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Sutton Trust - EEF Teaching and Learning Toolkit

Spring 2013

APPROACH	COST ESTIMATE	EVIDENCE ESTIMATE	AVERAGE IMPACT	SUMMARY
Ability grouping	£ £ £ £ £	★ ★ ★ ★ ★	- 1 Month	Negative impact for very low or no cost, based on moderate evidence.
After school programmes	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Low impact for high cost, based on limited evidence.
Arts participation	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Low impact for low cost, based on moderate evidence.
Aspiration interventions	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Very low or no impact for moderate cost based on very limited evidence.
Behaviour interventions	£ £ £ £ £	★ ★ ★ ★ ★	+ 4 Months	Moderate impact for very high cost, based on extensive evidence.
Block scheduling	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Very low or negative impact for very low of no cost, based on limited evidence.
Collaborative learning	£ £ £ £ £	★ ★ ★ ★ ★	+ 5 Months	Moderate impact for very low cost, based on extensive evidence.
Digital technology	£ £ £ £ £	★ ★ ★ ★ ★	+ 4 Months	Moderate impact for high cost, based on extensive evidence.
Early years intervention	£ £ £ £ £	★ ★ ★ ★ ★	+ 6 Months	Very high impact for very high costs, based on extensive evidence.
Extended school time	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Low impact for moderate cost, based on limited evidence.
Feedback	£ £ £ £ £	★ ★ ★ ★ ★	+ 8 Months	Very high impact for low cost, based on moderate evidence.
Homework (Primary)	£ £ £ £ £	★ ★ ★ ★ ★	+ 1 Month	Low impact for very low or no cost, based on moderate evidence.
Homework (Secondary)	£ £ £ £ £	★ ★ ★ ★ ★	+ 5 Months	Moderate impact for very low or no cost, based on moderate evidence.
Individualised instruction	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Low impact for low cost, based on moderate evidence.
Learning styles	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Low impact for very low cost, based on moderate evidence.
Mentoring	£ £ £ £ £	★ ★ ★ ★ ★	+ 1 Month	Low impact for moderate cost, based on moderate evidence.
Meta-cognition and self-regulation	£ £ £ £ £	★ ★ ★ ★ ★	+ 8 Months	High impact for low cost, based on extensive evidence.
One to one tuition	£ £ £ £ £	★ ★ ★ ★ ★	+ 5 Months	Moderate impact for high cost, based on extensive evidence.
Parental involvement	£ £ £ £ £	★ ★ ★ ★ ★	+ 3 Months	Moderate impact for moderate cost, based on moderate evidence.
Peer tutoring	£ £ £ £ £	★ ★ ★ ★ ★	+ 6 Months	High impact for low cost, based on extensive evidence.
Performance pay	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Low or no impact for moderate cost, based on very limited evidence.
Phonics	£ £ £ £ £	★ ★ ★ ★ ★	+ 4 Months	Moderate impact for very low cost, based on extensive evidence.
Physical environment	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Very low or no impact for low cost based on very limited evidence.
Reducing class size	£ £ £ £ £	★ ★ ★ ★ ★	+ 3 Months	Low impact for very high cost, based on moderate evidence.
School uniform	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Very low or no impact for very low cost, based on very limited evidence.
Small group tuition	£ £ £ £ £	★ ★ ★ ★ ★	+ 4 Months	Moderate impact for moderate cost, based on limited evidence.
Social and emotional aspects of learning	£ £ £ £ £	★ ★ ★ ★ ★	+ 4 Months	Moderate impact for very low cost, based on extensive evidence.
Sports participation	£ £ £ £ £	★ ★ ★ ★ ★	+ 2 Months	Moderate impact for moderate cost based on moderate evidence.
Summer schools	£ £ £ £ £	★ ★ ★ ★ ★	+ 3 Months	Moderate impact for moderate cost based on limited evidence.
Teaching assistants	£ £ £ £ £	★ ★ ★ ★ ★	0 Months	Very low or no impact for high cost, based on limited evidence.

The Sutton Trust-EEF Teaching and Learning Toolkit is an accessible summary of educational research which provides guidance for teachers and schools on how to use their resources to improve the attainment of disadvantaged pupils.

The Toolkit currently covers 30 topics, each summarised in terms of their average impact on attainment, the strength of the evidence supporting them and their cost.

The Toolkit is a live resource which will be updated on a regular basis as findings from EEF-funded [projects](#) and other high-quality research become available. In addition, we would welcome suggestions for topics to be included in future editions. If you have a topic suggestion, or any other comments or questions about the Toolkit, please contact Robbie Coleman at robbie.coleman@eefoundation.org.uk.

Why is research useful?

We know that the relationship between spending and pupil outcomes is not simple. Nationally a 68% spending increase over the past decade has led to only marginal increases in pupil outcomes. At school level, it is clear that different ways of spending school budgets can have very different impacts on pupil attainment, and choosing what to prioritise is not easy. Even once a decision to implement a particular strategy has been taken there are a wide variety of factors which determine its impact. We believe that educational research can help schools get the maximum "educational bang for their buck", both in terms of making an initial choice between strategies, and in implementing a strategy as effectively as possible.

One particular spending decision which research can inform is how to spend the Pupil Premium. Introduced in 2010, the aim of the Pupil Premium is to raise achievement among disadvantaged children. It provides additional funding to schools for disadvantaged pupils to ensure they benefit from the same educational opportunities as pupils from wealthier families. In 2012-13 the Pupil Premium is worth £623 per child, and by 2014-15 this is expected to rise to approximately £1,200 per child. If the Pupil Premium is to succeed in achieving its ambitious goals, the choices that schools make in allocating the money are of vital importance.

Average impact

Average impact is estimated in terms of additional months progress you might expect pupils to make as a result of an approach being used in school, taking average pupil progress over a year as a benchmark.

For example, research summarised in the Toolkit shows that improving the quality feedback provided to pupils has an average impact of eight months. This means that pupils in a class where high quality feedback is provided will make on average eight months more progress over the course of a year compared to another class of pupils which were performing at the same level at the start of the year. At the end of the year the average pupil in a class of 25 pupils in the feedback group would now be equivalent to the 6th best pupil in the control class having made 20 months progress over the year, compared to an average of 12 months in the other class.

These estimations are based on 'effect sizes' reported in British and international comparative data (see table below). Effect sizes are quantitative measures of the impact of different approaches on learning. The Toolkit prioritises systematic reviews of research and quantitative syntheses of data such as meta-analyses of experimental studies. To be included in the analysis an approach needed to have some quantifiable evidence base for comparison.

Months' Progress	Effective Size From...	...to	Description
0	-0.01	0.01	Very Low or no effect
1	0.02	0.09	Low
2	0.10	0.18	Low
3	0.19	0.26	Moderate
4	0.27	0.35	Moderate
5	0.36	0.44	Moderate
6	0.45	0.52	High
7	0.53	0.61	High
8	0.62	0.69	High
9	0.70	0.78	Very High
10	0.79	0.87	Very High
11	0.88	0.95	Very High
12	0.96	>1.0	Very High

Cost

Cost estimations are based on the approximate cost of implementing an approach in a class of twenty five pupils. Where the approach does not require an additional resource, estimates are based on the cost of training or professional development which may be required. Approaches marked with £££ or less could be funded from the 2012-13 pupil premium allocation of £623 per eligible pupil.

£	<i>Very low:</i> up to about £2,000 per year per class of 25 pupils, or less than £80 per pupil per year.
££	<i>Low:</i> £2,001-£5,000 per year per class of 25 pupils, or up to about £170 per pupil per year.
£££	<i>Moderate:</i> £5,001 to £18,000 per year per class of 25 pupils, or up to about £700 per pupil per year. This represents the 2012/13 Pupil Premium allocation (£623).
££££	<i>High:</i> £18,001 to £30,000 per year per class of 25 pupils, or up to £1,200 per pupil.
£££££	<i>Very High:</i> over £30,000 per year per class of 25 pupils, or over £1,200 per pupil. By 2014/5, the Pupil Premium is projected to rise to approximately £1,200 per pupil.

Evidence

Evidence estimates are based on: the availability of evidence (i.e. the number of systematic reviews or meta-analyses and the quantity of primary studies which they synthesise); the methodological quality of the primary evidence; the magnitude of the impact (in terms of effect size); and the reliability or consistency of this impact across the studies reviewed.

Rating	Description
★	<i>Very limited:</i> Quantitative evidence of impact from single studies, but with effect size data reported or calculable. No systematic reviews with quantitative data or meta-analyses located.
★★	<i>Limited:</i> At least one meta-analysis or systematic review with quantitative evidence of impact on attainment or cognitive or curriculum outcome measures.
★★★	<i>Moderate:</i> Two or more rigorous meta-analyses of experimental studies of school age students with cognitive or curriculum outcome measures.
★★★★	<i>Extensive:</i> Three or more meta-analyses from well controlled experiments mainly undertaken in schools using pupil attainment data with some exploration of causes of any identified heterogeneity.
★★★★★	<i>Very Extensive:</i> Consistent high quality evidence from at least five robust and recent meta-analyses where the majority of the included studies have good ecological validity and where the outcome measures include curriculum measures or standardised tests in school subject areas.

Notes on the January 2013 Update

Major updates made to the Toolkit in January 2013 include:

- The addition of eight new topics: **Aspiration interventions**, **Behaviour interventions**, **Collaborative learning**, **Extended school time**, **Mentoring**, **Physical environment**, **Social and emotional aspects of learning**, **Small group tuition**.
- A full update on all existing topics to incorporate the publication of new research
- The addition of video case studies and improved links to further reading and providers of professional development via the Teacher Development Trust's *GoodCPDGuide*.

Significant changes to existing topics include:

- An adjustment of the average impact in **Feedback** from nine months to eight months. This adjustment was made following the publication of a new meta-analysis of Assessment for Learning. It suggests that gains from implementing more effective feedback are challenging to achieve in school contexts.
- Splitting Homework into **Homework (Primary)** and **Homework (Secondary)** to reflect the difference in impact according to stage.
- An adjustment of the average impact in **Sports participation** from three months to one month following the publication of two new meta-analyses.
- Adjustments to the average impact estimates for **Ability grouping**, **Block scheduling** and **School uniform**. These estimates are now given as point estimates (i.e. a single number of months progress) rather than ranges, for consistency with other summaries. Where the research shows different impacts for different groups of pupils, as in the case of **Ability grouping**, the average impact for disadvantaged students has been shown.
- Cost estimates for **Digital technology** (previously Information and computer technologies) have been reduced to moderate, based on the increasing use of cheaper laptops and tablet PCs in schools.
- Cost estimates for **One to one tuition** by an experienced teacher have been reduced to high, based on figures supplied by schools.

Who wrote the Toolkit?

The Toolkit was originally commissioned by the **Sutton Trust** and produced as the '*Pupil Premium Toolkit*' by Durham University in May 2011. The Sutton Trust-EEF Teaching and Learning Toolkit has been developed from this initial analysis, since the Education Endowment Foundation's launch in 2011.

The Toolkit is written by Professor Steve Higgins, Maria Katsipataki and Dimitra Kokotsaki (School of Education, Durham University), Professor Rob Coe (CEM Centre, Durham University), Dr Lee Elliot Major (The Sutton Trust) and Robbie Coleman (Education Endowment Foundation). The authors thank Isabella McDonald, Laura Evans and Sarah Whiteway for their help producing the January 2013 update.

