Education Endowment Foundation

It ain't what you don't know that gets you in to trouble. It's what you know for sure that just ain't so.

Mark Twain (or not)…

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Outline of the session

- Remarks about early education
- Introducing an approach to consider existing evidence
- Principles to guide generating new evidence
- The case for an integrated and aligned approach
- An urge to invest in collaboration to accelerate our pace of learning

Investing in the early years works, but…

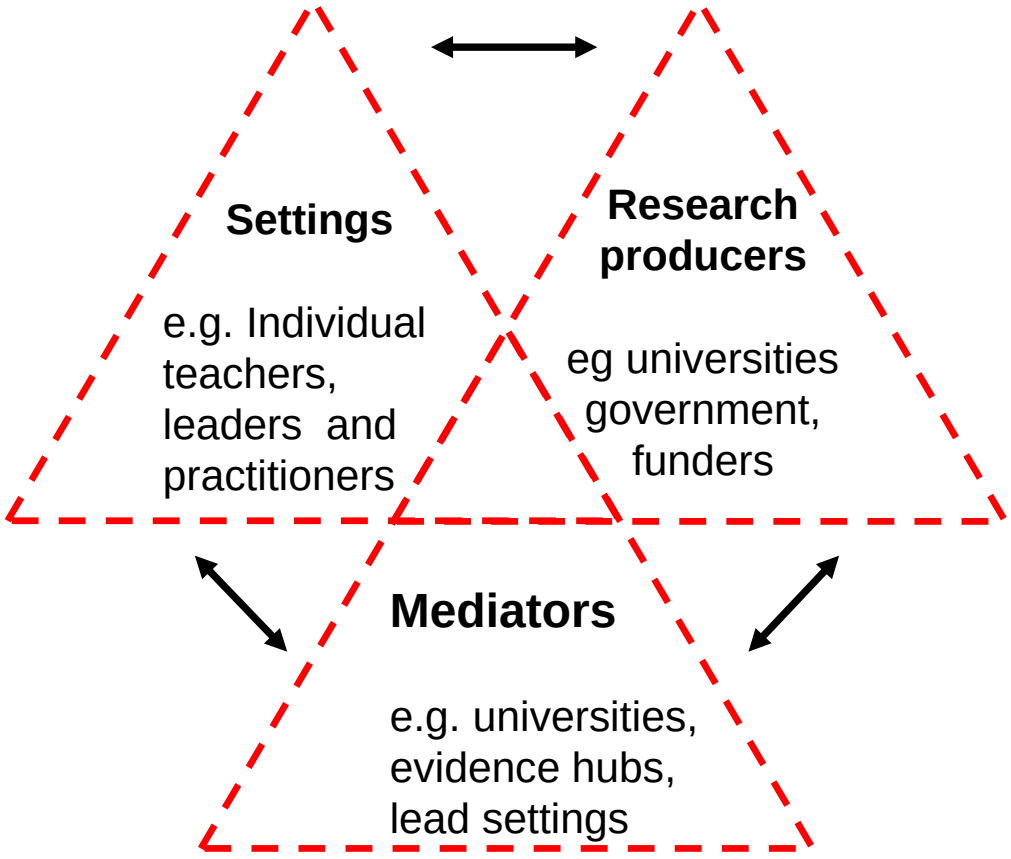
- We know that high quality early years education is a good idea. It benefits all children, but can have a particularly positive effect on disadvantaged children
- Investing in the early years provides an opportunity to tackle education inequality
- However, more resources alone will not necessarily lead to improved outcomes
- Variation in outcomes within and between settings prompts a shift from focusing on access to quality and setting level agency

