The Brilliant Club

Impact Case Study Series

Raising the Bar: Driving Attainment to Increase University Access

March 2019

Research and Impact Series

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About the Author

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Contact Details

This is the fifth in a series of impact case studies which can all be found on our [website](#). If you would like to learn more about The Brilliant Club or have specific questions about this case study, please contact:

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About The Brilliant Club

The Brilliant Club exists to increase the number of pupils from underrepresented backgrounds that progress to highly-selective universities. We do this by mobilising the PhD community to share its expertise with state schools. In pursuit of this mission, The Brilliant Club delivers two programmes:

The Scholars Programme recruits, trains and places doctoral and postdoctoral researchers in schools to deliver programmes of university-style tutorials, which are supplemented by two university trips.

Researchers in Schools recruits PhD graduates, places them as trainee teachers in schools and supports them to develop as excellent teachers and research leaders committed to closing the gap in attainment and university access.

Find out more about our work on our website at www.thebrilliantclub.org.

Executive Summary

This is the fifth in a series of impact case studies about wider thematic issues within widening participation. The focus for this case study is on how universities and university access organisations can effectively evidence the impact of their outreach interventions on raising attainment. This case study is relevant for anyone interested in understanding the relationship between university access and school performance.

Note on definitions: In this case study 'attainment' is used broadly to mean the acquisition of knowledge and skills, not just attainment in the school curriculum as measured by exams.

Pupils from underrepresented backgrounds are consistently underperforming academically compared to their peers

- The average attainment 8 score for Free School Meals (FSM) pupils in England is 35.0 compared to 48.0 for all other pupils (DfE, 2018).
- Children from the most disadvantaged fifth of families, even children with high initial attainment at age seven, are overtaken by those from the least disadvantaged fifth of families with only average prior ability by age sixteen (Crawford et al., 2014).
- In England in 2017, only 1 in 40 of young people who had been eligible for free school meals entered highly-selective universities, compared to 1 in 10 of those who were not eligible (UCAS, 2018).

The higher education sector has been asked to support schools with improving attainment for underrepresented pupils

- The government's *Schools that work for everyone consultation* paper asked universities to play a greater role in the state school system to improve school-level attainment as a way to widen access (DfE, 2016).
- The Office for Students (OfS) states that universities must provide evidence that their outreach and pre-entry support activities contribute to raised attainment among participants if they wish to charge the highest fees (OfS, 2018; OfS, 2019).

The Brilliant Club gives pupils the opportunity to learn with a PhD researcher to develop the skills needed for progression to highly-selective universities

- The Brilliant Club measures attainment-related cognitive skills using its intermediate outcomes framework. These skills include meta-cognition and critical thinking.
- The Brilliant Club has tested and embedded evidence-based attainment-related activities into its programmes.
- In 2017/18, we observed on average increase of 3% for meta-cognition and 13% for critical thinking for pupils taking part in The Scholars Programme.
- Independent evaluation from UCAS suggests that pupils who complete The Scholars Programme have higher rates of progression to highly-selective universities.

While there is a range of ways in which university access interventions can support improved performance in GCSE and A-Level exams (or equivalent qualifications), the contribution of each intervention is hard to separate from that of other in- and out-of-school factors. Measuring changes in attainment-related cognitive skills provides a meaningful way to evaluate the impact of an intervention on the specific aspects of attainment it was designed to improve.

There is an Entrenched Gap in University Access

Attainment is the single biggest predictor of positive outcomes in later life. It determines whether individuals enter higher education, which in turn impacts on a person's salary and wellbeing in adulthood (Crawford, Gregg, Macmillan, Vignoles, & Wyness, 2016; Hefce, 2017). We know that there is an attainment gap between the least disadvantaged and most disadvantaged pupils who attend school in the United Kingdom and that these pupils are subsequently underrepresented in higher education, especially at highly-selective universities. For example, according to UCAS's multiple equality measure, 1 in 4 of the 'most advantaged' quintile of English 18-year olds enter highly-selective universities compared to only 1 in 50 pupils from the 'most disadvantaged' quintile (UCAS, 2018).

Inequality in educational attainment emerges and increases over the course of schooling (Hutchinson, Dunford, & Treadaway, 2016). Children in England from the most disadvantaged fifth of families, even children with high initial attainment at age seven, are overtaken by those from the least disadvantaged fifth of families with only average prior ability by age sixteen (Crawford, MacMillan, & Vignoles, 2014). This finding suggests that tackling attainment gaps is a task that must start early and continue throughout school (Hutchinson et al., 2016; also see Cheung, 2018).

