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action tutoring

A review of the evidence needed to place a full economic value on Action Tutoring's work

Ciara Lenoach, Beth Hancock and Maureen O'Reilly

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Contents

Context & approach

About Action Tutoring (AT)

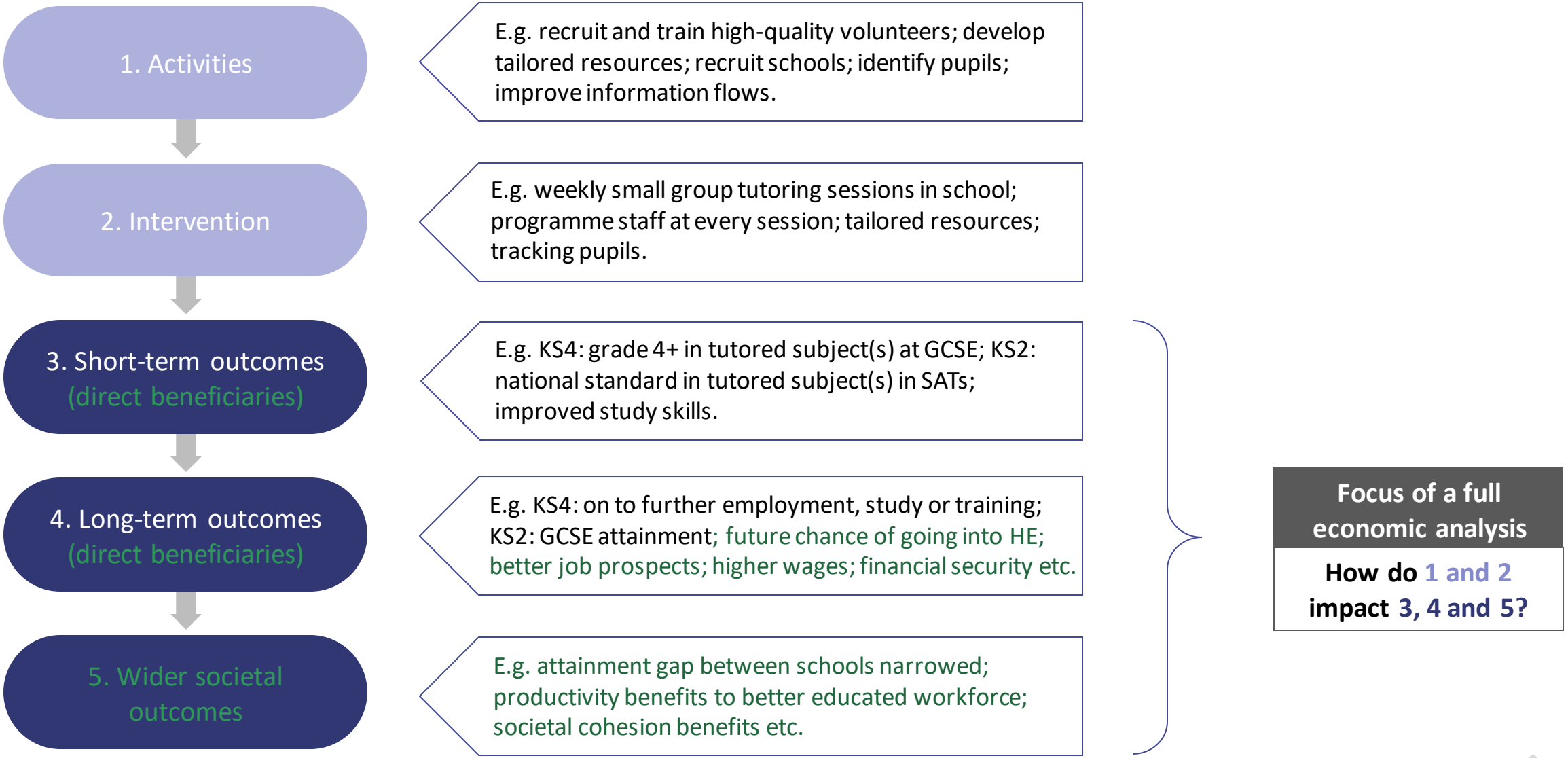
- AT targets pupils eligible for the Pupil Premium (have been eligible for Free School Meals at any point in the last six years), and at risk of not passing key GCSEs.
- AT trains volunteers to deliver tutoring sessions in primary and secondary schools on English and/or Maths.
- The average pupil:tutor ratio is 2:1.
- AT worked with 80 schools across seven cities in England to deliver 27,000 hours of tutoring by circa 1,100 volunteers in 2017/18.
- In secondary schools, 1,538 secondary school pupils received help with their Maths and/or English GCSEs and 945 primary school pupils received help with their Maths and/or English SATs in 2017/18.