Full reference: Higgins, S., Katsipataki, M., Kokotsaki, D., Coleman, R., Major, L.E., & Coe, R. (2013). The Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit. London: Education Endowment Foundation.

Like any toolkit, the Teaching and Learning Toolkit will be most useful when in the hands of professionals. The aim of the Toolkit is to support teachers to make their own informed choices and adopt a more 'evidence based' approach. The evidence it contains is a supplement to rather than a substitute for professional judgement; it provides no guaranteed solutions or quick fixes.

We believe that the Toolkit should be used as one step in a decision making process. One possible process is shown in Figure 1, below.

Figure 1. How should the Toolkit be used?



Step 1

Before identifying a new strategy and considering how to evaluate it, it is important to consider your school's context, and what you want to achieve. Much depends on your school, its teachers (their levels of knowledge and experience), and its pupils (their level of attainment and their social background). Internal data and professional judgement should be used to identify priorities.

Step 2

Having identified what you want to achieve, the summaries in the Toolkit can be used to help identify solutions. Crucially, the summaries in the Toolkit combine evidence from a range of different research studies into a single average for each area. **This average will not necessarily be the impact of this approach in your school.** Some of the approaches which are less effective on average might be effective in a new setting or if developed in a new way. Similarly, an approach which tends to be more effective on average may not work so well in a new context. However, we think that evidence of average impact elsewhere will be useful to schools in making a good 'bet' on what might be valuable, or may strike a note of caution when trying out something which has not worked so well in the past.

To take an example we have discussed with many teachers since the Toolkit was launched in 2011, the fact that the average impact of teaching assistants (TAs) is not

positive in no way means that TAs cannot have a positive impact on attainment. However, it does imply that schools might want to think carefully about the strategies they use to ensure that their TAs are deployed and supported effectively.

Step 3

As a result of the importance of context, it is crucial to use the Toolkit alongside on-going evaluations of the impact of the decisions you make, to ensure that the approaches you use are having the desired effect. To help with this step the EEF has published a [DIY Evaluation Guide](#) which provides advice for schools on how to evaluate new strategies as robustly as possible. Many changes in schools initially feel positive but have little lasting impact on learning so this step is essential.

Finally, it should be noted that the evidence summarised in the Toolkit takes educational attainment as its primary metric. Most of the measures used are traditional measures of attainment such as curriculum tests and examinations. This focus does **not** suggest that all educational aims and outcomes are captured in the literature that we have pulled together. Though we highlight impacts on other outcomes such as aspiration, attendance or behaviour where this information is available, these outcomes are not systematically recorded, or reflected, in the overall summary.

For more information, videos and supporting resources, please visit:

<http://educationendowmentfoundation.org.uk/toolkit/>

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The Education Endowment Foundation

Ability grouping

Negative impact for very low or no cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

-1
month

What is it?

Pupils with similar attainment levels are grouped together either for specific lessons on a regular basis (setting or regrouping) or as a class (streaming or tracking). The assumption is that it will be possible to teach more effectively or more efficiently with a narrower range of attainment in a class.

How effective is it?

The evidence consistently shows that while there may be some benefits for higher attaining pupils in particular subjects (with an average impact of one or two additional months progress for this group) these benefits are largely outweighed by the direct and indirect negative effects for mid-range and lower performing learners, with low attaining learners falling behind by on average one or two months a year compared with their progress in a class without segregation. In addition, research shows a clear longer term negative effect on the attitudes and engagement of low attaining and disadvantaged pupils.

There is some evidence that effective and flexible grouping for particular tasks can be beneficial, or when high-performing teachers are assigned to low attaining groups. However, more routine setting arrangements tend to undermine low attainers' confidence and the belief that effort is more important than ability. This is a clear example of what not to do if you want low-income pupils to benefit, as they are more likely to be assigned to lower attaining groups. Evidence suggests that the impact of setting is more detrimental to low attaining pupils in maths who do better in mixed attainment groups, and that ability grouping particularly affects upper primary and lower secondary education. The effects appear to be less clear-cut in other subjects, though negative effects are reported for low attaining pupils across the curriculum.

The clear exception to this overall finding is the impact of separate teaching for gifted and talented pupils, who benefit from a range of different kinds of ability grouping. These include 'pull-out' classes, accelerated classes and promotion (where pupils move up a year). The identification of gifted and talented pupils is a challenge and multiple criteria for assessment should be used. The effects of these programmes provide an advantage for these pupils of three and 12 months additional learning.

It is important to note that gifted and talented learners may respond differently to certain teaching strategies compared to other students. For example they appear to benefit less from collaborative group work than other pupils, though this inference is based on only a limited number of studies. The most recent meta-analysis found smaller benefits for accelerated classes relative to those shown for pull out classes or promotion. Programmes which promote complex or higher order thinking appear to be most effective. Finally, it should be noted that the studies of gifted and talented programmes very rarely measure the impact of the schemes on other students. As with ability grouping more generally, care should be taken to ensure then these students do not feel "left behind", or that their notion of the importance of effort is undermined.

How secure is the evidence?

The evidence is robust and has accumulated over at least 30 years of research. Although there is some variation depending on methods and research design, conclusions on the impact of ability grouping are relatively consistent. International evidence, mostly from the USA, is consistent with a recent study conducted in the UK across 45 secondary schools. This study suggests that setting in maths may be a means of raising the attainment of higher attaining pupils in Years 7 to 9, but that the benefits for pupils in high performing groups come at the cost of reducing the attainment of lower attaining pupils, who make better progress in mixed ability classes.

What are the costs?

Ability grouping is an organisational strategy which has few, if any, financial costs associated with it.

What do I need to know?

- The key issue is ensuring that any ability grouping benefits all learners, particularly low-attaining or disadvantaged pupils, over both the long and short term.
- It is important to recognise that a measure of current attainment, such as a recent curriculum test, is not the same as a measure of ability or of potential.
- Schools should consider how differences in grouping will support more effective teaching or intensive support for lower attaining pupils and the impact of any grouping should be monitored closely.
- Flexible within-class grouping is preferable to tracking or streaming for low attaining pupils
- If higher ability groups just move at a faster rate through the same curriculum their progress may be restricted once they have reached the end.

After school programmes

Low impact for high cost, based on limited evidence.

£££££
cost per pupil

★★☆☆☆
evidence rating

+2
months

What is it?

Children or young people are involved in planned activities which are supervised by adults at the end of the school day. The goals, objectives and approaches of the programmes may vary greatly. Some will have an academic focus and be taught by teachers from the school the pupils attend, others will have a wider variety of activities supported by adults with a range of skills and qualifications.

How effective is it?

Research indicates that participating in after school programmes improves performance on measures of academic achievement. However, the gains are low to moderate on tested attainment of reading or mathematics (with a benefit of about an additional two months progress per year) and there is an inconsistent pattern of impact across studies, which suggests that the quality and focus of the programme is important. In the UK there is evidence that such programmes are linked with GCSE improvement by a third of a level in maths and three-quarters of a level in science. There is evidence that there are wider benefits for low-income students in terms of attendance at school, behaviour and relationships with peers.

Programmes may not be equally effective with all students. At risk children are more likely to benefit as are younger children (5-10 year olds). Positive effects for reading were highest for younger primary pupils and in secondary schools. Maths gains were higher for older primary and secondary pupils. However the research indicates that it is harder to attract and retain pupils in after school programmes at secondary level compared with primary pupils. Programmes which support and encourage children academically while providing stimulating environments and activities will most likely link to engagement. Additionally, teacher's support, promotion of interaction and mutual respect appear to be some of the key elements in enhancing participation.

How secure is the evidence?

There are a number of reviews and a comprehensive meta-analyses, mainly using data from the USA, but with broadly similar findings from less rigorous evaluations undertaken in the UK. Analysis suggests that enthusiasm for after school programmes in the USA has outpaced the research base indicating the need for more rigorous evaluations with outcome measures that demonstrate effectiveness on learning.

What are the costs?

In the UK, official estimates suggest after school clubs cost on average £7 per session, indicating that about 15 weeks of after school provision could be supported by the pupil premium of £600 in 2012-13. The costs of well-qualified and well-trained staff may increase these estimates, particularly if they involve tutoring, so the Toolkit estimates about £10 per session per pupil to take into account the academic focus needed. £10 a day for about half a school year (100 days) comes to about £1,000 per pupil. Costs are therefore estimated as high.

What do I need to know?

- Programmes with greater structure, a strong link to the curriculum, well-qualified and well-trained staff are more clearly related to academic benefits.
- Particularly promising after school activities include one to one or small group tuition.
- Enrichment activities (such as sports or arts engagement) may have positive benefits on attitudes, but these alone will not improve academic learning.
- Particular effort may be required to engage and retain older secondary pupils.
- Booster activities to support revision and test or exam practice are likely to improve results.

Arts participation

Low impact for low cost, based on moderate evidence.

£££££
cost per pupil

★★★★★
evidence rating

+2
months

What is it?

Arts participation is involvement in terms of performance and creation in artistic and creative extra-curricular activities, such as dance, drama, music, painting, sculpture. Participation may be organised as regular weekly or monthly activities or more intensive programmes such as summer schools or residential courses.

How effective is it?

Overall the impact on academic learning tends to be low, though greater effects have been identified for younger learners of primary school age in terms of impact on cognitive tests. Wider benefits on attitudes and well-being have also consistently been reported.

There is reasonably consistent but weak evidence that participation in artistic and creative activities is beneficial. Outcomes have been identified from arts participation in terms of impact on English, mathematics and science learning in school at both primary and secondary school level. Specific benefits are linked with some particular activities (such as spatial awareness and music for example). There is some evidence that younger learners may benefit more from these approaches.

How secure is the evidence?

There are a number of systematic reviews and meta-analyses which have found small benefits for arts participation. However, these vary according to the detail of the approach and the age group targeted so the effects are hard to generalise and not conclusive.

What are the costs?

Costs vary considerably from junior drama groups with small annual subscriptions (about £20), through organised dance groups for young people at about £5 per session to high quality music tuition at about £35 per hour. Costs are estimated at £150 per year, though it should be noted that some activities would be considerably more expensive (e.g. nearer £1,500 for individual music tuition). Overall costs are estimated as low.

What do I need to know?

- The research evidence shows a wide range of effects from programmes studied, suggesting that achieving learning gains from arts programmes is not straightforward.
- Benefits for learning appear to be more achievable with younger learners, with some promising evidence supporting the academic impact of programmes which develop skills in music performance in particular.
- The transfer of learning to the classroom is not automatic and needs further exploration, e.g. by encouraging pupils to apply their learning from arts participation in more formal contexts.
- Arts-based approaches may offer a route to re-engage older learners in school.

Aspiration interventions

Very low or no impact for moderate cost based on very limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

0
months

What is it?

Aspirations are about what children and young people hope to achieve for themselves in the future. Raising aspirations is often believed to be an effective way to motivate pupils to work harder so as to achieve the steps necessary for later success. A number of approaches to raising aspirations have been tried across three broad areas: focusing on parents and families, through work by teachers, and through out-of-school interventions or extra-curricular activities, sometimes involving peers and mentors. Approaches which seek to raise aspirations are very diverse and may seek to improve learners' self-esteem, self-efficacy or self-belief, or to develop motivation and engagement.

How effective is it?

On average, interventions which aim to raise aspirations appear to have little to no positive impact on educational attainment. This may seem counter-intuitive – and it should be noted that the relationship between aspirations and attainment is complex and not fully understood – but there appear to be three main explanations.