The picture is similar for Scotland and Wales. In Scotland, by the age of five there is a 10 to 13-month gap in school performance based on household income (Sosu & Ellis, 2014). Specifically, "lower attainment in literacy and numeracy is linked to deprivation throughout primary school. By age 12–14 (S2), pupils from better-off areas are more than twice as likely as those from the most deprived areas to do well in numeracy. Attainment at 16 (the end of S4) has risen overall, but a significant and persistent gap remains between groups." (Sosu & Ellis, 2014, p1). In Wales, the attainment gap is larger at Key Stage 4 than at Key Stage 2; a trend which has remained broadly the same since 2007. The biggest gap was in 2010 at approximately 34 percentage points but has since narrowed to 31 percentage points as of 2016 (Joseph Roundtree Foundation, 2016).

The low attainment of students from underrepresented backgrounds has become a key issue in narratives around under-recruitment of students from these backgrounds to university. The government's *Schools that work for everyone* consultation paper, asks universities to do more to support the state school system to improve school-level attainment as a way to widen access (DfE, 2016). Similarly, The Office for Students (OfS) states that universities must provide evidence that their outreach and pre-entry support activities contribute to raised attainment among participants if they wish to charge the highest tariff fees (OfS, 2018). While the OfS acknowledges that isolating the effect of a single activity on attainment outcomes is difficult, it nonetheless expects universities to evaluate their attainment-raising activities (OfS, 2019).

The remainder of this case study explores how universities and university access organisations can meaningfully help to raise attainment and how they can evidence this impact. It looks at The Brilliant Club's Scholars Programme as an example of a university access programme that includes attainment-raising activities. Specifically, the following three questions are addressed through the lens of The Scholars Programme: (i) what role can university access interventions play in raising attainment? (ii) what types of activities help to raise attainment? and (iii) how can these activities be evaluated meaningfully?

University Access and Attainment

How can university access interventions support attainment?

Raising attainment in a university access context can refer to one of two components:

1. Attainment in the school curriculum as measured by GCSE and A-Level performance (or equivalent).
2. Developing the knowledge and skills to succeed at university.

The first component is covered extensively by schools, whilst the second component is broader than the school curriculum and requires expertise from multiple sources. This is partly due to the practical constraints of classroom teaching (e.g. time, resource) but also because the development of knowledge and skills need to be cultivated in different domains in and outside of the school context.

Of course, there are many ways in which universities and university access organisations can support and augment the core work of schools. For example, The Brilliant Club's Researchers in Schools programme places postdoctoral career changers in schools long-term to train as teachers and apply their deep subject knowledge to improving subject pedagogy and curriculum design. Other examples might include the provision of Further Maths tuition where it is not otherwise available.

However, universities and university access organisations are, by their nature, particularly well placed to support schools and pupils with developing the knowledge and skills to succeed at university. In the section below, we explain what skills we focus on as part of The Scholars Programme to support attainment.

The Scholars Programme: Developing cognitive skills

The purpose of The Scholars Programme is to expose pupils to both the physical and intellectual environment which students experience at highly-selective universities. The Brilliant Club does this by mobilising the PhD community to share its research expertise with state schools and through bringing pupils on trips to highly-selective universities. Like many university access programmes, The Scholars Programme is a supra-curriculum programme meaning that it does not deliver school curriculum content. Therefore, an important question is how do interventions like The Scholars Programme help to improve attainment?

A meaningful way for interventions to improve attainment is through the development of cognitive skills, such as meta-cognition and critical thinking. Meta-cognition focuses on how an individual can optimise their performance through planning, monitoring and evaluating their learning (Facione, 1986; Sperling, Howard, Miller, & Murphy., 2002; Whitebread et al. 2009). Critical thinking is linked to meta-cognition and covers a range of higher-order thinking skills, including analysis, evaluation and interpretation (Facione, 1990). Studies predict that there will be a greater demand for jobs that involve higher order thinking, including the deployment of general and specialised knowledge, in the future (Bakhshi, Downing, Osborne, & Schneider, 2017).

