Science Stars
2018-19 Evaluation

Introduction

About the organisations

St George's, University of London (SGUL) is the UK's specialist health university, and a constituent college of the University of London. With a strong historical commitment to widening participation activities, SGUL is now increasingly working across the whole student lifecycle to support pupils from under-represented backgrounds. In 2018-19, SGUL piloted its first project focused specifically on school-based attainment-raising activity, the Science Stars programme.

ImpactEd is a not-for-profit organisation that exists to improve pupil outcomes by addressing the "evaluation deficit" in education. ImpactEd works in partnership across the education sector to support high-quality monitoring and evaluation that informs decisions about what will work most effectively to support pupils. Their work in access and widening participation has included evaluation projects with The Brilliant Club, Nesta and Leeds Beckett University among others.

Ernest Bevin College is a community school in South West London for boys aged 11-19 and girls aged 16-19. Over 1,200 pupils are enrolled, and in 2017-18 40% of them had been eligible for free-school meals within the previous six years. At the end of Key Stage 4, 37% of pupils were classified as disadvantaged by the Department for Education.

Project background & context

The Science Stars programme was created by SGUL in response to substantial evidence showing that students from disadvantaged backgrounds are less likely to achieve good GCSE results compared to their more advantaged peers. Attainment, particularly at Key Stage 4, is one of the significant barriers to learners accessing university[1], and GSCE results are a strong predictor of university progression. Data shows that, on average, a disadvantaged pupil falls two months behind their peers for each year of their time at secondary school[2].

Science Stars is a sustained tutoring intervention designed to support Year 11 pupils to prepare for their Science GCSEs, as well as supporting a range of cognitive and non-cognitive skills associated with improvements in academic achievement and longer-term life outcomes. The programme is delivered to small groups of pupils by current SGUL students, who have trained as tutors and who follow a pre-designed curriculum developed by an academic and SGUL alumnus with expertise in education and experience of teaching. The innovative curriculum covers the core of the GCSE Science curriculum while also allowing tutors to respond dynamically to the needs of participants, delivering sessions tailored to the pupils' particular areas of weakness. The programme aims to raise GCSE Science attainment, increasing the likelihood that participants will enter higher education.
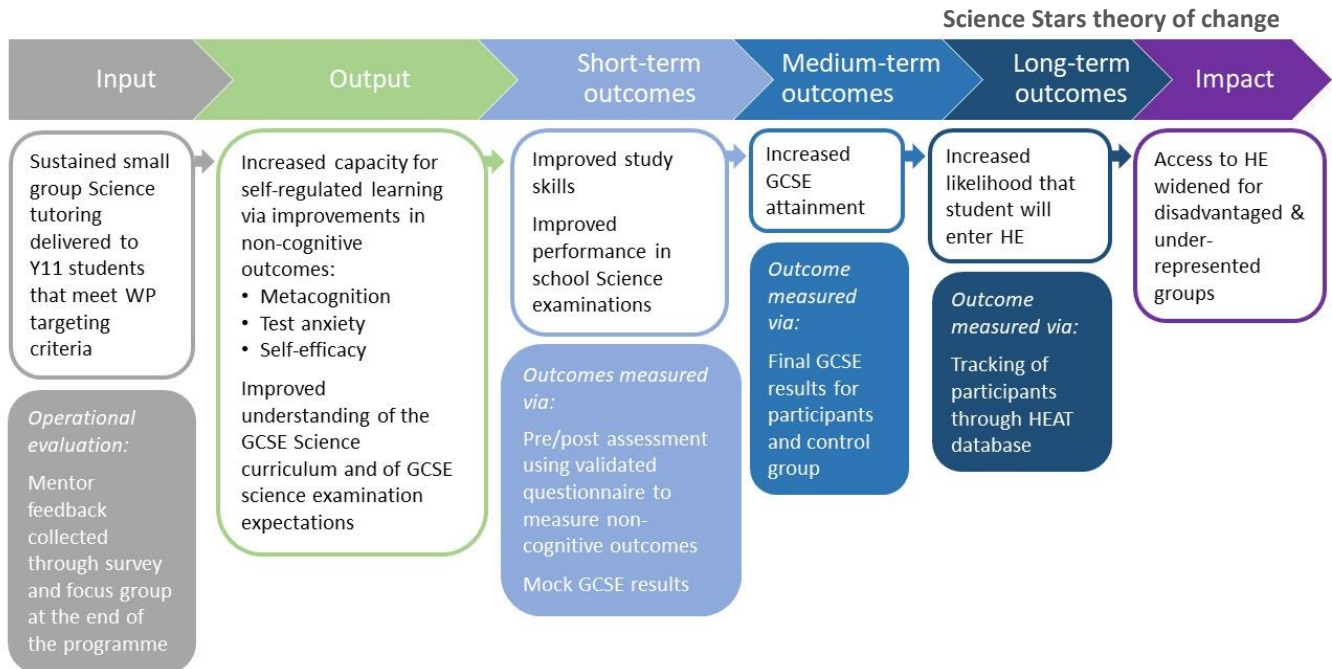
As this is the first project run by SGUL that focuses primarily on raising attainment within schools, with an ambitious aim to directly improve GCSE outcomes for participating pupils, SGUL is working with an external evaluator, ImpactEd, to ensure a high-quality evaluation process for the pilot year and to generate evidence to inform future programme development. This evaluation report summarises the results of the pilot evaluation.

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[1] OfS, 2019. See: Topic briefing: Raising attainment in schools and colleges to widen participation Last accessed: May 2019
[2] Andrews, J., Robinson D., and Hutchinson, J., (2017). Closing the Gap? Trends in Educational Attainment and Disadvantage Education Policy Institute

Programme aims and theory of change

Science Stars aims to improve educational outcomes in GCSE Science for target pupils in Year 11, intervening at a crucial stage that has the potential to improve the trajectory of participants' future academic pursuits. This goal is grounded on a robust, evidence-based Theory of Change, which is underpinned by evidence of the efficacy of small group tutoring in general within education literature[3].