Action Tutoring asked Pro Bono Economics to assess whether the charity holds sufficient data to place a monetised or full economic value on its work. In particular, the following research question was posed:

"Does Action Tutoring collect/hold sufficient data and evidence to facilitate a robust economic analysis which could put a monetised value on the impact achieved by its intervention for direct beneficiaries and in turn wider society?"

These slides set out our research and recommendations in answering this question and describes our suggested next steps.

It is helpful to map our question on to AT's theory of change



Note: We have made suggested additions in green to Action Tutoring's theory of change to help answer our question

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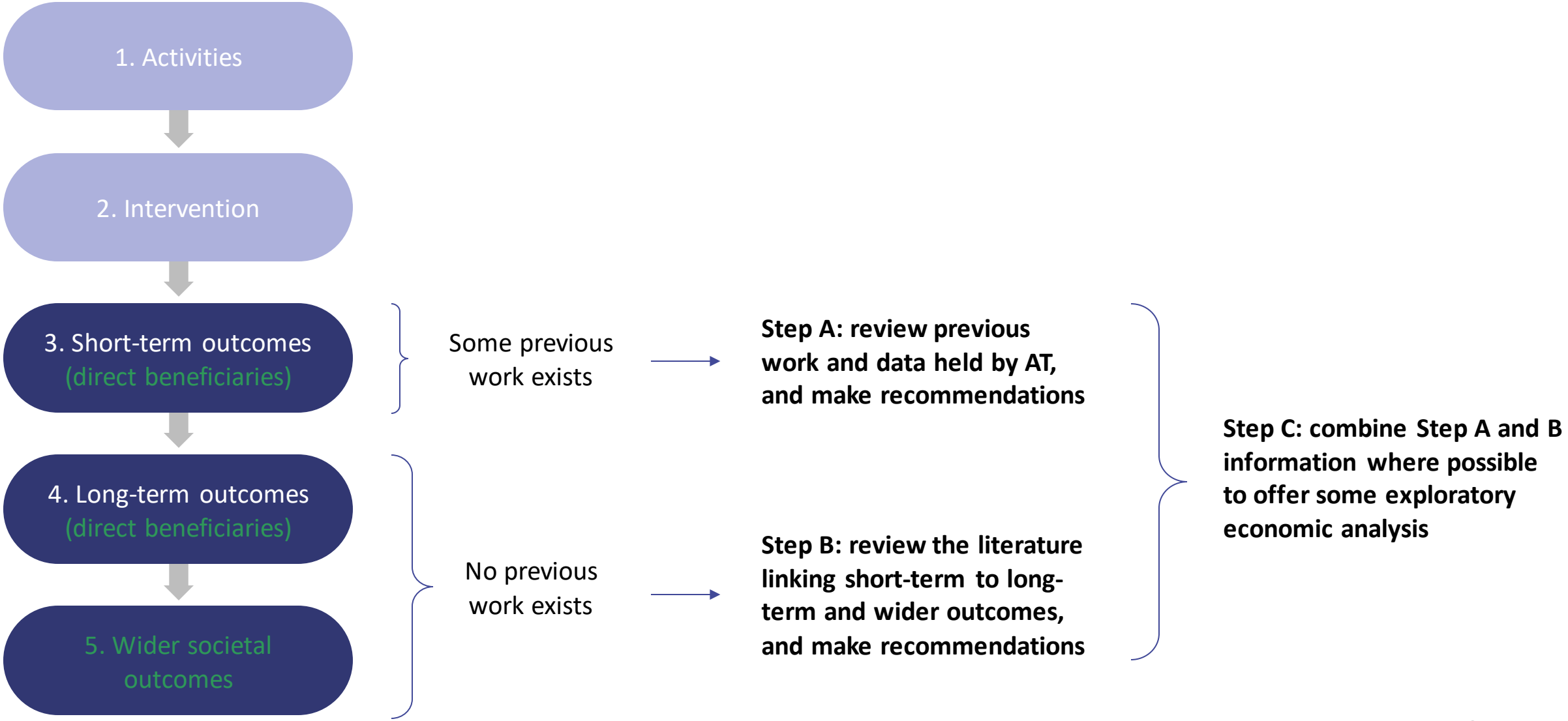
The theory of change guides our approach in these slides



Note: We assume 1-5 are consecutive. As a result, a robust economic analysis of the link between Action Tutoring and short-term outcomes is needed *before* long-term outcomes and *then* wider societal outcomes can be assessed.