Research shows that improving skills, such as meta-cognitive regulation and critical thinking, are linked to significant improvements in attainment, especially for pupils from underrepresented backgrounds (Education Endowment Foundation, 2018, August 30). For example, academic performance significantly increased following meta-cognitive strategy instruction, showing greater long-term benefits for low socio-economic status pupils (de Boer, Donker, Kostons, & van der Werf, 2018). The key message is that by helping pupils to apply these cognitive skills they

become better learners, which improves attainment (Donker, de Boer, Kostons, Dignath van Ewijk, & van der Werf, 2014).

The development of these skills requires pupils to receive explicit instruction, experience opportunities to regulate their own learning, and learn in a variety of contexts, including subject-specific and general domains to facilitate transfer. As noted above, the opportunities for pupils to have these experiences in the daily school context are necessarily limited by time, resources and the content prioritised by the school curriculum (de Boer, Donker, Kostons, & van der Werf, 2018). This is where supra-curricular outreach interventions can help raise attainment by providing different types of educational experiences that explicitly centre on the development of cognitive skills in new contexts.

Examples of attainment raising activities on The Scholars Programme

As part of The Scholars Programme, we explicitly build opportunities to develop and practice cognitive skills in a less structured learning environment than the classroom. The Scholars Programme consists of seven university-style tutorials delivered by PhD researchers, where debate and discussion are not only encouraged but expected, and the content is based on PhD researchers' academic expertise, which is widely varied. Examples of course titles include "From Bare Bones: Reconstructing Ancient Diets using Zooarchaeological Techniques" and "Liquid Crystals Matter: From TV to Medicine". This type of learning environment provides a good basis for developing meta-cognition and critical thinking because the environment is constructionist, meaning that the pupils create their own learning and reflection opportunities. However, we also need to explicitly teach these skills if we expect to see improvements (Abrami et al., 2015). There are several ways in which The Scholars Programme does this:

- We provide pupils with opportunities to explicitly assess their meta-cognitive regulation using an essay reflection activity, which asks pupils to evaluate their academic performance. This self-reflection is then supported with one-to-one feedback tutorials from their PhD Tutor, who scaffolds a conversation about a pupil's ability to calibrate their strengths and weaknesses. For further information on our essay reflection activity and one-to-one feedback tutorials, please see this research report published on our website.
- We use a number of specific cognitive strategies that have been shown to increase meta-cognitive regulation and critical thinking. These activities include embedding graphical organisers and using higher-order questions (King, 1995). Importantly, alongside reviewing the academic literature to identify activities that have the potential to increase attainment, we have tested some of these approaches and activities out in the context of our own programmes. Please refer to our Research Report Series for examples.

How does The Brilliant Club measure attainment?

Given the focus of The Scholars Programme, we measure meta-cognition and critical thinking as part of our intermediate outcomes framework to understand how the programme is impacting on pupils during the period of delivery. The intermediate outcomes framework includes six cognitive skills, see Figure 1 on the next page:

Long-Term Outcome
Pupils taking up a place at a highly-selective university.

Intermediate Outcome
Impact on skills that have positive effect on university access, academic attainment and life outcomes.

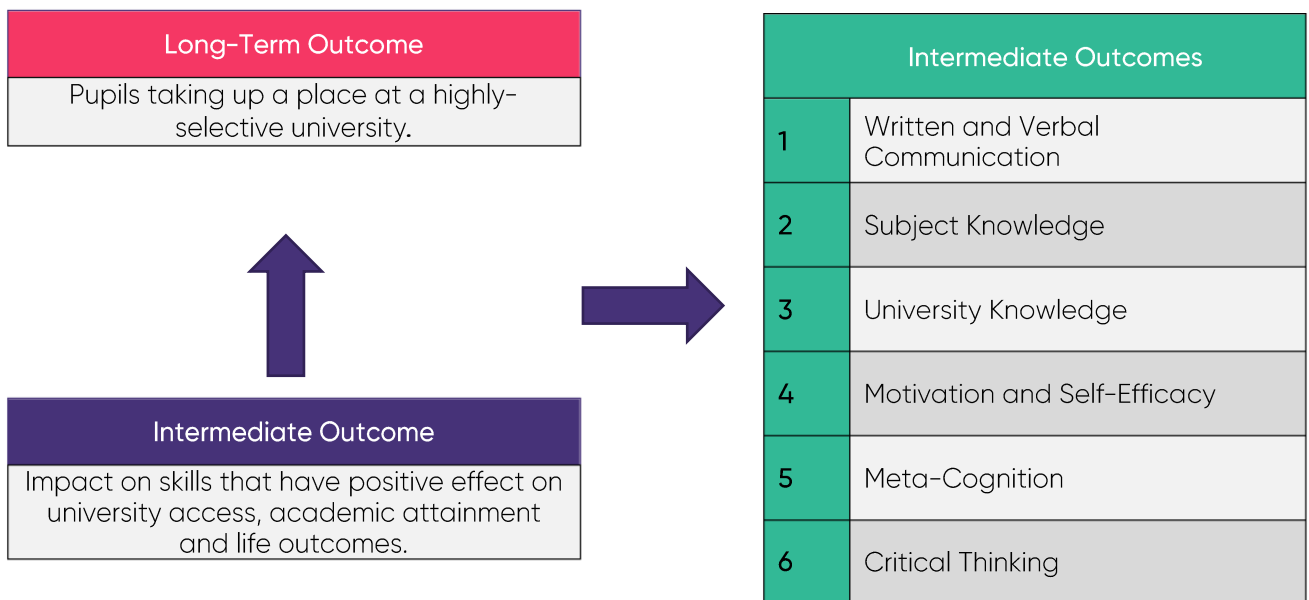| Intermediate Outcomes	
1	Written and Verbal Communication
2	Subject Knowledge
3	University Knowledge
4	Motivation and Self-Efficacy
5	Meta-Cognition
6	Critical Thinking