Aligning effort and improving relationships

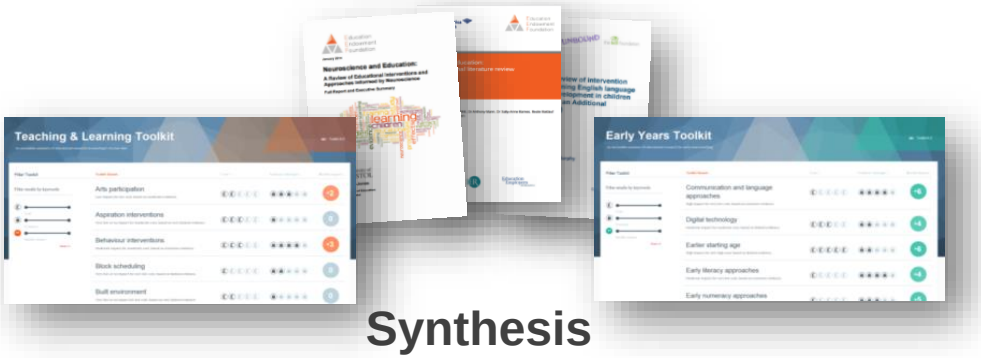
How can **research organisations** and others effectively communicate their findings?

How can **settings and schools** overcome the barriers to using evidence well?

What support from **brokers and mediators** do settings and schools need to adopt evidence informed approaches?