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The theory of change implies that we focus on two areas

1. Action Tutoring's work in secondary schools. This is for two key reasons:
   - The full economic impact of primary school interventions will depend on the impact they have had on secondary school performance. As a result, it makes sense to first consider secondary school interventions, secondary school outcomes and long-term outcomes.
   - The long-term evidence and literature we rely on to consider steps 4 and 5 focuses primarily (if not solely) on secondary school outcomes.
2. The impact to direct beneficiaries. This is again because a robust economic analysis of the direct benefits is needed to inform the wider societal impacts.

Step A: Short-term outcomes*

**short-term outcomes refers to outcomes at the end of KS4.*

In this section we:

1. Outline the core challenge: finding data that best approximates the short-term outcomes for each tutored pupil if they had not received Action Tutoring (AT) support
2. Summarise the data AT currently holds that could be used to address this core challenge.
3. Assess the work that has been done previously by Action Tutoring to try and address this core challenge.
4. Provide our recommendations on the additional data and/or ways of using existing data to better address the core challenge and arrive at a robust assessment of the economic impact of AT on short-term outcomes.

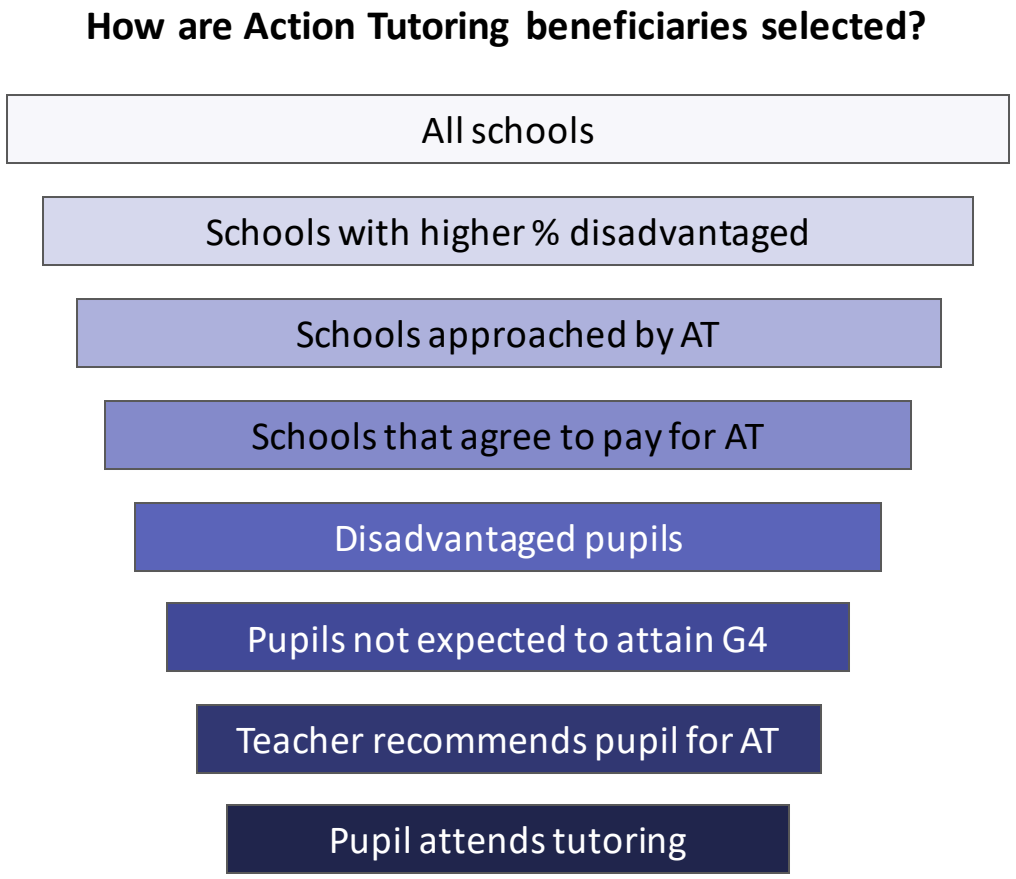
The core challenge: what would have happened at the end of KS4 without Action Tutoring?