Science Stars theory of change

Input	Output	Short-term outcomes	Medium-term outcomes	Long-term outcomes	Impact
Sustained small group Science tutoring delivered to Y11 students that meet WP targeting criteria	Increased capacity for self-regulated learning via improvements in non-cognitive outcomes: • Metacognition • Test anxiety • Self-efficacy Improved understanding of the GCSE Science curriculum and of GCSE science examination expectations	Improved study skills Improved performance in school Science examinations	Increased GCSE attainment	Increased likelihood that student will enter HE	Access to HE widened for disadvantaged & under-represented groups
Operational evaluation: Mentor feedback collected through survey and focus group at the end of the programme		*Outcomes measured via:* Pre/post assessment using validated questionnaire to measure non-cognitive outcomes Mock GCSE results	*Outcome measured via:* Final GCSE results for participants and control group	*Outcome measured via:* Tracking of participants through HEAT database	

Outcome measures and evaluation design

The evaluation had a combined focus; as well as looking at impact on science attainment, attention was also paid to non-cognitive outcomes with predictive validity that have been shown to be associated with improvements in long-term outcomes, such as well-being, academic achievement and employment destinations. Alongside academic achievement, there is evidence that these skills can be particularly important in closing disadvantage gaps[4].

In terms of specific outcomes, the following were considered:

- Science attainment data using school administered mock examinations;
- Science attainment data using final GCSE results;
- Pre/post assessment using validated questionnaire measures to assess pupil attitudes and perceptions for meta-cognition, self-efficacy and test anxiety.

These non-cognitive outcomes were measured using psychometrically validated questionnaires, administered to pupils before the Science Stars programme began, and repeated after the conclusion of the programme. The evaluation used a control group design in order to go beyond simply comparing pre-programme and post-programme data and better isolate the impact of Science Stars.

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[3] EEF. See: https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/small-group-tuition/#effectiveness Last accessed: May 2019
[4] Gutman & Schoon, 2013

As pupil selection was conducted by the school and through a voluntary sign-up process, a randomised control group design was not possible. As such, a matched control group that consisted of pupils who were in the same GCSE Science set as participants, but who were not participating in Science Stars, was created. As GCSE Science sets at the school were streamed according to ability, this allowed pupil's prior attainment to be controlled for.

Two caveats for this evaluation design are worth noting:

- As the control group was not randomised, there may have been unobserved characteristics affecting performance beyond prior attainment. For example, Science Stars participants may have been more motivated in general or likely to study harder than their peers, independent of the programme itself.

- Science Stars is currently only being run in one school, so the overall sample size for both participants and the control group was small (39 pupils in total). As such, results may not be immediately generalisable to other school contexts.

Nonetheless, within these constraints, the design approach allowed relatively robust inferences to be drawn. In particular, the design aimed to collect a range of data points to triangulate findings and assess if there was a common pattern across indicators, including:

- Collecting data on drop-out and joining rates, to assess if length of participation in Science Stars affected outcomes;
- Non-cognitive survey measures assessing key skills linked to academic achievement and aligned to the overall aims of the programme;
- Gathering interim data from mock examinations as well as final GCSE data in order to examine trends over time;
- Process evaluation through semi-structured interviews and group workshops with programme tutors and other stakeholders.

Across all outcome measures, two-sample t-tests were used to assess statistical significance, and these were tested against non-parametric methods to see if there was any divergence in findings – results were consistent throughout.

Evaluation Findings

Headline findings were that:

- On average, Science Stars participants achieved over a grade higher than the control group in their Science GCSEs, a finding that was statistically significant;
- This effect was largest in Physics and Chemistry and smallest in Biology, a result that was consistent with trends observed in mock exams as well as final GCSE exams;
- Both late joiners to the programme and programme drop-outs had relatively lower achievement, suggesting that length of participation in Science Stars influenced these results;
- Trends across non-cognitive questionnaire measures showed improved outcomes for Science Stars participants relative to the control group. However, this result was not statistically significant so may have been due to natural variation.
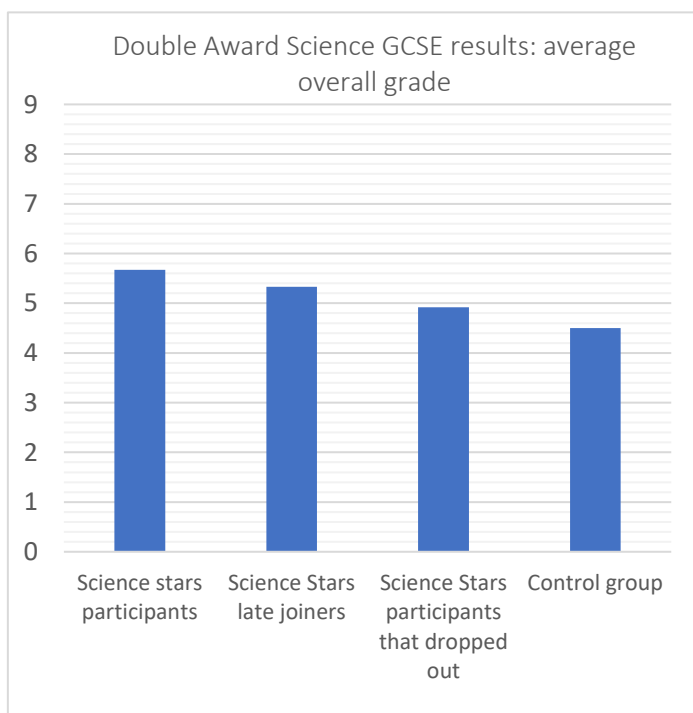
GCSE Attainment

Final GCSE Science Results

There was a difference of over a grade between Science Stars participants and the control group. This finding was statistically significant, recording a p-value of 0.004, meaning that it was unlikely this difference between the groups was due to chance.