First, evidence suggests that most young people actually have high aspirations, implying that much underachievement results not from low aspiration itself but from a gap between the aspirations that do exist and the knowledge and skills which are required to achieve them. As a result it may be more helpful to focus on raising attainment more directly in the first instance.

Second, where pupils do have lower aspirations it is not clear that any targeted interventions consistently succeed in raising their aspirations. Third, where aspirations begin low and are successfully raised by an intervention, it is not clear that an improvement in learning necessarily follows. In programmes which do raise attainment, it is unclear whether learning gains can be credited for raising aspirations rather than the additional academic support or increased parental involvement.

How secure is the evidence?

Generally the evidence base on aspiration is weak, and further, more rigorous studies are required, particularly focusing on pupil level rather than school level interventions. There are two systematic and high quality reviews of aspiration interventions, some of which include quantitative data. These indicate that the relationship between aspirations and attainment is complex, but that there is no evidence of a clear causal connection between learning, aspirations and attitudes to school. There are no meta-analyses of interventions to raise aspirations which report impact on attainment or learning. Most studies look at the relationship between aspirations and attainment and some find a link, particularly between low aspirations and low attainment. However this does not mean that raising aspirations will raise attainment. This lack of evidence does not mean that impact is not achievable, but should make schools cautious as to how they make any investment of time or resources in this area.

What are the costs?

Costs vary widely, and are hard to estimate precisely. After school programmes typically cost about £5-£10 per session, so a 20 week programme once per week would cost a maximum of £200 per pupil. Parental involvement programmes also vary in costs but again are typically between £200 per child per year where the school covers the staffing costs and up to about £850 per child per year for family support involving a full-time support worker. Mentoring approaches to raising aspiration in the USA have been estimated at \$900 per student per year or about £560. Overall the costs are estimated as moderate.

What do I need to know?

- The relationship between aspirations and attainment is not straightforward; in general, approaches to raise aspirations have not translated into increased learning.
- A key reason for this may be that most young people have high aspirations for themselves. As a result, it is more important to keep these on track by ensuring that students have the knowledge and skills to progress towards them.
- The attitudes, beliefs and behaviours that surround aspirations in disadvantaged communities are diverse so generalisations should be avoided.
- Interventions which have positive effects almost always have a significant academic component, suggesting that raising aspirations in isolation will not be effective.
- For pupils or learners with low aspirations, it is important to monitor the impact of any interventions or approaches if the goal is to improve attainment, given the mixed success of interventions to date.

Behaviour interventions

Moderate impact for very high cost, based on extensive evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+4
months

What is it?

Behaviour interventions seek to improve attainment by reducing challenging behaviour, including aggression, violence, bullying, substance abuse and general anti-social activities. Three broad categories of behaviour interventions can be identified: 1. Universal programmes which seek to improve behaviour and generally take place in the classroom; 2. More specialised programmes which are targeted at students with either behavioural issues or behaviour and academic problems; 3. School level approaches to developing a positive school ethos or improving discipline which also aims to support greater engagement in learning. It should also be noted that other approaches such as parental involvement programmes are often associated with reported improvements in school ethos or discipline, but are not included in this summary which is limited to interventions which focus directly on behaviour (see instead [Parental Involvement](#)).

How effective is it?

Evidence suggests that behaviour interventions can produce large improvements in academic performance along with a decrease in problematic behaviours, though there is relatively wide variation between alternative programmes. Effect sizes are larger for targeted interventions matched to specific students with particular needs or behavioural issues, than for universal interventions or whole school strategies.

The majority of studies report higher impact with older pupils (at middle or secondary rather than primary level). Different treatment approaches, such as behavioural, cognitive and social skills for aggressive and disruptive behaviour seem to be equally effective. Parental and community involvement programmes are often associated with reported improvements in school ethos or discipline so are worth considering as alternative to direct behaviour interventions.

School level behaviour approaches are often associated with improvement in attainment, but the evidence of a causal link to learning is lacking. There is some anecdotal evidence about the benefits of reducing problematic behaviour of disruptive pupils on the attainment of their classmates, but this is an understudied dimension in evaluations of behaviour programmes.

How secure is the evidence?

Overall, it is clear that reducing challenging behaviour in schools can have a direct and lasting effect on pupils' learning. This is based on a number of meta-analyses based on randomised controlled studies of interventions in schools. Evidence mainly comes from studies in the US where problematic behaviours in schools have been studied in more depth than in the UK.

Some caution in interpreting findings is needed as the majority of the meta-analyses on behaviour focus on pupils diagnosed with specific emotional or behavioural disorders. There is also considerable variation in impact between interventions studies, with one meta-analysis of an anger management intervention showing a positive effect on behaviour but an overall negative effect on learning. This implies both that careful targeting and evaluation is important, and also that it is possible to reduce problematic behaviour without improving learning. Further research is needed to investigate links between universal approaches to improving behaviour and learning.

What are the costs?

There are no specific costs reported in the studies summarised here. Costs will be highly dependent on the type of intervention. Teacher-led behavioural interventions in the classroom are the least costly, but the least effective (about £500 for professional development, so about £20 per pupil per year). One to one support is much more expensive, but more effective (about £40 per hour, or £640 per pupil for 15 sessions). Overall, costs are estimated as moderate.

What do I need to know?

- Targeted interventions for those diagnosed or at-risk of emotional or behavioural disorders produce the greatest effects.
- Programmes of two to six months seem to produce more long-lasting results.
- The wide variation in impact among evaluated programmes suggests that schools should look for programmes with a proven track record of impact.
- Training of facilitators or professional development improves the impact of programmes
- On average, programmes which involve parent or community involvement show higher effects.

Block scheduling

Very low or negative impact for very low or no cost, based on limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

0
months

What is it?

Block scheduling is one approach to school timetabling in secondary schools. It typically means that pupils have fewer classes (4-5) per day, for a longer period of time (70-90 minutes). The three main types of block schedules found in the research are:

- 4x4: 4 blocks of 80–90 minute classes in one day, students take 4 subjects in one term
- A/B: classes of 70-90 minutes each for 3/4 different subjects on every alternating day; and
- Hybrid: 5 classes per day, between 55 and 90 minutes in length.

How effective is it?

There is no consistent pattern in the evidence. The most recent systematic review concluded that 4x4 seemed to produce higher overall achievement than traditional schedules, though this may mask differences between subjects. More detailed analysis suggests that in science the A/B block scheduling approach resulted in higher results than traditional schedules (two to five months of additional progress); in mathematics and English the evidence was unclear with studies showing both better and worse results for any type of block scheduling compared with traditional scheduling.

The evidence suggests that how teachers use the time they are allocated is more important than the length of lesson or the schedule of lessons, and hence that the introduction of the introduction of block scheduling is unlikely to raise attainment by itself. This evidence is insufficient to support the introduction block scheduling in secondary schools to raise attainment by itself. The evidence suggests that how teachers use the time they are allocated is more important than the length of lesson or the schedule of lessons. It may also be that when different timetable patterns are introduced, the changes will only be beneficial if teachers alter the way they teach to get the best from the time allocation. Teachers and students often perceive that timetabling changes are beneficial especially when it appears to increase one-to-one interaction. However these perceptions are not clearly linked with improved learning outcomes.

How secure is the evidence?

There are a reasonable number of studies and one systematic review which looks at the quantitative evidence of the impact of timetabling and scheduling changes on students' learning.

Timetabling mainly affects secondary schools, though the time spent on different areas of the curriculum is also relevant at primary level. The research has mainly looked at impact on mathematics, English and science.

What are the costs?

The costs of making alterations to the timetable are mainly in terms of organisational effort and time and involve minimal financial outlay.

What do I need to know?

- Timetabling changes alone are not sufficient to improve learning
- Teachers need to alter the way that they teach and should plan and organise different kinds of learning activities to obtain benefits.
- Timetabling changes need to be matched to curriculum goals and teaching and learning objectives (such as longer lessons for science experiments).
- One promising approach might be to investigate how longer lessons can increase the amount of feedback that students get from the teacher or from each other (see Feedback).

Collaborative learning

Moderate impact for very low cost, based on extensive evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 5
months

What is it?

Collaborative or cooperative learning can be defined as learning tasks or activities where students work together in a group small enough for everyone to participate on a collective task that has been clearly assigned. This can be either a joint task where group members do different aspects of the task but contribute to a common overall outcome, or a shared task where group members work together throughout the activity. Some collaborative learning approaches also get mixed ability teams or groups to work in competition with each other, in order to drive more effective collaboration. There is a very wide a range of approaches to collaborative and co-operative learning involving different kinds of organisation and tasks, but this summary does not include *Peer Learning* which is reviewed separately

How effective is it?

The impact of collaborative approaches on learning is consistently positive, but it does vary so it is important to get the detail right. Effective collaborative learning requires much more than just sitting pupils together and asking them to work together; structured approaches, with well-designed tasks lead to the greatest learning gains. There is some evidence that collaboration can be supported with competition between groups, but this is not always necessary, and can lead to learners focusing on the competition rather than the learning it aims to support. Approaches which promote talk and interaction between learners tend to promote the best gains.

How secure is the evidence?

Evidence about the benefits of collaborative learning has been found consistently for over 40 years and a number of systematic reviews and meta-analyses of research studies have been completed. In addition to direct evidence from research into collaborative learning approaches, there is also indirect evidence where collaboration has been shown to the effectiveness of other approaches such as mastery learning or digital technology. It appears to work well for all ages if activities are suitably structured for learners' capabilities and positive evidence has been found across the curriculum. Not all of the specific approaches to collaborative learning that are adopted by schools have been evaluated so it is important to evaluate any new initiative in this area.

What are the costs?

The direct costs involved are very low, though professional development is advisable. Estimated costs for a class of 25 pupils are about £500 or £20 per pupil per year, plus the costs of monitoring and evaluating impact of adopting the approach. Overall the costs are estimated as very low.

What do I need to know?

- Pupils will need support and practice to work together; this does not happen automatically.
- Tasks need to be designed carefully so that working together is effective and efficient, otherwise some pupils will try to work on their own.
- Competition between groups can be used to support pupils in working together more effectively within their group, though over-use of competition can focus learners on the competition rather than succeeding in their learning so it needs to be used cautiously.
- It is particularly important to encourage lower achieving pupils to talk and articulate their thinking in collaborative tasks as they may contribute less.
- Managing effective collaborative group work is challenging so professional development or collaborative professional inquiry is likely to be helpful to support effective use of these approaches.

Digital technology

Moderate impact for high cost, based on extensive evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 4
months

What is it?

The use of digital technologies to support learning. Approaches in this area are very varied, but a simple split can be made between 1) Programmes for students, where learners use technology in problem-solving or more open ended learning and 2) Technology for teachers such as interactive whiteboards or learning platforms.

How effective is it?

Overall, studies consistently find that digital technology is associated with moderate learning gains (on average an additional four months), however there is considerable variation in impact. Evidence suggests that technology should be used to supplement other teaching, rather than replace more traditional approaches. It is unlikely that particular technologies bring about changes in learning directly, but different technology has the potential to enable changes in teaching and learning interactions, such as by providing more effective feedback for example, or enabling more helpful representations to be used or simply by motivating students to practice more.

There is some evidence that it is more effective with younger learners and studies suggest that individualising learning with technology (one-to-one laptop provision, or individual use of drill and practice) may not be as helpful as small group learning or collaborative use of technology. There is clear evidence that it is more beneficial for areas like writing than spelling or mathematics practice rather than problem solving.

