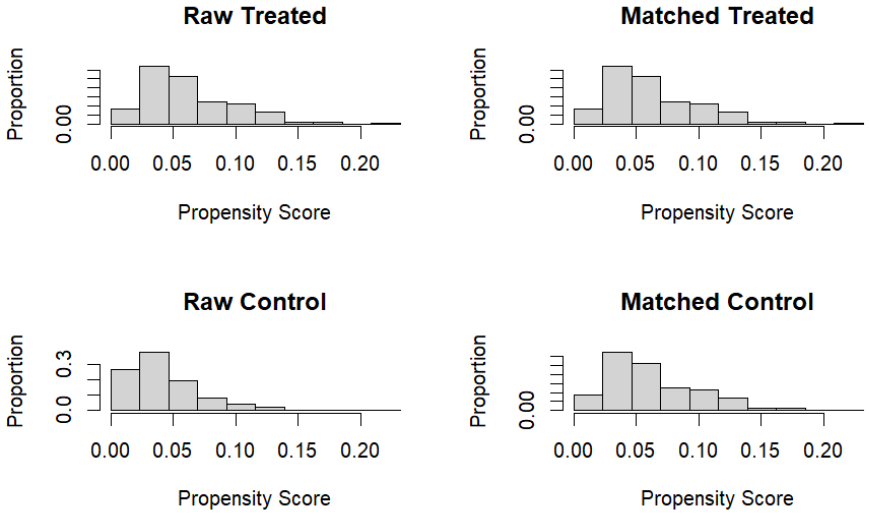

Figure A2. Distribution of Propensity Scores

8.2. Appendix B. RQ1: Does BLP participation influence students' engagement at NTU? Academic engagement model assumptions

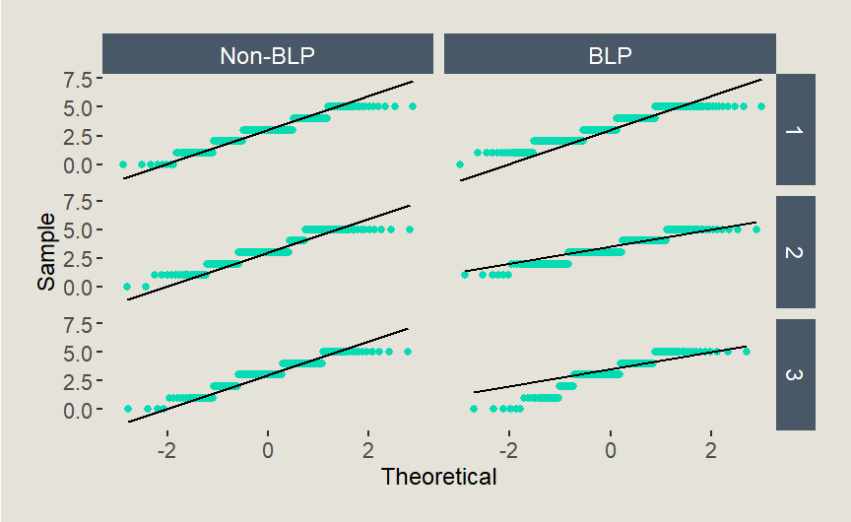

Figure B1. Linearity and Normality of Academic Engagement By Level of Study and BLP Condition