We need to be able to isolate the impact of AT from all the different family, school and individual circumstances facing each child that also affect their KS4 outcomes. Put a different way, we need to know what each child would have achieved at KS4 if the only difference they faced was whether or not they had AT.

However, in reality it is not possible to observe this: each individual either goes to AT or they do not. As a result, we need to find and use the best data to construct an approximation for each child (the "counterfactual" or "comparator group").

The data needs to address some key “confounding factors”

- Confounding factors are characteristics of pupils and schools that could change the nature of the relationship between participation in the AT programme and student attainment.
- This is a really important issue in assessing AT’s impact because neither the schools nor the pupils that participate are selected at random.
- Importantly, many of the factors associated with the selection of beneficiaries are hard to observe and unlikely to be directly captured in the National Pupil Database. For example, pupil or school motivation.
- Unless these factors are appropriately controlled for we can’t be sure whether the estimated differences in outcomes between AT beneficiaries and other groups of pupils are due to the AT program or underlying “confounding factors”.



If these factors are not addressed, we could over- or under-estimate Action Tutoring's true impact

Confounding factor	Why this might over-estimate	Why this might under-estimate
Schools with a higher proportion of disadvantaged pupils	-	A disadvantaged pupil at a school with many disadvantaged pupils may be expected to perform worse
Schools that are approached by AT	The school is more likely to be in London, where GCSE grades are higher on average	-
Schools that agree to pay for AT	The school may be highly committed to either attaining good results or supporting disadvantaged pupils	The school may be especially concerned about this year's results
Pupils who are disadvantaged	-	Disadvantaged pupils have been shown to achieve lower GCSE grades than the national average
Pupils who are not expected to attain a Grade 4	-	Pupils with a lower starting point are expected to achieve lower GCSE grades than the national average
Pupils who the teacher thinks could benefit from AT	Teacher could perceive these pupils to be more motivated	Teacher could be more concerned about these pupils' results
Pupils who show up	Pupils who show up could be more motivated	Pupils who show up could be more concerned about their GCSEs

We have information about the intervention that is some help in identifying a comparator group

- **Population of focus:** pupils eligible for the Pupil Premium (have been eligible for Free School Meals at any point in the last six years), and at risk of not passing key GCSEs.
- **Nature of intervention**: 15-20 pupils are supported on a programme by 8-10 volunteer tutors. Each tutoring session lasts for 1-1.5 hours, where pupils receive support for either maths or English, or both subjects.
- Action Tutoring also collects data on individual pupils before the intervention, during the intervention and after the intervention to help narrow in further. This is covered on the next slide.

We also know Action Tutoring currently collect the following data about its tutored pupils

Data collection point	Type of data	Data collected
Before intervention	General Information	• Full name • Date of birth • Gender • School year • Unique pupil number
	Eligibility for Action Tutoring	• Pupil Premium status • Exceptions criteria
	Baseline assessment	• Working-at grades • Areas need most support to produce 'gap report'
During intervention	Halfway assessment	• Working-at grades • Areas still need most to produce 'gap report'
After intervention	Short-term outcome	• The GCSE grade in the tutored subject(s)
	Other outcome data	• "Soft skills" including subject confidence

Previous work has used this information and external data to construct comparator groups and estimate impact

We have reviewed the following work with a view to understanding whether it can provide a robust assessment of short-term impact (i.e. steps 1-3 in the theory of change):

- NIESR (2016) "Action Tutoring's small-group tuition programme: an impact evaluation using statistical comparison groups"
- Nesta (2019) "Action Tutoring Case Study"
- Chris Percy (2019) "Action Tutoring Grade Outcome Drivers: 2019 analysis"
- Impetus (2018) "Backing the Best: Our work with Action Tutoring"

The table on the next page summarises what these studies can tell us.