How secure is the evidence?

There is extensive evidence across age groups and for most areas of the curriculum which shows positive impact on learning. However, the variation in effects and the range of technologies available suggest that it is important to evaluate the impact on learning when technology is used. The pace of technological change means that evidence is usually about yesterday's technology rather than today's but average impacts have remained consistent for some time, implying that general messages are likely to remain relevant.

What are the costs?

The costs of investing in new technologies are high, but they are already part of the society we live in and most schools are already equipped with computers and interactive whiteboards. The evidence suggests that schools rarely take into account or budget for the additional training and support costs which are likely to make the difference to how well the technology is used. Expenditure is estimated at £300 per pupil for equipment and technical support and a further £500 per class (£20 per pupil) for professional development and support. Costs are therefore estimated as moderate.

What do I need to know?

- Effective use of technology is driven by learning and teaching goals rather than a specific technology: technology is not an end in itself.
- It is important to identify clearly how the introduction of technology will improve learning rather than assuming that new technology will automatically lead to increased attainment; technology without pedagogy is very unlikely to be effective.
- Technology should support pupils to work harder, for longer or more efficiently to improve their learning.
- Motivation to use technology does not always translate into more effective learning, particularly if the use of the technology and the learning outcomes are not closely aligned.
- Teachers need support and time to learn to use new technology effectively. This involves more than just learning how to use the technology and should include support to use it for teaching through professional development.

Early years intervention

Very high impact for very high costs, based on extensive evidence.

£ £ £ £ £

cost per pupil

★★★★★

evidence rating

+6

months

What is it?

Early years or early childhood interventions are approaches which aim to ensure that young children have educationally based pre-school or nursery experiences which prepare for school and academic success, usually through additional nursery or pre-school provision. Many of the researched programmes and approaches focus on disadvantaged children. Some also offer parental support.

How effective is it?

Overall, the evidence suggests that early years and pre-school intervention is beneficial with above average levels of impact (a typical impact of six additional months progress). There is some international evidence that these programmes need to be for a whole day (rather than half-day which on average has less impact, though it should be noted the UK's Effective Provision of Pre-School Education (EPPE) study did not find a difference) and of longer duration (up to a year or more) rather than for shorter periods of time.

In most studies, the impact on attainment tends to wear off over time, though impact on attitudes to school tends to be more durable. There is no established amount of time where the fade takes place, rather there is a pattern of decline over time. Early years and pre-school interventions are therefore not sufficient to close the gap in attainment for disadvantaged children.

How secure is the evidence?

There are a number of systematic reviews and meta-analyses which have looked at the impact of early childhood intervention. Most of these are from the US however, where children tend to start school at a later age. Evaluations of Sure Start in the UK do not show consistent positive effects and indicate that some caution is needed when generalising from exceptionally successful examples. However, overall the evidence supporting early childhood intervention is robust.

What are the costs?

Understandably the costs are high, as adult/child ratios in pre-school provision tend to be higher than in school classes and family interventions have similar high costs. The Sure Start average cost per child was about £1,000 in 2006, so the estimates are in the region of £1,000-£2,000 per child. This can be compared with the average yearly child-care costs for a child under two at about £5,000. Overall, the costs are estimated as very high.

What do I need to know?

- High quality provision is essential with well-qualified and well trained staff.
- Such provision is likely to be characterised by the development of positive relationships between staff and children and by engagement of the children in activities which support pre-reading, the development of early number concepts and non-verbal reasoning.
- Extended attendance (1 year+) and starting early (i.e. 3 years) is more likely to have an impact than shorter durations starting later, which on average produce much lower gains.
- Disadvantaged children benefit from good quality programmes, especially where these include a mixture of children from different social backgrounds, and a strong educational component.
- Immediate impact of Home based programmes is associated with a shorter duration.

For more information, videos and supporting resources relating to this approach, please visit

<http://educationendowmentfoundation.org.uk/toolkit/approaches/early-years-intervention>

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The Education Endowment Foundation

Extended school time

Low impact for moderate cost, based on limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

+ 2
months

What is it?

Internationally, two main approaches to extending school time have been implemented and evaluated: 1. Extending the length of the school day; 2. Extending the length of the school year. The are examples of the school day being extended to up to 12 hours per day and the school year being extended by up to five additional weeks. Specific approaches to increasing learning time are included in other sections of the Toolkit, such as *Summer School*, *After School Programmes* and *Early Years Intervention*; this summary is limited to extending core school time.

How effective is it?

Most of the studies find evidence of improved learning compared to shorter days or school years, but this is usually quite small and gains are not consistent across all studies. Unsurprisingly, the amount of improved learning appears to depend heavily on how the time is used and which aspects of teaching and learning are increased. Evidence suggests that it is likely to be cheaper and more efficient to focus on using existing school time more effectively before considering extending school time.

Overall approaches to increasing the length of the school day or the school year add on average two months additional progress to pupils' attainment over the course of a year. Additionally, research based on international comparisons, looking at average times for schooling in different countries is consistent with this conclusion. However, it should also be noted that pupils from disadvantaged backgrounds benefit by, on average, an additional half a month's progress relative to their peers suggesting that extending school time can be an effective means to improve learning for pupils who are most at risk of failure.

Caution should be taken to ensure that any increase in school time does not reduce time for other positive activities either for pupils (e.g. activities which support overall development and well-being, or time to complete homework) or for teachers (e.g. lesson preparation time). To be successful any increases should be supported by both parents and staff, and extreme increases (e.g. above nine hours per day) do not appear to be effective.

How secure is the evidence?

Most of the evaluations of initiatives to extend school time come from the USA and are from wider evaluations of school reform or school improvement models that incorporate an extended school day as one component among a number of changes. This makes attributing any academic gains to either an extended day or an extended year difficult, though what evidence there is suggests that both extending the school day and extending the school year can improve academic attainment, particularly for pupils from disadvantaged backgrounds. More analyses have been undertaken on extending the school year so there is more evidence in this area, but given the current state of the evidence however, it may be better to invest in the quality of teaching and learning in schools in the first instance, rather than the quantity.

What are the costs?

The costs of extending the school day or the school year are rarely explicit in the studies reviewed. It is not clear when teachers were paid more for the additional hours or days worked or that the costs of running the schools for this extra time has been estimated. One US study which aimed to increase school time by 30% worked on a budget of \$1,300 per student, per year (about £800). Average costs per pupil in primary schools are about £2,500 and for secondary about £3,500, which is about £13 and £18 per pupil per day. Extending the school year by two weeks would therefore need about £260 per pupil per year for primary schools and about £360 per pupil per year for secondary, if the same spending model is used. The costs are therefore estimated as moderate.

What do I need to know?

- In terms of a longer school day there are indications that smaller increases are associated with greater gains, and with more than three of four hours a day the benefit decreases.
- It is important to look at the quality of teaching and learning in school time as well as the quantity; it might be cheaper and more efficient to attempt to use existing time more effectively before considering extending the school day.
- Staff commitment is vital or any changes may increase staff turnover.
- It may be necessary to do things differently with the extra time, rather than provide more of the same teaching and learning activities.
- Schools should consider what pupils and staff would stop doing because of extended school time.

Feedback

Very high impact for low cost, based on moderate evidence.

£££££
cost per pupil

★★★★★
evidence rating

+ 8
months

What is it?

Feedback is information given to the learner and/or the teacher about the learner's performance relative to learning goals. It should aim to (and be capable of) producing improvement in students' learning. Feedback redirects or refocuses either the teacher's or the learner's actions to achieve a goal, by aligning effort and activity with an outcome. It can be about the learning activity itself, about the process of activity, about the student's management of their learning or self-regulation or (the least effective) about them as individuals. This feedback can be verbal, written, or can be given through tests or by means of ICT. It can come from a teacher or someone taking a teaching role (including pupils acting as teachers) or from peers.

How effective is it?

Feedback studies tend to show very high effects on learning. However, it also has a very high range of effects and some studies show that feedback can have negative effects and make things worse. It is therefore important to understand the potential benefits and the possible limitations of this as an approach. The research evidence about feedback was part of the rationale for Assessment for Learning (AfL). One evaluation of AfL indicated an impact of half of a GCSE grade per student per subject is achievable, which would be in line with the wider evidence about feedback. Other studies reporting lower impact indicate that it is challenging to make feedback work in the classroom. In general research-based approaches which provide feedback to learners, such as Bloom's 'mastery learning', also tend to have a positive impact.

Feedback has effects on all types of learning across all age groups. Research in schools has focused particularly on English, mathematics and, to a lesser extent, science.

How secure is the evidence?

There are a substantial number of reviews and meta-analyses of the effects of feedback. Educational (rather than psychological or theoretical) studies tend to identify positive benefits where the aim is to improve learning outcomes in reading or mathematics or in recall of information. The most recent meta-analysis of studies focusing on assessment for learning in schools indicates the gains are more modest, suggesting an improvement of about three months additional progress is achievable in schools or nearer four months when the approach is supported with professional development.

What are the costs?

The costs of providing more effective feedback are not high. However it is likely to require sustained professional development to improve practice, and this includes active inquiry and evaluation. Estimates of this (including up to 7-10 days cover) are in the region of £2,000-£3,000 per teacher per year or about £100 per pupil. Overall costs are estimated as low.

What do I need to know?

Providing effective feedback is challenging. Research suggests that it should:

- be specific, accurate and clear (e.g. "It was good because you..." rather than just "correct").
- compare what a learner is doing right now with what they have done wrong before (e.g. "I can see you were focused on improving X as it is much better than last time's Y...").
- encourage and support further effort (getting a balance between support and challenge) and be given sparingly so that it is meaningful (as too much feedback can stop learners working out what they need to do for themselves).
- provide specific guidance on how to improve and not just tell students when they are wrong.
- be supported with effective professional development for teachers.
- Wider research suggests the feedback should be about complex or challenging tasks or goals as this is likely to emphasise the importance of effort and perseverance as well as be more valued by the pupils. Feedback can come from other peers as well as adults (see Peer tutoring).

Homework (Primary)

Low impact for very low or no cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 1
month

What is it?

Homework refers to tasks given to pupils by their teachers to be completed outside of usual lessons. Common homework activities may be reading or preparing for work to be done in class, or practising and completing tasks or activities already taught or started in lessons, but it may include more extended activities to develop inquiry skills or more directed and focused work such as revision for exams.

How effective is it?

It is certainly the case that schools whose pupils do homework tend to be successful schools. However it is less clear that the homework is the reason why they are successful. A number of reviews and meta-analyses have explored this issue. There is some evidence that when homework is used as a short and focused intervention it can be effective in improving students' attainment (with some studies showing up to eight months positive impact on attainment). Overall the general benefits are likely to be modest if homework is more routinely set. There is clear evidence that it is helpful at secondary level, but there is much less evidence of benefit at primary level.

The research strongly suggests that it is more valuable at secondary school level and much less effective for children of primary school age.

How secure is the evidence?

Homework has been extensively studied. However studies have mainly looked at the correlation between homework and how well schools perform. There is a relatively consistent picture that there is a positive association, but there are a smaller number of studies which have investigated what happens when homework is introduced and compared with classes where homework is not given. These studies tend to show that homework is beneficial, though the evidence is less secure.

What are the costs?

There are few costs associated with homework, though there are implications for staff time for preparation and marking. With younger children there may be additional resources required (such as reading books or games for children to take home). Overall costs are estimated as very low.