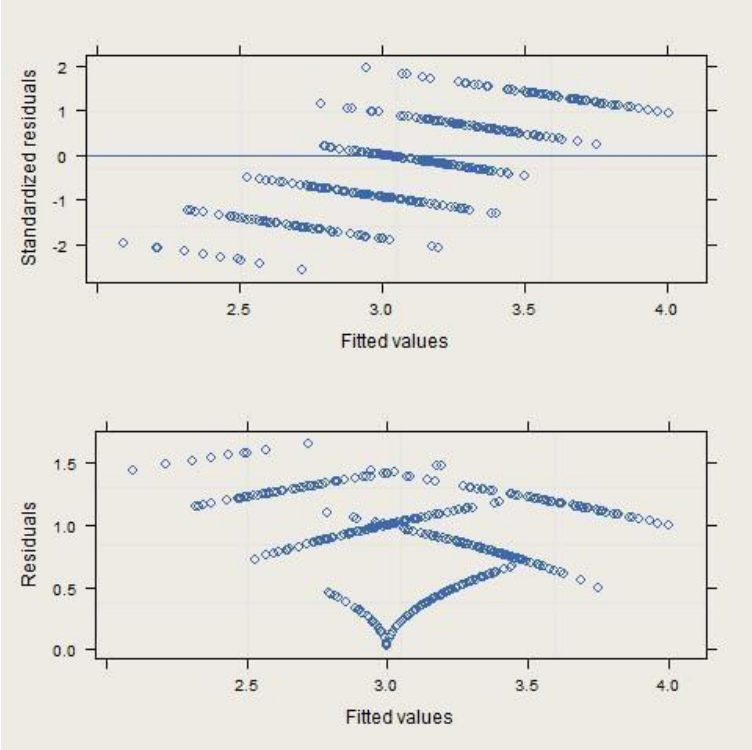

Figure B2. Residual Plots of the Model

8.3. Appendix C. RQ1: Does BLP participation influence students' engagement at NTU? Academic engagement Model

Table C1. Model Fit Statistics

Model	df	logLik	Test	L-ratio	p-value
1	4	-1730.60	-	-	-
2	6	-1724.43	1 vs 2	12.43	<.001

Table C2. Model Parameters

Term	Estimate	Low CI	High CI	SE	*t*-statistic	p-value
(Intercept)	2.98	2.74	3.21	0.12	24.99	<.001
Level of study	0.10	-0.02	0.22	0.06	1.67	.095
BLP	-0.07	-0.40	0.26	0.17	-0.40	.688
Level of study:BLP	0.05	-0.13	0.22	0.09	0.51	.608

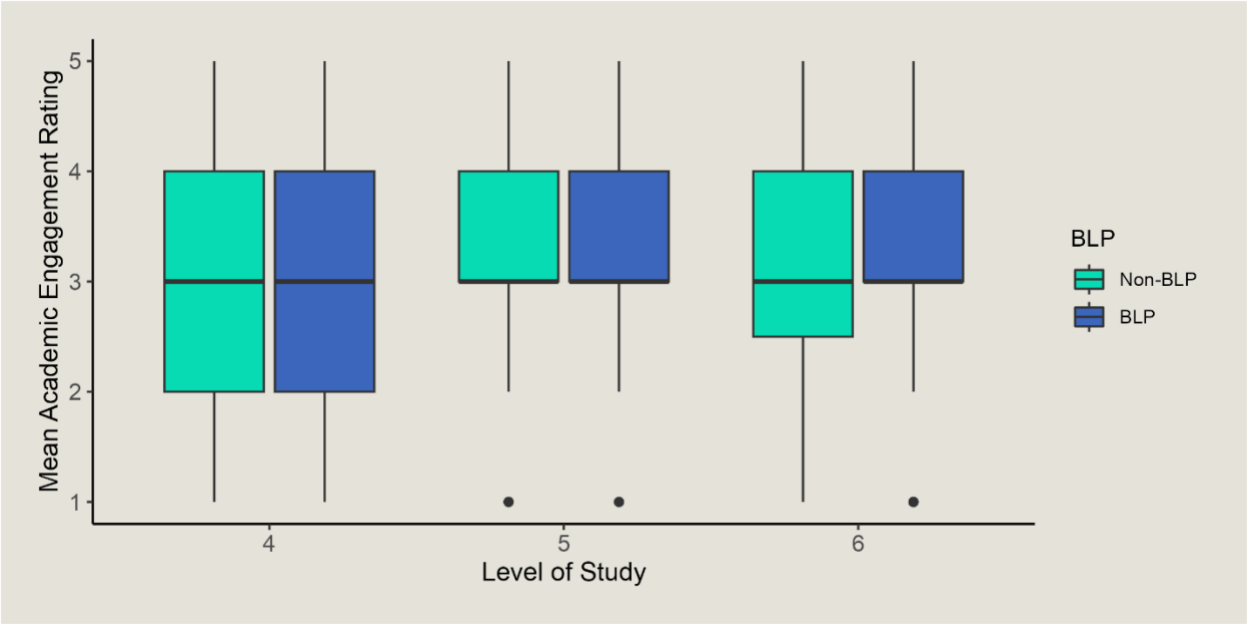

Figure C1. Boxplots of Academic Engagement by Level of Study and BLP Condition

8.4. Appendix D. RQ1: Does BLP participation influence students' engagement at NTU? Unstructured Social Engagement model

Table D1. Robust model Parameters (Raw Parameters) For Analysis 2

Term	Estimate	Low CI	High CI	SE	*t*-statistic	p-value
(Intercept)	-1.98	-4.71	0.48	1.31	-1.51	.130
BLP participation	-2.18	-6.32	1.76	2.03	-1.07	.284
Level of study	-0.05	-1.06	1.00	0.52	-0.09	.930
Level of study*BLP participation	0.72	-0.80	2.30	0.78	0.92	.356