Figure 1: An overview of The Brilliant Club's outcomes framework.

The distance travelled by pupils is measured across the six intermediate outcomes at the start and end of the programme. To assess critical thinking, subject knowledge and written communication, we conduct a baseline assignment and a final assignment on the pupils using a standardised mark scheme. Further information about how we designed the mark scheme can be found here. For meta-cognition, motivation and self-efficacy we use a standardised pupil self-report measure called the Motivated Strategies for Learning Questionnaire (Pintrich & DeGroot, 1990). University knowledge is measured using a multiple-choice test with Key Stage 5 pupils only, which we designed in collaboration with Cambridge Assessment. After a pilot, we started using the intermediate outcomes framework across the whole programme in 2017/18, and below is data from the first year:
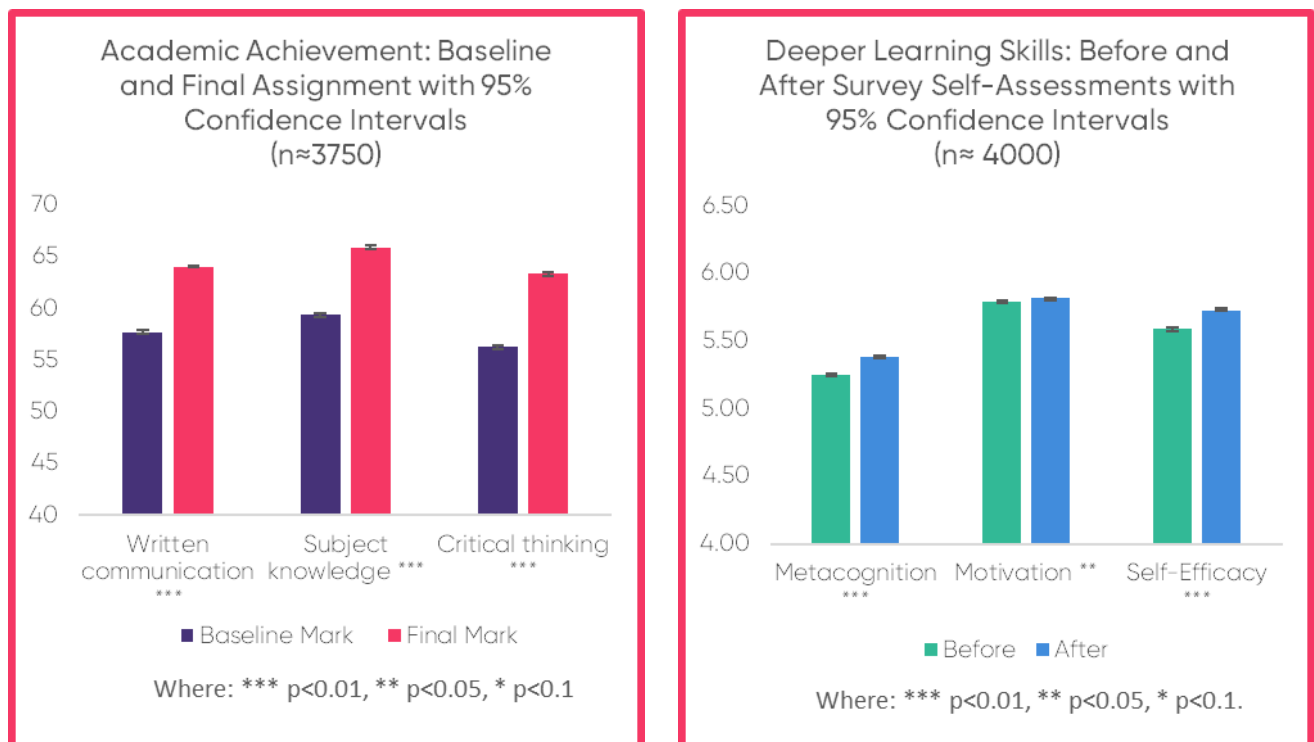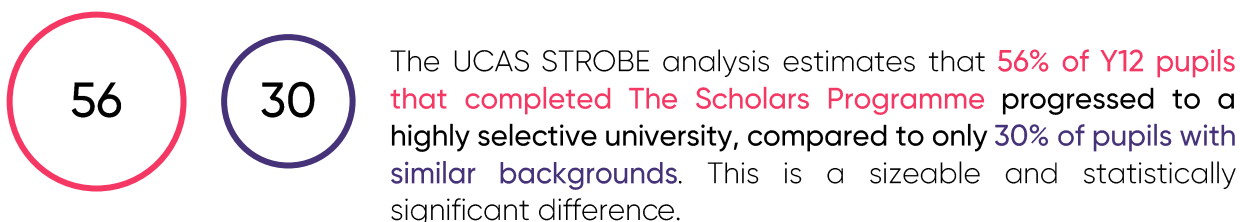