What do I need to know?

- Overall, homework in primary schools does not appear to lead to large increases in learning.
- Effective homework is associated with greater parental involvement and support and can be developed to increase parental engagement.
- Short focused tasks or activities which relate directly to what is being taught, and which are built upon in school are likely to be more effective than regular daily homework.
- The purpose of homework should be made clear to children.

For more information, videos and supporting resources relating to this approach, please visit

<http://educationendowmentfoundation.org.uk/toolkit/approaches/homework>

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The Education Endowment Foundation

Homework (Secondary)

Moderate impact for very low or no cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 5
months

What is it?

Homework refers to tasks given to pupils by their teachers to be completed outside of usual lessons. Common homework activities may be reading or preparing for work to be done in class, or practising and completing tasks or activities already taught or started in lessons, but it may include more extended activities to develop inquiry skills or more directed and focused work such as revision for exams.

How effective is it?

On average, the impact of homework on learning is consistently positive (leading to on average five months additional progress). However, beneath this average there is a wide variation in potential impact, suggesting that how homework is set is likely to be very important.

There is some evidence that when homework is most effective when used as a short and focused intervention (e.g. in the form of a project connected with a particular element of learning) with some exceptional studies showing up to eight months positive impact on attainment. Benefits are likely to be modest if homework is more routinely set (e.g. EXAMPLE).

Evidence also suggests that how homework relates to learning during normal school time is important. In the most effective examples homework was an integral part of rather learning, rather than an add-on. To maximise impact, it also appears to be important that students are provided with high quality feedback on their work (see [Feedback](#)).

Studies imply that there is an optimum amount of homework of between 1-2 hours per school day (slightly longer for older pupils), with effects diminishing as the time that students spend on homework increases.

How secure is the evidence?

Homework has been extensively studied. However studies have mainly looked at the correlation between homework and how well schools perform. It is certainly the case that schools whose pupils do homework tend to be successful schools, but it is less clear that the homework is the reason why they are successful.

There are a smaller number of studies which have investigated what happens when homework is introduced and compared with classes where homework is not given. These studies tend to show that homework is beneficial, though the evidence is less secure.

What are the costs?

There are few costs associated with homework, though there are implications for staff time for preparation and marking. With younger children there may be additional resources required (such as reading books or games for children to take home). Overall costs are estimated as very low.

What do I need to know?

- Planned and focused activities are more beneficial than homework which is more regular but routine or not linked with what is being learned in class.
- The purpose of homework should be made explicit to learners, e.g. to increase a specific area of knowledge, or fluency in a particular area.
- It should not be used as a punishment or penalty for poor performance.
- A variety of tasks with different levels of challenge is likely to be beneficial.
- The quality of homework is more important than the quantity. Pupils should receive feedback on homework which is specific and timely.

Individualised instruction

Low impact for low cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+2
months

What is it?

Individualised instruction provides different tasks for each learner and provides support at the individual level. It is based on the idea that all learners are different and therefore have different needs, so an individualised or personally tailored approach to instruction ought to be more effective, particularly in terms of the tasks and activities that pupils undertake and the pace at which they make progress through the curriculum. Examples of individualised education have been tried over the years in education, particularly in areas like mathematics where pupils can have individual sets of activities which they complete, often largely independently.

How effective is it?

Individualising instruction does not tend to be particularly beneficial for learners. One possible explanation for this is that the role of the teacher becomes too managerial in terms of organising and monitoring learning tasks and activities, without leaving time for interacting with learners or providing formative feedback to refocus effort. The average impact on learning tends overall to be low, and is even negative in some studies, appearing to delay progress by one or two months.

How secure is the evidence?

There have been a number of meta-analyses which have found broadly similar effects, and support the conclusion that individualising learning for whole classes is not beneficial for pupils' learning.

This finding is also supported by research from other connected fields, such as computer based learning, and Bloom's 'mastery learning', where students have instructions broken down into steps, receive feedback on their learning, and only move on when they have 'mastered' a particular step. In both fields, small group approaches appear to be more effective than individualised approaches.

The evidence is mostly drawn from secondary school studies and predominantly in mathematics, though there is also evidence from other curriculum subjects such as science, history and geography.

What are the costs?

The costs of implementing individualised learning are usually low, unless the approach uses technology (such as tutoring programmes or integrated learning systems). Estimated outlay for increased resourcing per pupils is £150 per year. Overall costs are therefore estimated as low.

What do I need to know?

- Overall the evidence does not support approaches which individualise instruction at class level.
- It is hard to identify exactly why individualised instruction is not more effective. It may be that in a classroom setting, learners receive less direct teaching, get less feedback or move at a slower pace when they manage their own learning progress with support (see Meta-cognition and self-regulation).
- Individualised instruction runs the risk of the teacher managing diverse activities and learners, without sufficient time to work directly with learners to teach them.
- It might be a more viable strategy in small group or one-to-one settings, where giving learners direct teaching at the same time is still possible.
- Approaches to individualise learning activities supported by technology may provide learners with effective practice, however it is still important to ensure that learners receive direct instruction from a teacher when learning new content, or when they are not making progress.

Learning styles

Low impact for very low cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 2
months

What is it?

The idea underpinning learning styles is that we all have different approaches or styles of learning and that learning will therefore be more effective or more efficient if we are taught accordingly. For example a student may prefer words versus pictures or analysis versus listening.

How effective is it?

It has proved difficult to identify reliably any consistent learning 'styles' in young people and evidence suggests that it is unhelpful to assign learners to groups or categories on the basis of a supposed learning style. Learning preferences do change in different situations and over time and there is some evidence that cognitive preference and task type may be connected (e.g. visualisation in some areas of mathematics is particularly valuable). However, studies where targeted learning takes place in conjunction with activities that match an identified learning style have not convincingly shown any benefit, particularly for low attaining pupils. In fact, in some studies the controls did better than the learning styles groups. Overall impacts recorded are low or negative, suggesting that only one or two pupils in a class of 25 might benefit from this approach.

It is particularly important not to label primary age pupils or for them to believe that their lack of success is due to their learning style, rather fostering a belief that they can succeed through effort, but the lack of impact of learning styles has been documented at all stages of education.

Where gains have been documented these may come from pupils taking responsibility for learning (see *Meta-cognition*) rather than directly from the use of learning styles approaches.

How secure is the evidence?

Overall the picture is consistent and reasonably robust. The evidence for the lack of impact (and in some cases detrimental effect) of using learning styles approaches has been shown in a number of studies. The unreliability of learning styles tests have also been the focus of a number of reviews.

What are the costs?

The costs are relatively low, though some of the available tests of learning styles require purchase. Typically, these about about £5 per pupil.

What do I need to know?

- Learners are very unlikely to have a single learning style, so restricting pupils to activities matched to their reported preferences may damage their progress. This is especially true for younger learners in primary schools whose preferences are still very flexible.
- Labelling students as a particular kind of learner is likely to undermine their belief that they can succeed through effort and to provide an excuse for failure.
- It appears to be more promising to focus on other aspects of motivation to engage pupils in learning activities.
- Pupils should be encouraged to take responsibility for identifying how they can succeed in their learning and develop their own successful strategies and approaches.
- It certainly appears to be beneficial to have different representations of ideas when developing understanding, but this does not demonstrate that individual learners have a learning style.

Mentoring

Low impact for moderate cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 1
month

What is it?

Mentoring in education aims to develop young people's strengths by pairing them with an older volunteer, sometimes from a similar background, who can act as a positive role model. It is often characterised as aiming to build confidence and competence, or to develop resilience and character. Mentors typically build relationships with young people by meeting with them one-to-one for about an hour a week either at school, or at the end of the school day or weekends. Activities will vary from programme to programme, sometimes including direct academic support with homework or other school tasks. Mentoring has increasingly been offered to young people who are hard to reach or deemed to be at risk of educational failure or exclusion. Community and school-based mentoring schemes have expanded rapidly, particularly in the USA. It can be distinguished from coaching or volunteer tutoring where the focus is very much on improving performance in academic subjects, though mentoring is sometimes referred to as 'life-coaching'.

How effective is it?

The impact of mentoring is variable, but on average it has tended to be low in terms of direct effect on academic outcomes. There is some evidence that pupils from disadvantaged backgrounds are likely to benefit more (nearly double the impact). Other positive benefits have been reported in terms of attitudes to school, attendance and behaviour. However, there are also risks associated with unsuccessful mentor pairings which may have a detrimental effect on the mentee, and the negative overall impacts seen in some studies should prompt caution. School-based mentoring programs have on average been less effective than community-based approaches, possibly because school-based mentoring can result in fewer opportunities for young people to develop more lasting and trusting relationships with adult role models. Programmes which have a clear structure and expectation, provide training and support for mentors, and use mentors from a professional background, are associated with more successful outcomes.

How secure is the evidence?

The evidence has been fairly consistent over the last decade or so, and the quality of more recent evaluations from the USA has been higher than in the past. The most recent randomised controlled trials have not been combined in a meta-analysis, but show similar impact to earlier meta-analyses and systematic reviews. Rigorous evaluation of mentoring programmes and approaches in the UK is needed.

What are the costs?

Compared with other professionally delivered interventions and approaches, mentoring is relatively inexpensive. Costs are mainly for mentor training and support and for the organisation and administration of the programme. Community based programmes tend to be more expensive than school based programmes as schools tend to absorb some of the costs, such as for space of general support. Estimates in the USA are between \$1000-\$1500 per student per year or about £600-£850 per pupil per year, some of which appears to pay for the costs of voluntary organisation providing the mentors. Costs are therefore estimated as moderate.

What do I need to know?

- The impact of mentoring varies, but overall, it is likely to have only a small impact on attainment.
- Positive effects tend not to be sustained once the mentoring stops, and often end abruptly, so care must be taken to ensure that benefits are not lost.
- Mentors will benefit from training and support.
- Community based approaches tend to be more successful than school based approaches.
- It is vital that the mentor is reliable, as there is evidence that mentor drop-out can have detrimental effects on their mentee.

Meta-cognition and self-regulation

High impact for low cost, based on extensive evidence.

£££££
cost per pupil

★★★★★
evidence rating

+ 8
months

What is it?

Meta-cognitive and self-regulation strategies (sometimes known as 'learning to learn' strategies) are teaching approaches which make learners think about learning more explicitly. This is usually by teaching pupils specific strategies to set goals, monitor and evaluate their own learning. Self-regulation refers to managing one's own motivation towards learning as well as the more cognitive aspects of thinking and reasoning. Overall these strategies involve being aware of one's strengths and weaknesses as a learner, such as by developing self-assessment skills, and being able to set and monitor goals. They also include having a repertoire of strategies to choose from or switch to during learning activities.

How effective is it?

Meta-cognitive and self-regulation approaches have consistently high levels of impact with meta-analyses reporting between seven and nine months additional progress on average. It is usually more effective in small groups so learners can support each other and make their thinking explicit through discussion.

Encouragingly the evidence suggests that teaching meta-cognitive and self-regulation strategies tends to be particularly effective with lower achieving pupils, as well as with older students. Most studies have looked at the impact on English or mathematics, though there is some evidence from other areas such as science, suggesting benefits are likely to be widely applicable.