For both overall grade level and in marks on individual exam papers, pupils who participated in the Science Stars programme (either in its entirety or after joining late) tended to achieve higher marks than those who did not participate or dropped out early in the programme. Those who completed the entire programme had the highest achievement of any group, suggesting length of participation was a key variable in the success of the intervention.

The graphs below show the average final GCSE Science grades and marks of four groups of pupils who had differing levels of exposure to the programme:

Double Award Science GCSE results: average overall grade

Double Award Science GCSE results: average paper marks
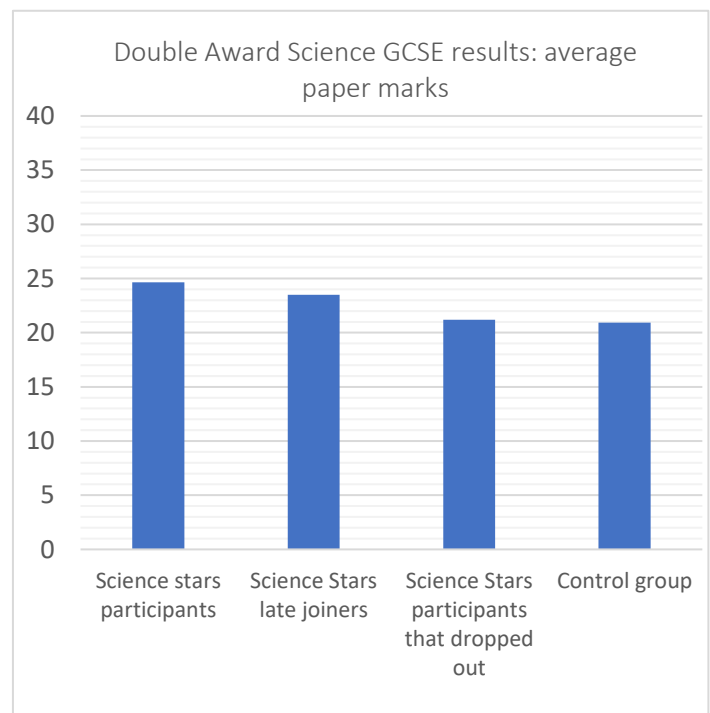
There was a statistically significant difference between the overall grades of Science Stars participants and the control group, although the difference between the two group's average paper marks was not statistically significant (p=0.164).

While it is important to bear in mind that a randomised control group design was not possible, leaving open the possibility of unintended selection bias influencing results, the fact that trends in the data were consistent for both programme drop-outs and late joiners suggest that, even if this is the case, it is unlikely to have altered the overall findings. Further support for this assumption can be found in the mock GCSE Science data, which followed a similar pattern, and is discussed in more detail in the section 'Comparison to interim outcomes from mock data'.

Average grades and marks can be broken down as follows:

| Group | Raw GCSE marks | | | | Average grade |
	Biology	Chemistry	Physics	Average mark	
Science stars participants	23.73	24.42	25.77	24.64	5.67
Science Stars late joiners	23.5	24.17	22.83	23.5	5.33
Science Stars participants that dropped out	22.58	22.83	18.17	21.19	4.92
Control group	22.95	19.61	20.24	20.93	4.50

The differential between Science Stars participants and the control group was greatest in Physics (5.53 marks) and Chemistry (4.82), and smallest for Biology (0.78).
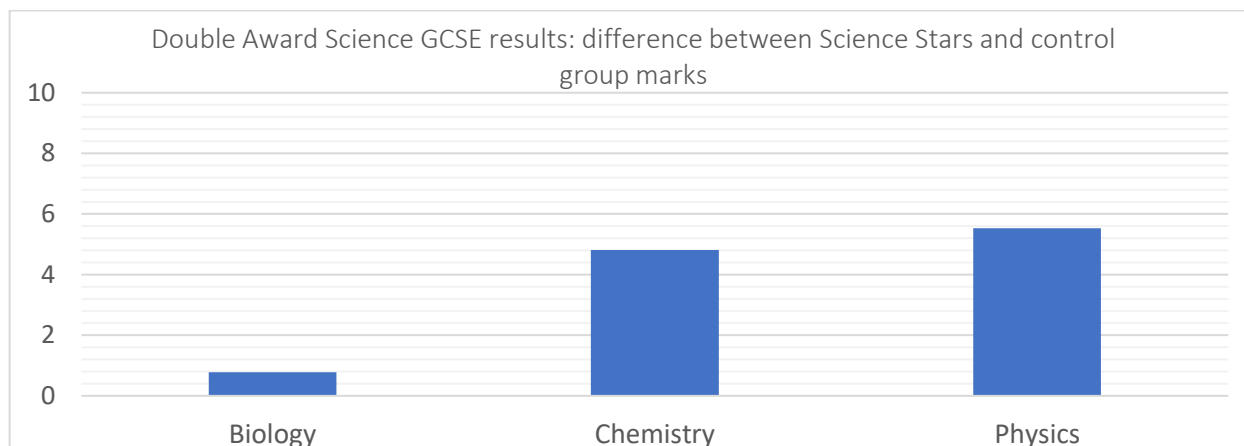
When broken down by subject, the differences between marks for Science Stars participants and the control group were not statistically significant, although they approached significance for Chemistry (p=0.08) and Physics (p=0.1). This suggests that the overall value of Science Stars was in the combined impact across Science subjects, rather than in any single subject.

Comparison to interim outcomes from mock examination data

Prior to pupil's final GCSE Science results being available, an interim analysis based on mock GCSE Science results was conducted. The findings from this analysis were largely consistent with the data from GCSE Science results discussed above, and provided a sense of how outcomes may have progressed over time.