Source	Headline findings	Caveats
NIESR (2016)	AT leads to average increase in GCSE point score of 2 points. This is roughly a third of a letter grade (on the basis that the difference between 2 letter grades is 6 points). Greater average impact in maths (2-2.5 points) vs. English (1.5 points). But no statistically significant impact on probability of achieving Grade C+.	Only valid if the school and pupil characteristics that drive programme participation and/or influence outcomes are successfully balanced across treatment and comparison groups – but some of these characteristics are unobservable. Not conclusive evidence of no effect – the research is not clear on the likelihood to have been insufficiently powered in relation to the grade C outcomes because the sample size may not have been large enough.
Impetus (2018)	Action Tutoring pupils attending ten or more sessions achieved on average a third of a grade more than similar peers at GCSE.	Only valid if the school and pupil characteristics that drive programme participation and/or influence outcomes are successfully balanced across treatment and comparison groups – but some of these characteristics are unobservable.
Chris Percy (2019)	There is a dose-response (i.e. more tutoring= bigger impact) relationship between number of tutoring sessions attended and estimated impact. The programme is most effective in London.	Attendance is expected to be highly correlated with pupil motivation and the school's engagement with the programme. Note: This is not a programme impact evaluation. It is an internal programme analysis without reference to an external control group.
Nesta (2019)	11.5 percentage point uplift in the proportion of pupils passing GCSE English or maths (i.e. receiving level 4) in those who received at least 10 tutoring sessions.	Comparison is based on England-wide data, but half of Action Tutoring schools are in London, where attainment is higher. Only valid if the school and pupil characteristics that drive programme participation and/or influence outcomes are successfully balanced across treatment and comparison groups – but some of these characteristics are unobservable.

These studies offer useful information but further work is needed to robustly assess short-term impact

- These studies suggest there is a positive and significant impact on the grades achieved, and arguably an impact on the probability of achieving Grade C+.
- However, all of these studies rely on comparing AT students against control groups constructed using observable characteristics from the National Pupil Database.
- This means that they are not controlling for the unobservable characteristics that could be important drivers of KS4 outcomes.
- The next slides recommend three alternative approaches to assessing short-term impact that would go some way towards addressing this challenge.

To address this, we suggest three alternative approaches to constructing the comparator group

The following slides consider the merits of three different alternative ways to construct a comparator group:

A – Pupils at intervention school from last year	B – Random selection within school	C – Pupils at a delayed intervention school

Our recommendations recognise the need to manage the trade-off between economic robustness against the practical constraints Action Tutoring is likely to face collecting the data needed to execute the approaches.

A: pupils at intervention school last year

- This approach to the comparator group is a **“before and after study”**: a comparison between the outcomes of pupils within a particular school in an intervention year and a non-intervention year.
- It helps control for some school-specific characteristics (such as motivation of teaching staff) but there remains a risk that this could change over time (for example, with staff turnover).
- The approach and data needed are summarised on the next slide.

A: pupils at intervention school last year

#	Intervention group	Comparator group	Methodology issues	Additional data AT needs	Acceptability to participating schools
-	Disadvantaged pupils at the AT school this year (whether or not they were selected for AT)	Disadvantaged pupils at the AT school last year (i.e. those with similar grade prospects*)	There could have been relevant changes in the school quality for the two cohorts. This method can only be applied to new schools that AT is working with.	One year of pupil data for cohort that do not ever participate in the programme or access to data from the National Pupil Database (NPD).	Permission must be obtained from Department for Education to access NPD and consent provided by beneficiaries to use their data in this way.

* Note: There could have been national changes since last year (e.g. the exam paper is easier/harder). This issue could potentially be controlled for using a "difference-in-difference" approach where the improvement in grades for a school entering the Action Tutoring programme is compared against the improvement in grades seen in similar schools elsewhere.

B: random selection within intervention school

- This approach to the comparator group is a **"randomised control trial"**: eligible pupils within each school are randomly assigned to the intervention. The control group is the group of eligible but non-assigned pupils.
- Random assignment is the gold standard to the core challenge: if there is a sufficiently large sample then impacts of all confounding factors can be neutralised.
- The approach and data needed are summarised on the next slide.

B: random selection within intervention school

#	Intervention group	Comparator group	Methodology issues	Additional data AT needs	Acceptability to participating schools
-	Pupils selected for AT who are randomly assigned to the intervention group.	Pupils selected for AT who are randomly assigned to the control group.	Need a sufficiently large sample to detect significant effects – likely to be 100s of pupils across multiple schools.	Data on the outcomes of eligible but randomly non-assigned pupils either direct from the school or from the National Pupil Database.	May be considered unethical/unfair to assign randomly rather than supporting the students who need program most. Need consent from both participants and non-participants to use their data.

C: pupils at a delayed intervention school

- This approach to the comparator group is a **"cluster randomised control trial":** schools selected to participate in AT are randomly selected to start this year or the following year. The outcomes of those starting this year (following the intervention) are compared to those starting next year (before intervention)
- This is an alternative approach to random assignment: instead of randomly assigning treatment within a school, you randomly assign treatment across schools. This reduces some of the ethical and administrative challenges associated with random selection within schools.
- The approach and data needed are summarised on the next slide.