The potential impact of approaches which encourage learners to plan, monitor and evaluate their learning is very high. However it can be difficult to achieve these gains as this involves pupils in taking greater responsibility for their learning and in developing their understanding of what is involved in being successful. There is no simple strategy or trick for this. It is possible to support pupils' work too much, so that they do not learn to monitor and manage their own learning but come to rely on the prompts and support from the teacher. A useful metaphor is scaffolding in terms of *removing* the support and dismantling the scaffolding to check that learners are taking responsibility to manage their own learning.

How secure is the evidence?

There are a number of systematic reviews and meta-analyses of programmes and approaches which promote thinking about thinking which have consistently found similar levels of impact.

What are the costs?

Costs are relatively low, though many studies report the benefits of professional development and/or outside support, or an inquiry approach for teachers where they actively evaluate strategies as they use them. A course of sustained professional development or collaborative professional inquiry is estimated at £2-3,000 per year (including some release from classroom teaching) or about £100 per pupil.

What do I need to know?

- Teaching approaches which encourage learners to plan, monitor and evaluate their learning have very high potential, but require careful implementation.
- Teach pupils explicit strategies to plan, to monitor and to evaluate their learning, and give them opportunities to use them with support and then independently.
- When using approaches for planning, ask pupils to identify the different ways that they could plan (general strategies) and about best approach for a particular task (specific technique).
- Monitoring involves identifying the key steps they need to be aware of as they go through a task to keep it on track. (Where might this go wrong? What will be the difficult parts?)
- Evaluating can be part of the process of checking so that it feeds into the current task as it nears completion (Can you make it better? Are you sure this is right?). It can also feed forward into future tasks (What have you learned that will change what you do next time?).

One to one tuition

Moderate impact for high cost, based on extensive evidence.

£££££
cost per pupil

★★★★★
evidence rating

+ 5
months

What is it?

One to one tuition is where an individual pupil is removed from their class and given intensive tuition. It may also be undertaken outside of normal lessons, for example as part of after school programmes or summer schools.

How effective is it?

Evidence indicates that in areas like reading and mathematics one-to-one tuition can enable learners to catch up with their peers. Research has been focused on children who are falling behind their peers, though one-to-one tuition reliably provides benefit. Meta-analyses indicate that pupils might make about 4 or 5 months progress during an intensive programme.

Short, regular sessions (about 30 minutes, 3-5 times a week) over a set period of time (6-12 weeks) appear to result in optimum impact. However there is no strong evidence that one-to-one is better than paired tuition or intensive small group teaching, and some evidence that pairs make better progress than individual pupils. Evidence also suggests tutoring should be additional or supplemental to normal instruction, rather than as a replacement and that teachers should monitor progress to ensure the tutoring is beneficial.

How secure is the evidence?

Overall, the evidence is consistent and strong, particularly for younger learners who are behind their peers in primary schools, and for subjects like reading and mathematics. Programmes which used experienced and specifically trained teachers are more effective than those using volunteers or classroom assistants (nearly double the effect). Where tuition is delivered by volunteers or teaching assistants there is some evidence that training is beneficial. The evidence is strongest at primary level and for subjects like reading and mathematics. There are fewer studies at secondary level or for other subjects.

What are the costs?

The costs are high as the support is intensive. A single pupil receiving 30 minutes tuition, five times a week for 12 weeks requires about four full days of a teacher's time, which will cost in the region of £800 per pupil. Costs could be reduced by using groups of one-to-two or one-to-three (see *Small Group Tuition*). Overall, costs are estimated as high.

What do I need to know?

- One-to-one tuition is very effective in helping learners catch up, but can be relatively expensive.
- To control costs, schools could consider other groupings for intensive support such as one-to-two or even one-to-three.
- Short periods (5-10 weeks) of intensive sessions (up to an hour three or four times a week) tend to have greater impact.
- A qualified teacher is likely to achieve greater progress than support staff or volunteers, and training and professional development are likely to be beneficial for both teachers and support staff.
- Pupils and regular class teachers may need support at the end of the tutoring to ensure the impact is sustained once they return to normal classes and tuition should be explicitly linked to what happens in class.

Parental involvement

Moderate impact for moderate cost, based on moderate evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 3
months

What is it?

Actively involving parents in supporting their children's learning at school. This includes programmes focused on parents and their skills (such as improving literacy or IT skills), general approaches to encourage parents to support their children to read or do mathematics, and more intensive programmes for families in crisis.

How effective is it?

Although parental involvement is consistently associated with pupils' success at school, the evidence about how to increase involvement to improve attainment is much less conclusive. This is particularly the case for disadvantaged families. There is some evidence that supporting parents with their first child will have benefits for siblings. However there is also conflicting evidence which suggests that, at least in terms of Early Years Intervention for example, the involvement of parents does not increase the benefits. This suggests that developing effective parental involvement to improve their children's attainment is challenging and will need effective monitoring and evaluation. The impact of parents' aspirations is also important, though again there is insufficient evidence to show that changing parents' aspirations will raise their children's aspirations and achievement over the longer term. Two recent meta-analyses from the USA suggest that increasing parental involvement in primary and secondary schools has on average 2-3 months positive impact.

How secure is the evidence?

Although there is a long history of research into parental involvement programmes, there is surprisingly little robust evidence of the impact of programmes which have tried to *increase* involvement to improve learning. The association between parental involvement and a child's academic success is well established, but rigorous evaluation of approaches to improve learning through parental involvement is more sparse.

The evidence is predominantly from primary level and the early years, though there are studies which have looked at secondary schools. Impact studies tend to focus on reading and mathematics attainment.

What are the costs?

The costs of different approaches vary enormously, from running parent workshops (about £80 per session) and improving communications, which are cheap, to intensive family support programmes with specially trained staff. The cost of a specialist community or home/school liaison teacher is about £35,000, or about 60 Pupil Premium allocations. Costs per pupil are therefore estimated as moderate.

What do I need to know?

- Focused approaches which support parents in working with their children to improve their learning are beneficial. The challenge is in engaging and sustaining such involvement.
- Involvement is often easier to achieve with parents of very young children.
- Parents of older children may appreciate short sessions at flexible times to involve them.
- Schools can be daunting places for parents so it is important to establish a welcoming environment.
- Parents may be anxious about their own educational achievements and it is important to discuss with them the ways in which they can support their children's effort which do not require a high level of ability (e.g. by ensuring that students have an environment where they can work at home, or by asking them to explain what they learned at school and how they learned it).

Peer tutoring

High impact for low cost, based on extensive evidence.

£££££
cost per pupil

★★★★★
evidence rating

+6
months

What is it?

A range of approaches in which learners work in pairs or small groups to provide each other with explicit teaching support. In cross-age tutoring an older learner takes the tutoring role and is paired with a younger tutee or tutees. Peer-Assisted Learning is a structured approach for mathematics and reading with sessions of 25-35 minutes two or three times a week. In Reciprocal Peer Tutoring, learners alternate between the role of tutor and tutee. The common characteristic is that learners take on responsibility for aspects of teaching and for evaluating their success. Peer assessment involves the peer tutor providing feedback to children relating to their performance and can have different forms such as reinforcing or correcting aspects of learning.

How effective is it?

The evidence of impact is relatively high (typically equating to about a GCSE grade). The benefits are apparent for both tutor and tutee (particularly in cross-age tutoring), though the approach should be used to supplement or enhance normal teaching, rather than to replace it. There is some evidence that children from disadvantaged backgrounds and low attaining pupils make the biggest gains.

Though both pupils involved gain, cross-age tutoring appears to offer slightly greater benefit for tutor than tutee. A study of cross-age peer tutoring showed that the lowest attaining pairs actually made most progress, and a two-year gap seems to support both tutee and tutor learning. One way of matching pupils across classes is to match the highest attaining pupil in the older class with the highest attaining child in the younger class through to the lowest attaining pupil in the older class being matched with the lowest attaining pupil in the younger class (making adjustments if necessary). This enables the teacher to focus support on lower attaining pairs.

How secure is the evidence?

The evidence is consistent and positive especially for mathematics and reading and at both primary and secondary school levels.

What are the costs?

The direct costs of running peer tutoring in schools are low, as few additional materials required (£10-20 per pupil). Professional development and additional support for staff is recommended, particularly in the early stages of setting up a programme. Estimates are about £3,000-£4,000 per class or £200 per pupil indicating low overall costs.

What do I need to know?

- Activities should be sufficiently challenging for the tutee that they can benefit from the tutor's support but not too difficult that they cannot succeed with support.
- Planning the organisation of tutoring to address the logistical challenges and then training the tutors is a key step. At least a day's professional development for staff is recommended.
- There are several different approaches to peer-tutoring which make different demands on the teacher(s) organising the pairs and on the tutors and tutees.
- Reviewing challenges and successes with tutors will improve their skills and learning.
- Relatively short but intensive periods of tutoring over 4-10 weeks are likely to be more effective than for a longer period with more routine sessions.

For more information, videos and supporting resources relating to this approach, please visit

<http://educationendowmentfoundation.org.uk/toolkit/approaches/peer-tutoring>

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The Education Endowment Foundation

Performance pay

Low or no impact for moderate cost, based on very limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

0
months

What is it?

We know that teachers are the most important part of the education system in terms of improving students' learning. Performance pay is where a direct link is created between a teacher's wages or bonus and the performance of their class. A distinction can be drawn between awards where improved performance leads to a higher permanent salary and payment by results where teachers get a bonus for higher test scores. In the USA, it is sometimes referred to as 'merit pay'. One key issue is how performance is measured and how closely this is linked to outcomes for learners. In the UK, performance measurement was one component in the performance threshold assessment introduced in 2000, but was very loosely connected and at the discretion of the head teacher.

How effective is it?

Estimates based on cross-national comparisons suggest that performance pay could lead to positive impacts of around three months, and one UK study estimates the benefit as about half a GCSE grade, which is a similar effect. However, when more rigorous evaluations are looked at, such as those with experimental trials or with well-controlled groups, within countries such as the USA, the actual average impact has been close to zero. In India, there is evidence of the benefit of performance pay in the private sector but not the state sector, but it is not clear how this evidence applies in the UK.

As the evaluation of a number of merit pay schemes in the USA have been unable to find a clear link with student learning outcomes, investing in performance pay would not appear to be a good investment without further study. There are a number of examples of unintended consequences of performance pay from the US and elsewhere, which suggests that designing effective performance pay schemes is difficult.

How secure is the evidence?

The evidence is not conclusive. Although there has been extensive research into performance pay most of this is either from correlational studies linking national pay levels with general national attainment or from naturally occurring experiments. It is hard to make causal claims about the efficacy of performance pay. In the latter it is hard to measure other variables which may influence the impact of pay increases, such as teaching to the test or other forms of "gaming".

What are the costs?

Increases are usually of the order of £2,500 per teacher or £100 per pupil across a class of 25. Overall cost estimates are therefore low.

What do I need to know?

- It is clearly important to recruit the most effective teachers possible, and any additional resource may be better targeted at identifying and appointing the best teachers for a school.
- Performance pay has been tried on a number of occasions, however the evidence of impact on student learning does not support the approach.
- Evaluations of the English threshold assessment offer a cautious endorsement of approaches which seek to reward teachers in order to benefit disadvantaged students by recognising teachers' professional skills and expertise. However, approaches which simply assume that incentives will make teachers work harder do not appear to be well supported.
- Spending on professional development linked to evaluation of better learning by pupils may also offer an alternative to performance pay.
- Performance pay may lead to a narrower focus on test performance and restrict other aspects of learning.

Phonics

Moderate impact for very low cost, based on extensive evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 4
months

What is it?