In the interim mock examination data, obtained in March 2019 and compared against a baseline from November 2018, the following was evident:

- Science Stars participants showed greater levels of progress on average when compared to control group pupils. Participation was associated with increased grades in all subjects, with the result being statistically significant for Physics (p=0.011).
- In Physics mock results, Science Stars participation was associated with a difference of more than a grade above (1.26) what would have been expected based on the performance of the control group.
- Participation was also associated with increased grades in Chemistry (0.64 of a grade) and Biology (0.42 of a grade). As these results were not statistically significant they may have been due to chance or measurement error, but they do line up with later findings in final GCSE Science results.
- There was no improvement for the subset of six pupils who participated initially in Science Stars and then dropped out. This indicated that participation in the programme was likely to be what contributed to the observed improvement in results. It also suggested that any benefits were more likely to be achieved through sustained participation in the programme (i.e. there was no benefit to only attending the initial sessions).
- There was no statistically significant negative effect from joining the programme late. However, as this applied to only two pupils, this finding cannot be generalised.

We can see the trends were broadly similar to those in pupils' final GCSE Science results. There was an overall positive effect for Science Stars participants in both sets of data, with a larger average effect on final GCSE Science grades than in mocks. Dropping out of the programme or joining late were both associated with lower achievement, as compared to those who participated in the entirety of the programme. Finally, Physics and Chemistry both saw higher levels of improvements relative to Biology across both sets of data, although this improvement was larger in final GCSE Science exams than in mock results.

Overall, mock examination data supported both the general validity of the analysis and the level of certainty with which improved results can be ascribed to participation in Science Stars.

Non-cognitive outcomes

As well as an analysis of academic metrics, data was collected on non-cognitive outcomes. Three measures were selected as particularly relevant to the aims of Science Stars:

Metacognition	Meta-cognition means 'thinking about thinking': pupils' ability to think explicitly about their own learning (Flavell, 1979; Higgins et al., 2016). It is strongly associated with academic progress and improves other skills required for learning, such as critical thinking. Meta-cognition enables pupils to develop strategies to plan, monitor, and evaluate their learning.
Self-efficacy	Self-efficacy is a measure of pupils' belief in their ability to achieve a specific task in the future. Self-efficacy is correlated with higher academic achievement and persistence, and also contributes to pupil wellbeing. (Gutman & Schoon 2013, DeWitz et. al. 2009).
Test anxiety	Test anxiety is concerned with pupils' emotional responses to tests (Pintrich and De Groot, 1990). Greater levels of test anxiety can result in worse performance in exams, but may in some situations be linked to increased motivation and self-regulation.

These non-cognitive outcomes were measured using psychometrically validated questionnaires, administered to pupils before the programme began, and again after the conclusion of the programme. Due to logistical issues with administering questionnaires, it was not possible to match individual pupils' test results before the Science Stars programme to their results after the end of the programme. However, it was possible to compare cohort averages across Science Stars participants and the control group. While still a meaningful approach, this allowed slightly less precision in the statistical significance analysis.

On the next page, the average change in scores for the intervention and control group are broken down for each non-cognitive measure.
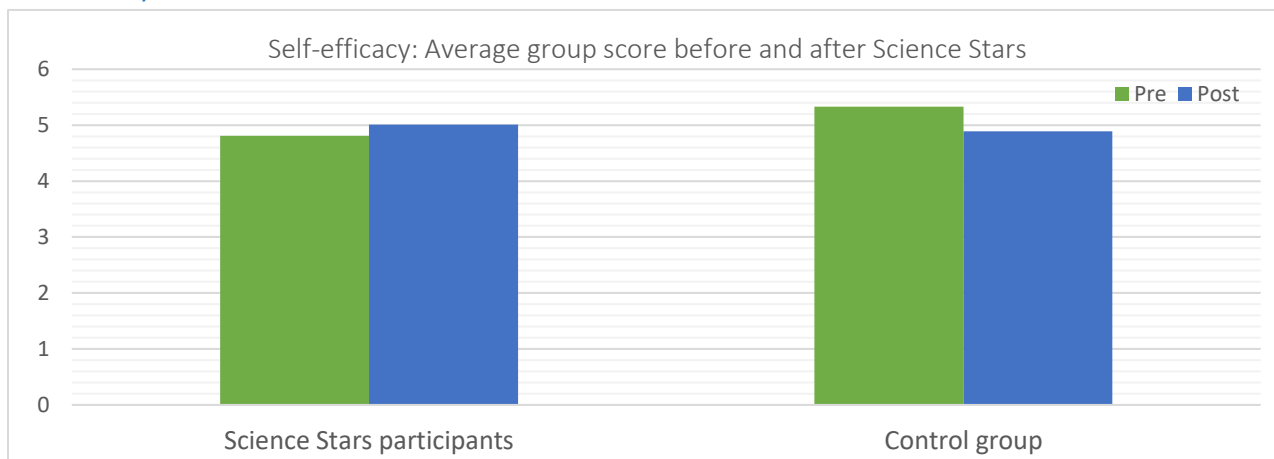
Metacognition