Figure 2: A figure showing the pre-programme changes for the baseline and final assignment (left) and pupil self-report surveys (right).

Particularly noteworthy in the context of attainment is the increase between the pre and post programme assessments for meta-cognition (3%) and critical thinking (13%). Regionally, we observe statistically significant differences in critical thinking between the beginning and end of the programme for England and Wales but not Scotland, because of the small sample size. We cannot draw causal conclusions based on this simple pre and post design. But we are also working with the University of Cambridge to further validate our programme's impact on these competencies through a randomised control group study, which will examine which aspects of the programme appear to be having the effect on performance.

Does the Model Work?

We explicitly teach and measure intermediate outcomes because we think it will improve a pupil's likelihood of progressing to a highly-selective university. Therefore, an important question is, does this approach work? The answer is, yes, so far. For the third year in a row, independent analysis by UCAS showed that pupils on The Scholars Programme are significantly more likely to apply to, receive an offer from and progress to a highly-selective university than pupils with similar socio-demographic background and GCSE attainment.

56 **30** The UCAS STROBE analysis estimates that 56% of Y12 pupils that completed The Scholars Programme progressed to a highly selective university, compared to only 30% of pupils with similar backgrounds. This is a sizeable and statistically significant difference.

For further details about our latest UCAS evaluation, please refer to our website.

Final Comments and Recommendations

No outcomes framework can ever measure every dimension of learning or everything that a pupil has achieved as the result of an educational opportunity. It is likely that good university access interventions have wide-ranging impact on multiple outcomes, from the tangible (future exam performance) to the less tangible (self-esteem; enjoyment; passion for learning). However, these impacts are also likely to be complex, indirect and difficult to measure in isolation.

The ability to measure the distance travelled by each pupil in their development of cognitive skills during the course of an intervention, provides schools, universities and other partners with a shared picture of the intervention's impact on academic attainment. Robust assessments of skill development offer partners confidence that pupils have learned something that, the research tells us, is likely to support improved performance at school and readiness for university.

Based on the lessons learned and experiences of The Brilliant Club, we have identified some recommendations for universities and other university access organisations:

- Universities and university access organisations should focus on attainment-related outcomes that their programmes can have a direct impact on.
- One meaningful way to do this is targeting the development of cognitive skills.
- There are assessments that are available and can be used for non-profit purposes to assess cognitive outcomes.

The cognitive skills which are important for attainment and HE progression are well documented in academic primary sources, as well as 'grey literature', which refers to documents that are

typically published but for non-commercial purposes (e.g. government reports, policy statements and issues papers).

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