C: pupils at a delayed intervention school

#	Intervention group	Comparator group	Methodology issues	Additional data AT needs	Acceptability to participating schools
1	Pupils selected for AT at an intervention school.	Pupils selected for AT at a delayed intervention school.	This method can only be applied to new schools that AT is working with.	One year of pupil data for cohort that do not ever participate in the programme.*	Requires permission from Department for Education to access data and consent from participants to use their data in this way. May be considered unethical/unfair to delay support.
2	Disadvantaged pupils at an intervention school (whether or not they were selected for AT).	Disadvantaged pupils at a delayed intervention school.	This method can only be applied to new schools that AT is working with.	One year of pupil data for disadvantaged pupils that do not ever participate in the programme. *	As above Wouldn't need to ask schools to select pupils who would never receive intervention.

* Note: greater sample size required compared to an individually randomised approach

Summary

- There is a **trade-off between robustness and data requirements.**
- We suggest an **"experimental approach"** involving collection of additional data is the best way to increase the robustness of the existing short-term impact estimates, given the limitations of constructing a comparator group using external data such as the National Pupil Database.
- We have **suggested three ways to do this**, each with different data requirements. **The key uncertainty is the acceptability to participating schools**.
- The table on the next slide summarises these considerations for each approach.
- We suggest these options **should be scoped up further, tested with schools and considered as part of Action Tutoring's future impact work**.

#	Intervention group	Comparator group	Methodology issues	Additional data AT needs	Acceptability to participating schools
A	Pupils at intervention school last year	All disadvantaged pupils	Moderate	Moderate	Moderate
B	Other pupils at intervention school	AT pupils	High	Low	Low
C1	Pupils at a delayed intervention school	AT pupils	High	Low	Low
C2	Pupils at a delayed intervention school	All disadvantaged pupils	Moderate	Low	Low

Step B: Long-term outcomes*

**long-term outcomes refers to all outcomes for direct beneficiaries and wider society after secondary school.*

In this section we:

1. Outline the challenge associated with assessing long-term impacts.
2. Assess the literature linking short-term outcomes to long-term outcomes for direct beneficiaries and wider society (i.e. steps 4 and 5 of the theory of change).
3. Provide recommendations on additional short-term outcome data (in addition to the recommendations in Step A) to help link Action Tutoring's work to long-term outcomes in the future.

Understanding long-term outcomes is inherently more challenging

It is not feasible for Action Tutoring to collect data on the long-term outcomes of pupils they work with.

As a result, approaches to assessing the long-term impact of Action Tutoring's work on direct beneficiaries and wider society need to rely on literature linking short-term outcomes to long-term outcomes.

Long-term impact for direct beneficiary	=	**STEP A**: Estimate of impact of Action Tutoring on short-term outcome	X	**STEP B**: Impact of short-term outcome on long-term outcome

To make these links we need:

- Robust estimates of the impact of Action Tutoring on short-term outcomes;
- Those robust estimates to cover the same short-term outcomes as those used in the long-term outcomes literature; and
- The magnitude of the short-term impacts of Action Tutoring to be sufficiently large for any long-term impact to be meaningful.

To be robust, the Step B literature needs to address the same core challenge as in Step A: what long-term outcomes would the individual have achieved without the KS4 results they have?

The existing literature provides some useful estimates

The literature on the impact of KS4 outcomes on long-term outcomes for direct beneficiaries or wider society is relatively out-of-date.

We have reviewed the following key studies:

- Department for Education (2014) "The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships"
- Department for Business, Innovation and Skills (2011) "Returns to Intermediate and Low Level Vocational Qualifications"
- Greenwood et al. (2007) "The Returns to Qualifications in England: Updating the Evidence Base on Level 2 and Level 3 Vocational Qualifications"
- Impetus-PEF (2014) "Make NEETs history in 2014"

The table on the next page summarises what these studies can tell us.