Metacognition: Average group score before and after Science Stars
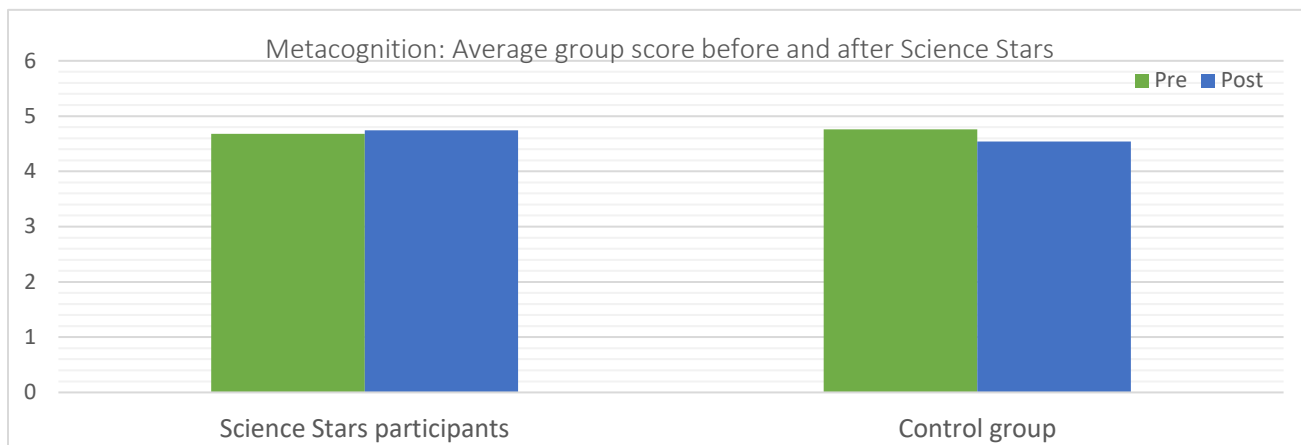
Metacognition remained relatively stable for Science Stars participants, increasing only slightly across the duration of the programme. However, it is important to note that this was relative to a decrease in the metacognition score observed in the control group over the same period. While the difference between the two groups was not statistically significant and cannot with certainty be attributed to Science Stars, the inability to match individual pupils' results across the two rounds of questionnaire did hamper this portion of the analysis. It is impossible to determine if a stronger connection could have been found with more granular data, which would have made statistical significance testing more robust.

Either way, the clear difference between Science Stars participants and the control group was promising, and could suggest that the programme helps to sustain metacognitive ability against the decrease was observed for other pupils over the course of the academic year.

Self-efficacy

Self-efficacy: Average group score before and after Science Stars

Of the three non-cognitive measures, self-efficacy showed the largest difference in change between groups, with a 3.3% increase for Science Stars participants relative to a 7.5% decrease in the control group. Similarly to metacognition, the results were not statistically significant and causality cannot necessarily be assigned to the Science Stars programme. However, the results still suggest a promising relationship between participation in the programme and the sustainment or improvement of self-efficacy.

The relative difference in baseline scores between the two groups was particularly noteworthy for self-efficacy. This suggests that the targeting criteria for programme participants may correlate with low baseline self-efficacy and sense of capability to achieve academically.

Test Anxiety: Average group score before and after Science Stars
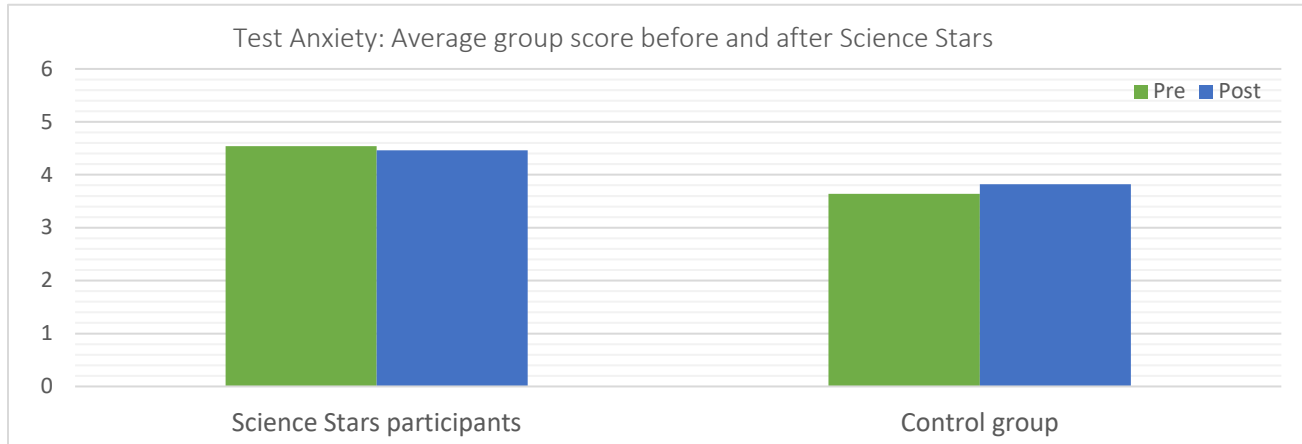

For test anxiety, reductions reflect a positive result, as the programme is aiming to reduce anxiety for participants.

Science Stars participants showed a small decrease in test anxiety, relative a slight increase in text anxiety for the control group. While the changes were not dramatic and again not statistically significant, this was an encouraging result, indicating that the Science Stars programme may have helped bolster participants' confidence as their Science GCSEs approached.

Again, as was the case for measures of self-efficacy, there was a relatively large difference between the baseline group averages for Science Stars participants and the control group. This suggested that the targeting criteria for participants may correlate with higher baseline test anxiety.

Non-cognitive outcomes overall

The graph below summarises the changes seen for the intervention and control groups as a percentage format across the three non-cognitive outcome measures.