8.5. Appendix E. RQ1: Does BLP participation influence students' engagement at NTU? Structured Social Engagement model

Table E1. Robust model Parameters (Raw Parameters) For Analysis 2

Term	Estimate	Low CI	High CI	SE	*t*-statistic	p-value
(Intercept)	-1.08	-3.21	0.93	1.05	-1.03	.301
BLP	3.10	0.52	5.78	1.34	2.32	.020
Level of study	-0.17	-0.99	0.66	0.42	-0.40	.691
BLP:Level of study	-0.92	-2.00	0.13	0.54	-1.71	.088

8.6. Appendix F. RQ2. Does academic engagement mediate the relationship between BLP participation and end of level outcomes? Mediation model

Table F1. Model Parameters for Mediation Analysis

Term	Label	Estimate	Low CI	High CI	SE	*t* statistic	p-value
Academic engagement ~ blp (a)	a	0.05	-0.24	0.35	0.15	0.35	.723
End of level 6 grade ~ Academic engagement (b)	b	0.57	0.28	0.85	0.15	3.88	<.001
End of level 6 grade ~ BLP (c)	c	0.80	0.20	1.38	0.30	2.63	.009
ab := a*b	ab	0.30	-0.14	0.20	0.09	0.35	.724
total := c+(a*b)	total	0.82	0.21	1.43	0.31	2.63	.009
End of level 6 grade ~ Level 4 grade		2.44	1.64	3.24	0.41	5.96	<.001
End of level 6 grade ~ UCAS Tariff		0.00	-0.01	0.01	0.00	0.17	.868

8.7. Appendix G. NTU Grade-Based Assessment Model – taken from the September 2023 Quality Handbook

Class	Grade	Grade Point	Grade Point Range	Numerical Equivalent	Mark Range
First	Exceptional 1st	16	15.5 - 16	96	100 - 93
	High 1st	15	14.5 - 15.4	89	92 - 85
	Mid 1st	14	13.5 - 14.4	81	84 - 78
	Low 1st	13	12.5 - 13.4	74	77 - 70
Upper Second	High 2.1	12	11.5 - 12.4	68	69 - 67
	Mid 2.1	11	10.5 - 11.4	65	66 - 64
	Low 2.1	10	9.5 - 10.4	62	63 - 60
Lower Second	High 2.2	9	8.5 - 9.4	58	59 - 57
	Mid 2.2	8	7.5 - 8.4	55	56 - 54
	Low 2.2	7	6.5 - 7.4	52	53 - 50
Third	High 3rd	6	5.5 - 6.4	48	49 - 47
	Mid 3rd	5	4.5 - 5.4	45	46 - 44
	Low 3rd	4	3.5 - 4.4	42	43 - 40
Fail	Marginal Fail	3	2.5 - 3.4	38	39 - 35
	Mid Fail	2	1.5 - 2.4	32	34 - 30
	Low Fail	1	0.5 - 1.4	18	29 - 1

Zero	Zero	0	0 - 0.4	0	0

8.8. Appendix H. Impact table

Outcome	**Sample size**	**P Value**	**Effect**	**Estimated 'real world' effect**	**Evaluation security** (1 = not at all secure 5 = very secure)	**Type of evidence**
What is the outcome measure? (include primary and secondary outcomes)	*How many participants were included in the study relating to this outcome?*	*Report the p-value derived from the statistical tests*	*Report the size of the effect - confidence intervals/Cohen's d / Cohen's h*	*Where possible, please translate the effect size into a tangible example of the size of the effect - e.g., 13 more students apply to HE*	*See evaluation security note*[5]	*Is it Type 1,2 or 3 evidence - according to the OfS standard of evidence?*
PRIMARY: Engagement ratings	498	.688	-0.02	-	3	2
PRIMARY: Count of extra-curricular and student union activities attended	498	.284	-0.07	-	3	2
PRIMARY: total count of attendance at NTU gym	498	.020	0.15	17% more BLP students used the gym than non-BLP students	3	2

[5] *Based on the decisions made around the evaluation, you will be able to assess the security of your evaluation – that is, how confident you can be when making claims about the findings. The most robust evaluations with large samples, low attrition levels and no threats to validity will receive the highest score of 5/5.*

Outcome	Sample size	P Value	Effect	Estimated 'real world' effect	Evaluation security (1 = not at all secure 5 = very secure)	Type of evidence
SECONDARY: Level 6 grade	498	.005	0.13	BLP participation is associated with an uplift in half a grade classification, e.g. low 2:1 to high 2:1	3.2	2