Source	Short-term outcome used	Long-term outcome measured	Headline findings	Caveats
Department for Education (2014)	The impact of different bundles of good GCSEs (A*-C): • 1-2 GCSEs • 3-4 GCSEs • 5-7 GCSEs • 8+ GCSEs	Lifetime earning gains (direct beneficiary) Lifetime productivity gains (wider society)	Individuals acquiring five or more good GCSEs (including English and maths) as their highest qualification are estimated to have lifetime productivity gains worth around £100,000 on average compared to those with below level 2 or no qualifications. Individuals who just cross the five good GCSE threshold have considerable lifetime productivity gains compared to those who don't. Men holding 5-7 good GCSEs (including English and maths) as their highest qualification have lifetime productivity gains worth around £73,000 compared to those with only 3-4 good GCSEs; for women the figure is £55,000.	Based on old GCSE system so unclear how relevant for new grading system. Analysis before significant increase in minimum wage that will have altered returns.
Department for Business, Innovation and Skills (2011)	Five or more good GCSEs (A*-C)	Lifetime earning gains (direct beneficiary)	Individuals who gain five or more good GCSEs as their highest qualification have marginal wage returns of 15%.	Focuses on GCSEs as highest qualification i.e. is lower bound estimate.
Greenwood et al. (2007)	Five or more good GCSEs (A*-C)	Lifetime earning gains (direct beneficiary) Lifetime employment (direct beneficiary)	Individuals who gain five or more good GCSEs as their highest qualification have marginal wage returns of 21%. Individuals who gain five or more good GCSEs as their highest qualification have employment return (i.e. increase in likelihood of being in employment) of 16 percentage points compared to individuals who hold no qualifications.	Focuses on GCSEs as highest qualification i.e. is lower bound estimate.
Impetus-PEF (2014)	N/A	Lifetime earnings (direct beneficiary)	A young person who experiences a period NEET will, on average, lose £50,000 in lifetime earnings compared to a peer who doesn't experience a period NEET. For the 120,000 young people estimated to be NEET this adds up to a total individual cost of £6.4 billion. This has a long-term cost to the economy in lost taxes, youth crime and poor health of over £77billion: over ten times the cost to all individuals.	Cannot simply translate to the positive impact of leaving school with qualifications: inverse of absence of something is not the same as presence of it.

The literature suggests additional short-term outcome data should be collected if this information is to be used

- The literature all focuses on achieving A*-Cs across a bundle of GCSEs rather than the impact of a single GCSE. Furthermore, many studies use five GCSEs at A*-C including English and Maths.
- This focus is not surprising given Governments have historically targeted these metrics and increasingly school outcomes are now reported based on attainment of the English Baccalaureate or Attainment 8 scores which are also bundles of GCSE outcomes.
- Action Tutoring does not currently capture data on what grades were achieved in other GCSEs beyond those that an individual is tutored for. As such they are unable to report outcomes in terms of overall bundles.
- We therefore suggest Action Tutoring should start to collect this data as part of their standard pupil outcome data.
- We also suggest Action Tutoring should encourage further, more up-to-date work to build the evidence base on the long-term impacts of KS4 outcomes.

Step C: Exploratory economic scenario analysis

In this section we:

- Provide some exploratory economic analysis for purely illustrative purposes that estimates:
  - the marginal economic value of achieving an additional 'good' GCSE based on data from the DfE;
  - some scenarios for the potential increased likelihood of achieving a 'good' GCSE following support from AT, and;
  - a scenario analysis that combines these to give a crude estimate of the broad scale of per-pupil economic value of AT's work.
- This scenario analysis offers an indication of the order of magnitude of the benefits of AT's work based on the existing evidence. These estimates are only intended for internal use to help assess the value of undertaking additional analysis as recommended in Step A and Step B to produce robust and usable figures.

Estimates by the DfE give us an estimate of the marginal economic impact of one good GCSE

- There is some variation in the estimated economic impact of one additional good GCSE (historically defined as A*-C), depending on the starting number of good GCSEs.
  - However, there is some consistency in the estimates for pupils starting with between 1 and 4 good GCSEs – we provisionally assume an impact on lifetime productivity of around £27k (average of £26k and £28k) for an additional good GCSE.
  - This means that a 10% improvement in the probability of obtaining a good GCSE could be worth around £2,700 in future increases in productivity.