Percentage changes in non-cognitive outcomes
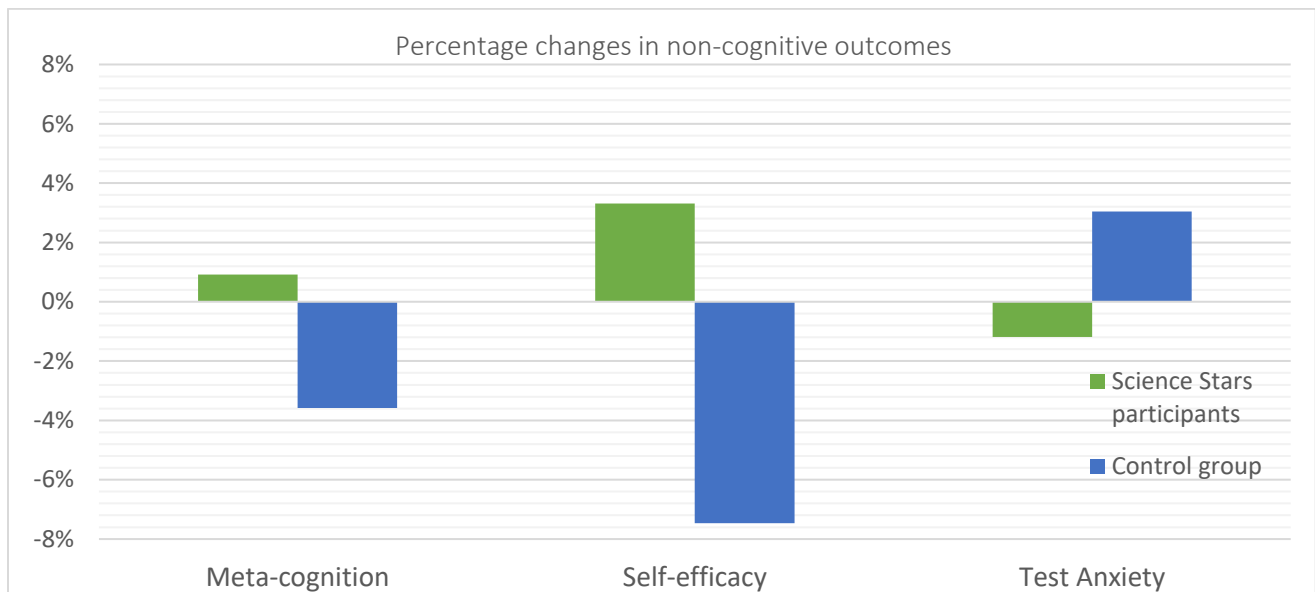
These results can be broken down further as follows. Hypothesis tests were conducted on the observed differences between intervention and control group pre and post scores. The p-values and statistical significance boxes below refer to the results of these tests.

Outcome measure	Group	Pre	Post	% Change	P-value	Statistically significant?
Meta-cognition	Science Stars participants	4.68	4.74	0.92%	0.606	No
	Control group	4.76	4.54	-3.58%		
Self-efficacy	Science Stars participants	4.81	5.01	3.31%	0.367	No
	Control group	5.33	4.89	-7.46%		
Test Anxiety	Science Stars participants	4.54	4.46	-1.19%	0.796	No
	Control group	3.64	3.82	3.04%		

Taken as a whole, analysis of the non-cognitive measures paints a positive picture of the effect that Science Stars had on participants' attitudes and perceptions as they approached their Science GCSEs. While pupils who were not part of the programme grew more disconnected from their own thinking and learning, less confident in their ability to achieve tasks, and more anxious about their exams, Science Stars participants seemed to be insulated from these declines. As a group, participants' ability to think explicitly about their own learning increased, as did their belief in their ability to succeed, even as their fears and concerns about tests reduced.

In the context of what proved to be a significant improvement in their eventual Science GCSE performance as compared to their peers, the patterns seen in the non-cognitive outcomes measured appear to reflect a realistic and accurate assessment by Science Stars participants of their own abilities and prospects in their exams.

Process evaluation

Alongside the impact evaluation, ImpactEd conducted a process focused evaluation, which aimed to gain further insight into the implementation of the programme and some of the key areas that might have been driving change.

Data sources

Data was collected primarily from the tutors delivering the programme. All six tutors responded to a questionnaire, and follow-up workshops/interviews were conducted with three of the six tutors.

The questionnaire was in a standardised format with no dynamic routing, and workshops and interviews were semi-structured. This method has several strengths including offering the flexibility for the interviewer to adapt questions depending on the expertise and knowledge of the stakeholder, and for the interviewer to probe complex issues and seek clarification.

In addition, ImpactEd conducted interviews with the curriculum developer and with the lead teacher facilitating the programme in the school to gain their perspectives on their experience of the implementation of the Science Stars programme.

Summary findings

Three positive themes emerged from the Science Stars tutors:
1.   High levels of overall satisfaction with the programme, particularly:

- The focus on small group tuition, which encouraged growth in participants' confidence and allowed a level of attention per pupil that wouldn't have been achievable in standard class time given teachers' limited time;
- The quality of the resources, which gave tutors the confidence that they were teaching to the curriculum in an appropriate fashion;
- The training delivered to tutors in advance of the programme.

2. A consensus that the programme was genuinely useful for pupils, and that the majority of participants showed significantly improved progress throughout their time on the programme. Particularly strong areas for the programme were:

- Pupils' increasing capability with written exam technique, a result of the explicit focus on this in the sessions;
- Pupils' increased confidence in applying scientific knowledge;
- The benefits of dedicating substantive amounts of time purely to working on science, which was particularly helpful during the stress of revising for so many subjects at once;
- The benefit of individualised feedback and instruction for pupils, which was not achievable in standard class time due to teachers' limited time.

3. That the structure of the programme was well thought through and appropriate in terms of length and coverage, particularly as this was a pilot year. Tutors seemed to understand the innovative nature of the programme and bought in to and understood its pilot status.