Phonics is an approach to teaching reading, and some aspects of writing, by developing learners' phonemic awareness. This involves the skills of hearing, identifying and using phonemes or sound patterns in English. The aim is to teach learners the relationship between these sounds and the written spelling patterns or graphemes which represent them. Phonics emphasises the skills of decoding new words by sounding them out and combining or 'blending' the sound-spelling patterns.

How effective is it?

Phonics approaches have been consistently found to be effective in supporting younger readers to master the basics of reading. The approach tends to be more effective than other approaches to early reading (such as whole language or alphabetic approaches), though it should be emphasised that effective phonics techniques are usually embedded in a rich literacy environment for early readers and only one part of a successful literacy teaching. For older readers (above Year 5) who are struggling, phonics approaches may be less successful, producing less or no impact and other approaches such as comprehension focused methods may be more effective. In particular, using age appropriate material is likely to be more successful. Furthermore upper primary and lower secondary readers may benefit more from strategy instruction or *Meta-cognitive and self-regulation* strategies to improve their reading skills.

The research suggests that phonics is beneficial for younger learners as they begin to read (4-7 year olds). It is less likely to be helpful for older, less successful learners. Qualified teachers tend to get better results (up to twice the effectiveness of others), suggesting that their expertise is a key component of successful teaching of early reading.

How secure is the evidence?

There have been a number of studies, reviews and meta-analyses which have consistently found that the systematic teaching of phonics is beneficial. There is some evidence that particular approaches such as synthetic phonics may be more beneficial than analytic approaches, however the evidence here is less secure and it is probably more important to match the teaching to children's particular needs and systematically teach the sound patterns with which they are not yet confident.

What are the costs?

There are some costs, as specific resources are needed for teaching phonics. Evidence suggests that the effectiveness of phonics is related to the pupil's stage of reading development, so it is also important that teachers have professional development in effective assessment as well as in the use of particular phonic techniques and materials. Costs for materials and professional development are estimated at £1,200 per teacher or £48 per pupil and therefore very low.

What do I need to know?

- Phonics can be an important component in supporting the development of early reading skills, particularly for children from disadvantaged backgrounds. However, it is not a panacea and it is also important that children are successful in making progress in all aspects of reading including vocabulary development, comprehension and spelling, which should be taught separately and explicitly.
- The teaching of phonics should be explicit and systematic to support children in making connections between the sound patterns they hear in words and the way that these words are written.
- The teaching of phonics should be matched to children's current level of skill in terms of their phonemic awareness and their knowledge of letter sounds and patterns (graphemes).
- Phonics improves the accuracy of children's reading, but not necessarily their comprehension, and as such should be included as part of a wider literacy programme.
- As a child's reading skills progress and they become successful with a phonics-based approach, the emphasis should move on to developing children's understanding of what they can read.

Physical environment

Very low or no impact for low cost based on very limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

0
months

What is it?

Changing the physical learning environment, either by moving to a new school building, or seeking to improve the design, air quality, noise, light or temperature of an existing building.

How effective is it?

Overall, changes to the physical environment of schools are unlikely to have a direct effect on learning beyond the extremes (i.e. once an adequate building standard has been achieved).

Moving to a new building could be an effective part of a whole school change which seeks to change behaviour and establish new norms (similar to School Uniform), but there is no evidence that new buildings or particular aspects of architecture directly improve learning. Where a new building is being used as a catalyst for change, there is some evidence supporting the impact of co-design, or involving potential beneficiaries in taking responsibility for learning spaces and changing their behaviours as they adapt to new settings.

Most individual factors in the physical environment show a relationship with learning only at the extremes. So in terms of sound, if the noise levels are high (such as under the flight path of an airport) there can be a measurable detrimental effect on learning. In terms of temperature, warmer and more humid conditions (particularly above 30°C conditions) can cause a loss of concentration and drowsiness though most school environments are within acceptable limits. Likewise, lighting in schools is usually adequate for reading and writing. The evidence on ambient music is inconclusive as it appears that people react differently to different kinds of music according to their preferences. Similarly with colour in the environment, personal preference is probably more important than any general effect.

Air quality is the one exception to the general picture on school environment. The evidence suggests low air quality does have a negative impact on attainment (reducing word recognition by 15% in one study), and that classrooms often have poor air quality conditions, with higher CO₂ concentrations than the average recommended levels.

How secure is the evidence?

The research on the impact of the physical environment on learning is generally weak, mainly being based on correlational studies or drawn as inferences from wider environmental research. There are very few more rigorous experimental designs, and this makes it hard to establish causal claims about the impact of physical changes.

What are the costs?

It is very difficult to estimate the costs of physical changes as they are usually part of capital spending and a single cost, rather than a recurrent part of a school budget. A new secondary school costs about £15 million for 1,500 pupils or £10,000 per pupil. However several generations of pupils are likely to use the building. Improving air quality can be done relatively cheaply with better ventilation, filtration and the use of dehumidifiers where necessary. Overall, costs are estimated as low.

What do I need to know?

- Most environmental factors have an impact on classrooms only at the extremes.
- Air quality is likely to be the most significant factor affecting learning, particularly where there is poor ventilation or high levels of dust and other pollutants
- Changes in the environment are opportunities to change people's behaviour as they adjust to the new setting, but are unlikely to have a direct positive impact on learning.

Reducing class size

Low impact for very high cost, based on moderate evidence.

£ £ £ £ £

cost per pupil

★ ★ ★ ★ ★

evidence rating

+ 3
months

What is it?

Reducing the number of pupils in a class. As the size of a class or teaching group gets smaller it is suggested that the range of approaches a teacher can employ and the amount of attention each student will achieve will increase.

How effective is it?

Intuitively, it seems obvious that reducing the number of pupils in a class will improve the quality of teaching and learning, for example by increasing the amount of high quality feedback or one-to-one attention learners receive. However, overall the evidence does not show particularly large or clear effects, until class size is reduced to under 20 or even below 15.

The key explanation for this appears to be whether a reduction is large enough to permit the teacher to change their teaching approach when working with a smaller class and whether, as a result, the pupils change their learning behaviours. If no change occurs then, perhaps unsurprisingly, learning is unlikely to improve. When a change in teaching approach does accompany a class size reduction (which appears hard to achieve until classes are smaller than about 20) then benefits on attainment can have been identified, in addition to improvements on behaviour and attitudes. In some studies these benefits persist for a number of years (from early primary school through to at least the end of Key Stage 2). It appears to be very hard to achieve improvements from class size reductions above 20, e.g. from 30 to 25.

There is some evidence that reducing class sizes are more likely to be effective when supported with professional development to learn and develop teaching skills and approaches. Some evidence suggests slightly larger effects are documented for the lower achievers and those from the lower socio-economic status for very young pupils. Additionally teachers may potentially further develop their teaching skills and approaches in a smaller class.

How secure is the evidence?

There are a number of issues in interpreting the evidence about class size as many countries or schools already teach lower attaining pupils in smaller groups. Overall there is a relatively consistent picture where smaller classes are associated with slightly higher attainment (when other factors are controlled for) and when class sizes have been deliberately reduced in experimental evaluations.

The strongest evidence comes from research into primary schools in the USA where the benefits appear to be sustained for 3-4 years when classes are reduced below 18. There is some evidence that pupils in disadvantaged areas in the UK benefit from classes of fewer than 20 pupils in primary schools.

What are the costs?

The costs associated with reducing class sizes to a level where a significant benefit is likely are very high. The evidence suggests that typical classes would need to be halved to 15 pupils or even fewer. A class of 25 pupils with 50% of them receiving free school meals would be allocated an extra £8,000 under the pupil premium in 2012/13; this would not be sufficient to appoint an additional teacher. In 2013-14, a year group of 60 pupils where 50% were eligible for the Pupil Premium would increase funding by £27,000, enabling two classes of 30 to be split between three teachers with 20 pupils in each class. Costs are estimated as very high.

What do I need to know?

- Smaller classes will not make a difference to learning unless the teacher or pupils do something differently in the smaller class.
- It is likely that the more flexible choices the teacher has for organising learners combined with an increase in the quality or quantity of feedback pupils receive accounts for any gains.
- Small reductions (e.g. from 30 to 25 pupils) are unlikely to be cost-effective relative to other strategies.
- Deploying staff (including teaching assistants) so that teachers can work more intensively with smaller groups may be worth exploring.
- Reducing class sizes for younger children may provide longer term benefits.

School uniform

Very low or no impact for very low cost, based on very limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

0
months

What is it?

Schools identify clothing considered appropriate for pupils to wear in school, usually including style and colour.

How effective is it?

There is a general belief in the UK that school uniform supports the development of a whole school ethos and therefore is supportive of discipline and motivation. However, there is no robust evidence that introducing a school uniform will, by itself, improve academic performance, behaviour or attendance. There are studies which have information about these outcomes linked to the introduction of a school uniform policy, but this was usually one factor amongst other improvement measures, such as changes in behaviour policy or other teaching and learning developments.

How secure is the evidence?

One of the problems in interpreting the evidence is that schools in challenging circumstances often choose a school uniform policy as part of a broader range of improvement measures. There are no systematic reviews of well-controlled interventions of a school uniform policy. The evidence rests mainly on correlational studies which look at the relationship between schools with uniforms compared with those without or the performance of schools before and after the introduction of uniforms and the school's subsequent trajectory of improvement. The most rigorous reviews and analyses have so far been unable to establish a causal link, but speculate that adoption of a uniform policy may provide a symbolic and public commitment to school improvement.

There are cultural issues about how a school uniform is perceived which play an important role in determining the acceptability and success (in terms of compliance). There is some evidence that in areas of very high poverty free school uniforms improve attendance, however this does not appear to be true in all areas. In other cultures school uniforms are associated with regulation and the loss of individuality, so care must be taken in generalising from studies from abroad.

What are the costs?

The costs associated with introducing a school uniform are very low and mainly depend on parents buying the clothes instead of others the child would wear.

What do I need to know?

- When combined with the development of a school ethos and the improvement of behaviour and discipline, the introduction or enforcement of a school uniform can be successfully included as part of this process.
- Wearing a uniform is not, on its own, going to improve learning.
- The commitment of staff to uphold and enforce a behaviour policy is crucial to its success.
- Improved behaviour, on its own, does not necessarily lead to better learning, though it may be an important precondition (see Behaviour).

Small group tuition

Moderate impact for moderate cost, based on limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

+ 4
months

What is it?

Intensive tuition in small groups is usually provided to support lower attaining learners or those who are falling behind, though it can also be used as a more general strategy to ensure effective progress, or to teach challenging topics or skills. The most familiar approach is one teacher with one pupil (see [One to one](#)). However other approaches to provide for intensive support are possible, such as teaching pupils in pairs or small groups of 3-5. For the purposes of the Toolkit 'Small group tuition' is defined as one teacher or professional educator working with two, three, four or five pupils. This arrangement enables the teacher to focus exclusively on a small number of learners, usually on their own in a separate classroom or working area.

How effective is it?

Overall the pattern is that small group tuition is effective, and as a rule of thumb, the smaller the group the better, e.g. groups of two have slightly higher impact than groups of three, but slightly lower impact compared to one to one tuition. Some studies suggest that greater feedback from the teacher, more sustained engagement in smaller groups, or work which is more closely matched to learners' needs explain this impact. Once group size increases above six or seven there is a noticeable reduction in effectiveness.