Increase in number of 'good' GCSEs (A*- C)	**Average improvement in lifetime earnings**	**Implied average increase in number of good GCSEs**	**Implied increase in lifetime earnings per one additional good GCSE (e.g. £140k *(1/1.5) = £93k)**
0 to 1-2	£140k	0 to 1.5 = 1.5	£93k
1-2 to 3-4	£55k	1.5 to 3.5 = 2	£28k
3-4 to 5-7	£64k	3.5 to 6 = 2.5	£26k
5-7 to 8+	£18k	6 to 9* = 3	£6k

We can use existing studies to inform scenarios for the potential increased likelihood of achieving a good GCSE with Acton Tutoring

The Nesta study (2019) suggests an increase of 11.5 percentage points in the likelihood of achieving a good GCSE following support from AT

Note: this study is associated with some notable limitations that mean this estimated impact may be unreliable, for example:

- This estimate is for pupils who attend 10 or more sessions
- This estimate is only valid if the school and pupil characteristics that drive programme participation and/or influence outcomes are successfully balanced across treatment and comparison groups – but some of these characteristics are unobservable

However, we look at scenarios that attribute between 25% and 75% of the suggested 11.5 percentage point increase to AT.

Therefore, for the purposes of this scenario analysis, we assume that support from AT is associated with between a 3 and 9 percentage point improvement in the likelihood of obtaining an additional good GCSE.

NOTE: these numbers are indicative to inform internal AT discussions and we strongly recommend additional short-term analysis is undertaken before these 'ballpark' figures are used.

On this basis we can generate a crude range of estimates for the per-pupil economic impact of AT

This is calculated as:

- The increase in the likelihood of achieving a good GCSE x the lifetime economic impact of achieving an additional good GCSE

At the lower end of the range:

- Scenario 1: 3% improvement in probability of getting a GCSE x £27k = ~£800

At the upper end of the range:

- Scenario 2: 9% improvement in probability of getting a GCSE x £27k = ~£2,400

These scenarios suggest that the scale of long-term economic benefit per pupil supported for more than 10 hours by AT could be in the region of £800 to £2,400.

These figures provide an indicative order of magnitude and should be treated with caution!

These figures provide an indicative order of magnitude that should be treated with caution

These estimates are indicative only given they are based on some of the data covered in Step A and Step B which we noted has some methodological challenges.

The next section covers our recommendations to make more robust estimates of AT's economic impact.

Summary of recommendations

Returning to our original research question:

“Does Action Tutoring collect/hold sufficient data and evidence to facilitate a robust economic analysis which could put a monetised value on the impact achieved by its intervention for direct beneficiaries and in turn wider society?”

- Action Tutoring does not currently have sufficient data to carry out a full economic analysis i.e. to place monetary value on short and long-term impact for direct beneficiaries and/or wider society.
- We have made five categories of recommendations to support Action Tutoring in doing this.
- We have used the Theory of Change to suggest where Action Tutoring should prioritise their efforts.
- We have provided some very indicative scenario analysis to illustrate the potential order of magnitude of Action Tutoring’s intervention which is only intended to inform internal discussion and not for wider use.
- However, we would caution that should more robust short-term impact analysis reveal relatively small effects, Action Tutoring may wish to consider if their intervention is strong enough or use other techniques (for example, threshold analysis) to communicate impact.

Recommendations	Rationale (i.e. relevance to research question)
Theory of Change • Augment to include wider set of long-term outcomes for beneficiaries and wider society; • Augment to include indirect effects of intervention; and • Use to develop Action Tutoring's evidence strategy	• The current Theory of Change does not comprehensively cover long-term outcomes. • To understand and guide Action Tutoring's recent efforts to collect data on the impact of their intervention on "soft skills" and confidence. • The Theory of Change provides the basic logic chain from intervention to impact. It also provides a rough set of chronological steps for economic analysis and therefore should be used as the basis of Action Tutoring's evidence-gathering and impact analysis efforts.
Short-term impact analysis: • Focus on improving KS4 short-term impact analysis • Scope "experimental" approaches	• The (direct) impact of AT primary school interventions on long-term outcomes will be mediated through impact on secondary school performance. • These approaches better address "core challenge" but require additional data from schools.
Additional short-term impact data: • Start collecting equivalent of five A*-C including English and Maths as core short-term outcome variable	• This is the focus of the long-term outcome literature i.e. needed to make the link. • Given Government focus on this outcome, this may also be useful for the purpose of communicating the value of Action Tutoring's work to Government, donors etc.
Consider changes to intervention: • Depending on magnitude of robust short-term impact estimates	• If a robust short-term analysis finds small magnitude, consider changes to intervention. • This may also be supported by evidence of dose-response from Chris Percy's (2019) analysis.
Understanding long-term impacts: • If find large short-term effects, use literature • Encourage partner research institutions to update	• Can get "sense of scale" or "ballpark" initial estimates for long-term impact. • Existing literature linking KS4 to long-term outcomes should be updated to ever arrive at more robust estimates of full economic impact of Action Tutoring's work.