The areas that were cited as needing improvement were primarily logistical, related to the practical side of running the programme. Particular themes included:

- Difficulty regarding the scheduling of the programme. Each weekly session was timetabled to start immediately at the end of the school day and last an hour, which did not leave time for transition. As a result, sessions often started fifteen minutes late and, in combination with some pupils needing to leave early, this meant that few sessions lasted the full hour as intended;
- Room allocations were frequently problematic. On multiple occasions tutors were not allocated a dedicated room and in some cases detentions were carried out in the same room as Science Stars tutoring sessions;
- Awareness of the programme was limited among school staff who were not directly involved. This was problematic when the lead teacher was not present, especially when trying to find appropriate rooms and locate pupils;
- There were several pupil drop-outs and replacement pupils were not always identified promptly;

"My favourite thing about Science Stars is the way topics are taught. Everything is taught in a straight-forward way which makes it easier to understand. The teachers are also reassuring and friendly."
Science Stars 2019-20 participant

"Science Stars has been very beneficial because I have been able to take knowledge from the sessions and apply that within my lesson... I understand loads more than I did before and it's made me more confident in lessons…before if I was 50/50 on the answers I never used to put my hand up, like when Sir would ask a question I was more shy, now I'm more confident within my ability in Science."
Science Stars 2019-20 participant

"The resources were amazing - it gave me the comfort to know that I was teaching the curriculum correctly."
Science Stars 2018-19 tutor

"I wanted to get involved because it felt like something really unique that I could have benefited from while I was at school. Most pupils from this sort of background never get the opportunity for really personalised teaching, so I thought it would be such a powerful thing to take part in."
Science Stars 2018-19 tutor

"I thought the programme did a really good job of giving us resources so we didn't have to create everything, but enough flexibility so we could change and adapt to them what the pupils needed in the sessions"
Science Stars 2018-19 tutor

- There was confusion amongst some of the tutors as to the nature of programme targeting, and if this was reflected in the ability of participating pupils. Several tutors commented that those who participated seemed more able than expected for those on the borderline of a pass grade, which was also reflected in the quantitative data.

There were some topics that were notable by their absence in feedback from and discussion with tutors. The two most prominent instances of this were:

- Tutors made very few references to the pre-session quizzes which were designed to help identify the areas of the curriculum that pupils most needed help with, a potential sign that they had been underutilised.
- While behaviour management was brought up as a concern that tutors had before the programme began, once the programme was underway, challenging behaviour was seldom an issue.

Within questionnaire data, there were five outcomes that received particularly high ratings from tutors (all on a 5 point scale).

Through tutoring on Science Stars, tutors felt:
- increased their confidence in teaching and tutoring young people (4.5)
- able to deliver the GCSE Science curriculum confidently throughout the programme (4)

That tutors felt Science Stars participants appeared to:
- improve their ability to respond to the demands of written examinations (4.17)
- improve their confidence in their ability to achieve in science (4.17)

Tutor questionnaire results
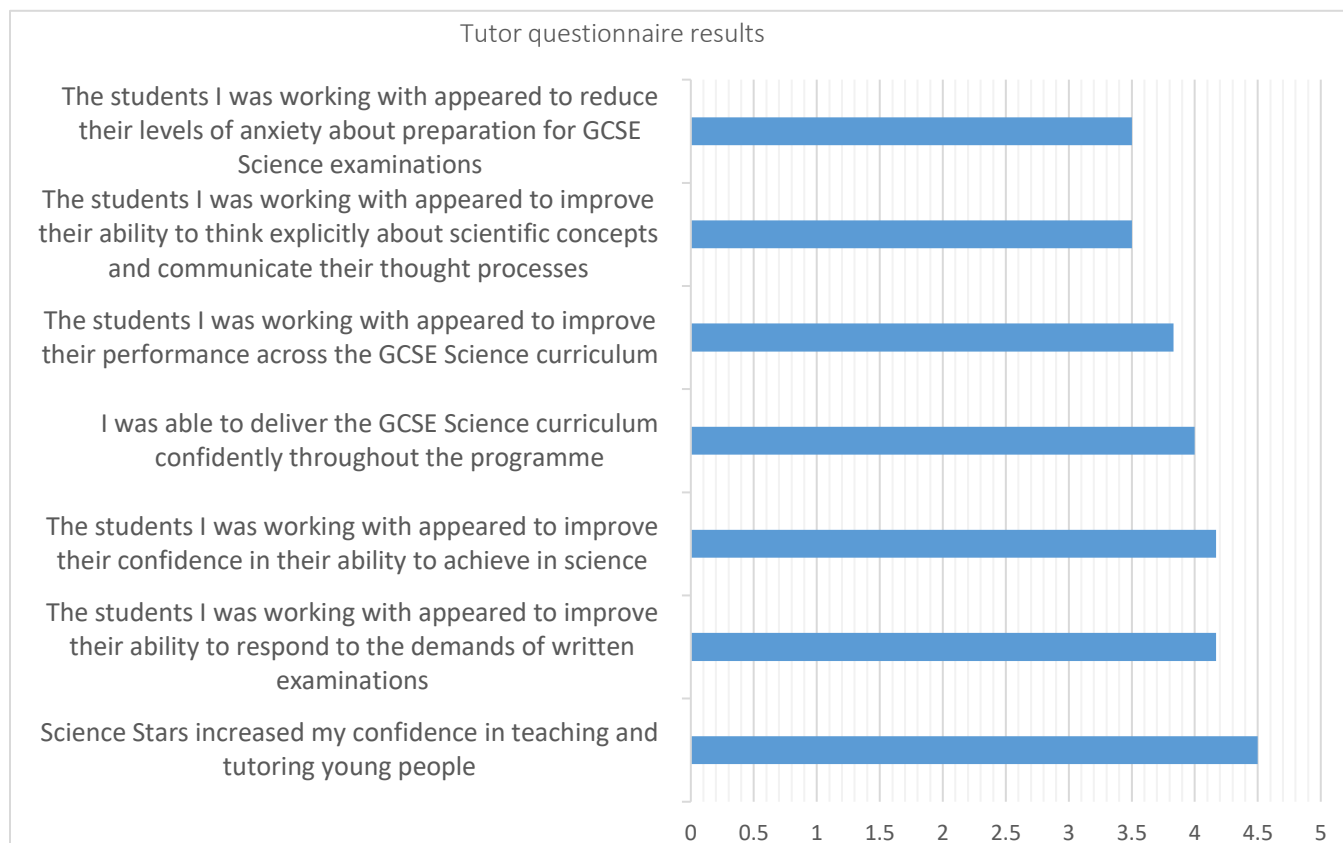
Tutors gave slightly lower, though still positive, ratings for statements that Science Stars participants appeared to:

- improve their performance across the GCSE Science curriculum (3.83)
- improve their ability to think explicitly about scientific concepts and communicate their thought processes (3.5)
- reduce their levels of anxiety about preparation for GCSE Science examinations (3.5)

The themes that emerged from the questionnaire were relatively consistent with those that were discussed in the group workshop session and interviews. The tutors were particularly happy with the quality of resources and training and felt that the support provided throughout the programme was sufficient. Logistical issues related to the running and organising of the sessions within the school were the main areas for improvement cited.

Tutors offered a number of suggestions for improving programme design and delivery. These included:

- An overview from the teacher of what pupils had already covered in school lessons;
- The possibility of considering longer sessions to allow time to go into more detail on content;
- The possibility of more flexible sessions later in the programme to allow more time for individualised feedback and revision based on pupils' identified weaknesses.

Alongside the tutor feedback, the curriculum developer and school lead offered a number of suggestions for areas to consider in the future and particular strengths and challenges associated with Science Stars. These included the possibility of:

- Adding a short additional training session several weeks on from the initial training to ensure expectations and processes are being implemented;
- Ensuring that tutor RAG rating of progress is happening regularly so that these can be used as an early indicator of any issues;
- Providing dedicated spaces and rooms for Science Stars, both to minimise logistical challenges and to reinforce the importance of the programme through a dedicated learning space;
- Reviewing the curriculum ordering of Science Stars to provide a greater level of consistency with the school's curriculum sequencing;
- Providing contact details (e.g. direct phone numbers) more readily for the tutors and in-school lead to ensure that they are able to liaise on the day of the sessions if needed.

In general, both of these stakeholders were highly positive about the value and potential impact of the programme, seeing it as a unique opportunity for young people to develop their skills and boost their chances of academic success. In particular, the relatively intensive nature of the intervention was highlighted (both through the small group sizes and the number of sessions), as well as the quality and enthusiasm of the tutors involved in the pilot.

The generally positive assumptions about the impact of the programme in feedback from all parties is reflected in the trends of the quantitative data.

Of particular interest may be academic self-efficacy. Many of the tutors expressed that the pupils' challenge was not necessarily knowledge, but the skill to apply it with confidence. This would appear to have been borne out in the results of the non-cognitive evaluation, where self-efficacy was the metric that saw the largest improvement for participants relative to the control group.

Overall, the core design of the programme and its curriculum appeared to be aligning well with the programme theory of change and intended objectives.

Conclusions

"There is a strong evidence base for the impact of small group tutoring approaches in general, and we are delighted to have worked with St George's to support the evaluation design and impact analysis of their Science Stars programme. Although the cohort is relatively small, the difference seen across several assessment points and the headline difference of over a grade in GCSE results between Science Stars participants and the matched control group provide strong indicators to suggest that Science Stars can make a meaningful contribution to improving outcomes for young people from underrepresented backgrounds at a key transition point in their lives."

Owen Carter, Co-Founder and Managing Director of ImpactEd

"The Science stars programme has been an excellent addition to the super-curricular opportunities available to the students of Ernest Bevin College. In its pilot year over 20 students participated and all benefited from the programme, in both examination results and personal development in their learning. As the programme rolls into its second year, it was significantly over-subscribed and the lucky few involved have already expressed their appreciation for Science Stars. I am fully expecting to see the positive outcomes of it in the forthcoming mock examinations and later on in their summer GCSEs."

James Dennett, lead teacher within Ernest Bevin College

The findings of Science Stars' pilot evaluation are strongly promising. Statistically significant effects on academic attainment were observed, suggesting the potential of the programme to deliver meaningful improvement for young people across their GCSE Science examinations. The reinforcement of these trends by non-cognitive data suggests that this movement is being achieved not only through successful acquisition and practice of knowledge, but through attitudinal changes towards the content of Science subjects.

The overall sample size was relatively small and the programme took place in one school only. As a consequence the evaluation findings should not necessarily be taken as fully generalizable; it is not yet known if Science Stars will scale to other school settings. However, within these confines the results were extremely positive. Some key findings were:

- Attainment in Science GCSEs was highest for participants that completed the Science Stars programme in full, both in terms of raw marks and overall grades. However, even participants that joined late, completing only part of the programme, tended to perform better than those who dropped out early or were in the control group of non-participants.

- Over the course of the programme, Science Stars participants showed increased metacognition and self-efficacy relative to an overall decrease in the control group, and decreased test anxiety relative to an overall increase in the control group. This suggests that participation in the programme may have helped to sustain or improve non-cognitive skills that have been found to underpin success in school.

- A process evaluation elicited positive feedback from a variety of stakeholder groups, reaffirming the success of the programme at fulfilling its intended objectives.

As a result of these promising findings, St George's, University of London has committed to continued investment in the Science Stars programme until at least 2024-25, setting a target in its Access & Participation Plan[5] that over the next five years participants will maintain, on average, an improvement of at least one third of a grade in their GCSE Science exams compared to a control group. Eighteen pupils have already enrolled in the 2019-20 programme, which has been adapted in response to the feedback in this report. SGUL is also renewing its partnership with ImpactEd, ensuring that rigorous and responsive evaluation of the programme will continue, supporting an evidence-led approach to implementation.

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[5] St George's, University of London Access and Participation Plan 2020-21 to 2024-25