However, although the above pattern is usually consistent, there is some variability in impact within the existing evidence. For example, in reading, small group teaching can sometimes be more effective than either one to one or paired tuition. It may be that in these cases reading practice can be efficiently organised so that all the group stay fully engaged as each take their turn, such as in Guided Reading. Likewise, in the evaluation of Every Child Counts in the UK, one to one, paired teaching and groups of three were almost equally effective. The variability in findings suggests two things. First, the quality of the teaching in small groups may be as or more important than the group size, and there is evidence of the benefits of professional development on pupils outcomes. Second, it is important to evaluate the effectiveness of different arrangements as the specific subject matter being taught and composition of the groups may influence the outcomes.

Given the closeness in impact between various forms of small group tuition and its much lower cost, it may be useful for schools to trial small group tuition as an alternative option to one to one tuition.

How secure is the evidence?

More research has been undertaken into paired tuition than other kinds of small group tuition, so the evidence for small group teaching, across varying sizes of groups and at different levels of intensity is less conclusive and mainly comes from single studies. There are very few studies where group size has been varied systematically to explore the effects beyond one-to-two and one-to-three so more research would be useful in this area.

What are the costs?

Costs decrease with group size as the majority of the costs are for teaching time. One to two is about half the costs of one to one (£400 for two pupils receiving 30 minutes tuition, five times a week for 12 weeks), with one-to-three cheaper still (£270) plus any resource or equipment costs. Costs are therefore estimated as moderate.

What do I need to know?

- Intensive tuition in small groups is very effective.
- Pupils are usually grouped according to current level of attainment or specific need.
- It is important to assess pupils' needs accurately and provide work at a challenging level with effective feedback and support.
- The cost effectiveness of one-to-two and one-to-three indicates that greater use of these approaches would be productive in schools.
- Professional development and evaluation are likely to increase the effectiveness of small group tuition.

Social and emotional aspects of learning

Moderate impact for very low cost, based on extensive evidence.

£ £ £ £ £
cost per pupil

★★★★★
evidence rating

+ 4
months

What is it?

Interventions which target social and emotional aspects of learning (SEAL) seek to improve attainment by improving the social and emotional dimensions of learning, as opposed to focusing directly on the academic or cognitive elements of learning. As with behaviour, three broad categories of interventions can be identified: 1. Universal programmes which seek to improve behaviour and generally take place in the classroom; 2. More specialised programmes which are targeted at students with either behavioural issues or behaviour and academic problems; 3. School level approaches to developing a positive school ethos or improving discipline which also aim to support greater engagement in learning.

SEAL interventions seek to improve the ways in which pupils work with and alongside their peers, teachers, family and community. In 2005, a national SEAL programme was introduced to support effective learning, positive behaviour, attendance, and emotional well-being, first in primary schools then in secondary schools.

How effective is it?

On average, SEAL interventions have an identifiable and significant impact on attitudes to learning, social relationships in school, and attainment itself (on average around three to four months additional progress).

However, though SEAL interventions almost always improve emotional or attitudinal outcomes, not all interventions are equally effective at raising attainment. In particular, evidence from the nationwide SEAL programme introduced in 2005 suggests that benefits on learning will not be automatically achieved. A quasi-experimental evaluation of the impact of the secondary programme did not find a significant impact on attainment in the SEAL schools.

Improvements seem more likely when approaches are embedded into routine educational practices, and supported by professional development and training for staff. In addition, the implementation of the programme and the degree to which teachers were committed to the approach appeared to be important.

SEAL programmes appear to benefit disadvantaged or low-attaining pupils more than other pupils, though all pupils benefit on average. Approaches have been found to be effective from nursery to secondary school.

How secure is the evidence?

There is extensive research in this area and a number of meta-analyses, though more research has been undertaken with younger children in primary, than in secondary schools, and more studies have evaluated the impact on disadvantaged or low attaining pupils.

What are the costs?

Social and emotional interventions targeted at individuals are the most expensive (see also [Behaviour interventions](#)). Estimates from the US suggest targeted programs cost about \$4,600 per student (about £2,800) per year and involve professional counselling services. However, the costs of training school staff and implementing and evaluating the impact are estimated at £1,000 per teacher for professional development and in-school support. Overall the costs per pupil are therefore estimated as low at about £40 per pupil per year, assuming a school-based, whole class approach.

What do I need to know?

- Skills should be taught purposefully and explicitly linked to direct learning in schools, encouraging pupils to apply the skills they learn.
- Teachers and other school staff can effectively support these approaches, particularly with appropriate professional development.
- Staff commitment to the programme and support for the consistent application of the skills more widely are likely to be important features of successful approaches.
- Sensitive and targeted intervention may benefit at risk or more vulnerable pupils.
- It is important to evaluate the impact of any initiative to improve learning based on social and emotional aspects of learning as the impact on attainment is not found consistently.

Sports participation

Moderate impact for moderate cost based on moderate evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

+ 2
months

What is it?

Sport participation is engaging in sports as a means to increase educational engagement and attainment. This might be through organised after school activities or as an organised programme by a local sporting club or association. Sometimes sporting activity is used as a means to encourage young people to engage in additional learning activities, such as football training at a local football club combined with study skills, ICT, literacy or mathematics lessons.

How effective is it?

The overall impact of sports participation on academic achievement tends to be low (less than one additional month's progress), though there is recent evidence from the UK that sports and learning participation can have a more dramatic effect on, for example, mathematics learning as assessed by standardised tests when combined with a structured numeracy programme (with one study showing an impact of up to 10 months' additional progress). In this circumstance the 'participation' acts as an enticement to undertake additional instruction.

The variability in effects suggest that the quality of the programme and the emphasis on or connection with academic learning may make more difference than the specific type of approach or activities involved.

How secure is the evidence?

There have been a number of reviews linking the benefits of participation in sport with academic benefits, including a recent systematic review for the Department for Culture, Media and Sport (DCMS). There is, however, considerable variation in impact, including some studies which show negative effects.

What are the costs?

Cost estimates are hard to identify in terms of costs of participation in specific activities (such as a football coaching club, linked with after school study), but are estimated here at up to about £400 per year excluding clothing and equipment. These costs vary according to equipment and venue. Costs are therefore estimated as moderate.

What do I need to know?

- Being involved in extra-curricular sporting activities may increase attendance and retention.
- Participation in sports does not straightforwardly transfer to academic learning.
- Planned extra-curricular activities which include short regular structured teaching in literacy and mathematics (either tutoring or group teaching) as part of a sports programme, such as an after school club or summer school) are much more likely to offer academic benefits.

For more information, videos and supporting resources relating to this approach, please visit

<http://educationendowmentfoundation.org.uk/toolkit/approaches/sports-participation>

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The Education Endowment Foundation

Summer schools

Moderate impact for moderate cost based on limited evidence.

£ £ £ £ £
cost per pupil

★ ★ ★ ★ ★
evidence rating

+ 3
months

What is it?

Summer schools are lessons or classes during the summer holidays, often run as catch-up or enrichment lessons. Some summer 'schools' do not have an academic focus and concentrate on sports or other non-academic activities. Others may be targeted at either low or high performing students for under-achieving or gifted and talented students.

How effective is it?

The effects are reasonably consistent (with an average impact of about three months progress), though usually higher for higher attaining pupils and less effective for low income pupils. Programmes are usually more effective in mathematics, when they are specifically tailored to students' needs, and when parents are involved, such as by attending conferences with teachers, observing their children in class and reading with them at home. Summer schools which do not have a clear academic component are not usually evaluated for, or associated with, learning gains. Other variables seem to make less difference, such as whether the teacher is one of the student's usual teachers.

The impacts vary according to the focus of the summer school, with more academic benefits linked to those with teaching or tutoring. Benefits have been identified in a range of subjects, particularly for secondary school pupils but are not consistent across all programmes. This indicates that it is important to have a clear focus on learning.

How secure is the evidence?

There are a number of meta-analyses, finding broadly similar effects, though mostly based on studies in the USA. As mentioned, a crucial factor is whether the summer school has an academic focus.

What are the costs?

The costs involved are the employment of teachers for the duration of the summer school, with associated venue and resource costs (books, photocopying etc.). Courses are in the region of £250 per week per student. A two week summer school would cost about £500 per pupil and are therefore estimated as moderate.

What do I need to know?

- Summer school provision which aims to improve learning needs to have an academic component.
- Qualified and experienced teachers are more likely to support improvement in literacy or mathematics (or other subjects) than less well-qualified staff.
- Intensive tutoring (one-to-one or small group) can be productively included in summer school provision.
- Summer schools can also provide support for the highly able and transition to university.
- As with After School Programmes providing a stimulating environment, teacher's support and promoting interaction appear to increase participation.

Teaching assistants

Very low or no impact for high cost, based on limited evidence.

£££££
cost per pupil

★★☆☆☆
evidence rating

0
months

What is it?

A teaching assistant (TA) is someone who supports a teacher in the classroom. Their duties can differ dramatically from school to school, though the main tasks tend to be working with small groups of children who need extra support in an area of the curriculum such as literacy or numeracy. They are also often responsible for hearing children read and helping teachers with administrative tasks.

How effective is it?

Overall, research shows that students in a class with a teaching assistant present do not on average outperform those in one where only a teacher is present. This average finding covers a range of recorded impacts; in some cases teachers and teaching assistants have worked together effectively leading to increases in attainment, while in others pupils (particularly those who are lower attaining) have performed worse in classes with teaching assistants present compared to those without.

One clear implication of this surprising finding is that schools should think carefully about the deployment, training (both of the teacher and TA) and evaluation of their TAs if they hope to achieve positive impacts in terms of attainment. Comparisons with qualified teachers suggest that TAs are consistently less effective in terms of raising attainment (achieving about half the gains). It is suggested that where overall negative impacts have been recorded TAs have effectively been substitutes rather than supplementary to teaching from teachers.

There is some evidence of greater impact when TAs are given a well-defined pedagogical role or responsibility for delivering specific interventions, particularly when training and support are provided. Evidence suggests that impact is similar across subjects and at both primary and secondary level. There is also evidence that pupils' perceptions and attitudes may be more positively affected, and also of positive effects in terms of teacher morale and reduced stress of working with a TA.

How secure is the evidence?

There are a number of systematic reviews of the impact of support staff in schools, though there are no meta-analyses specifically looking at the impact of TAs on learning. However, there have been a number of reviews internationally which have consistently found broadly similar effects. The most recent study in the UK suggests that on average low attaining pupils do less well with a TA supporting them. The research literature does not distinguish between different levels or grades of teaching assistants.

What are the costs?

The average teaching assistant's salary is about £17,000 per annum or about half of an average teaching salary. Costs overall are estimated as high.

What do I need to know?

Teaching assistants undoubtedly contribute to the effective management and organisation of a school. On average, however, they do not seem to add to the learning of the children and the classes that they support. More research must be done to determine the best ways for teachers and teaching assistants to work together, but likely best bets include:

- Identifying activities where TAs can support learning, rather than simply managing tasks.
- Providing support and training for teachers and TAs so that they understand how to work together effectively, e.g. by making time for discussion to talk before and after lessons.
- Ensuring that teachers do not reduce their support or input to the pupils supported by TAs that TAs are focused on learning as opposed to just ensuring that pupils finish their work.
- Evaluating the impact of different strategies for deploying TAs.
- Ensuring that teachers do not reduce their support or input to the pupils supported by TAs and that TAs are focused on learning as opposed to just ensuring that pupils finish their work.