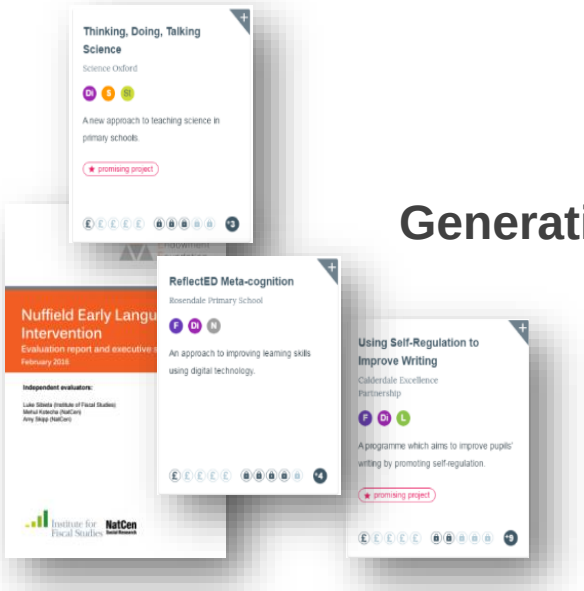


An evidence system…



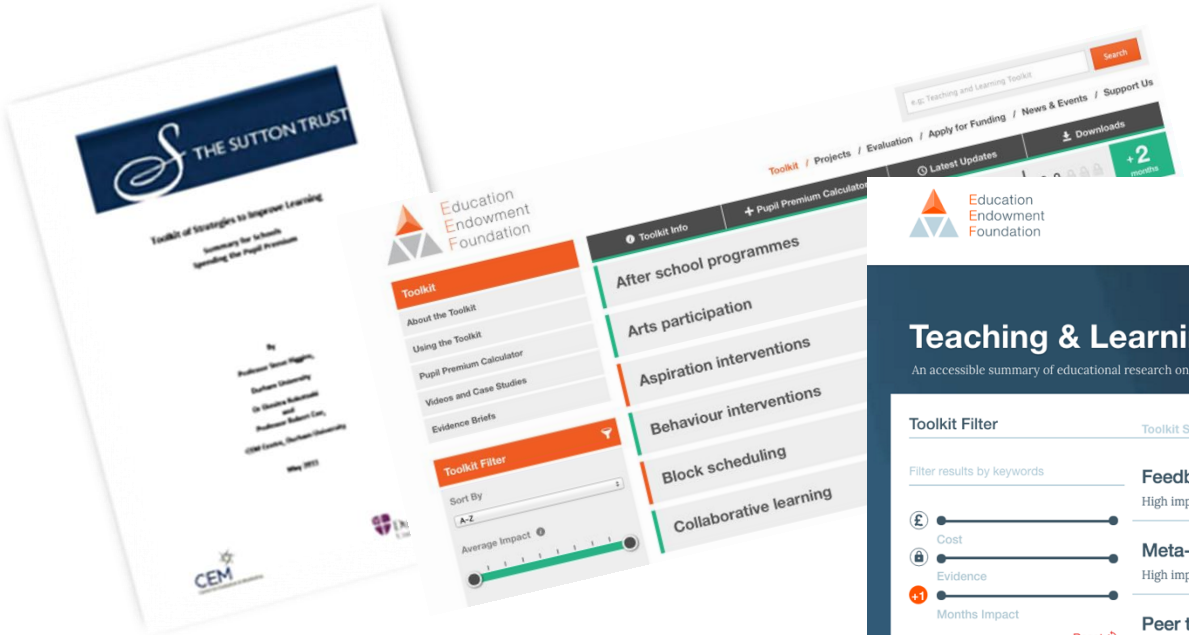
Synthesis

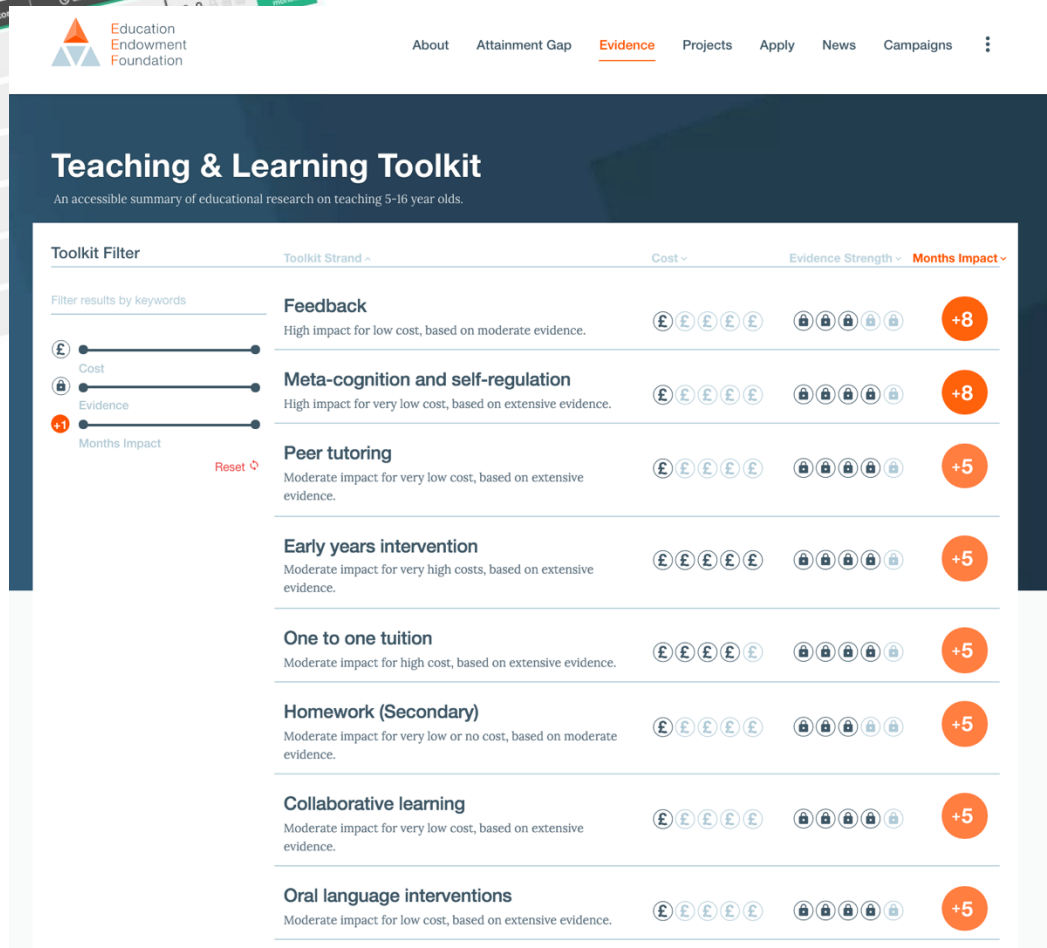
Generation



Adoption

Teaching & Learning Toolkit



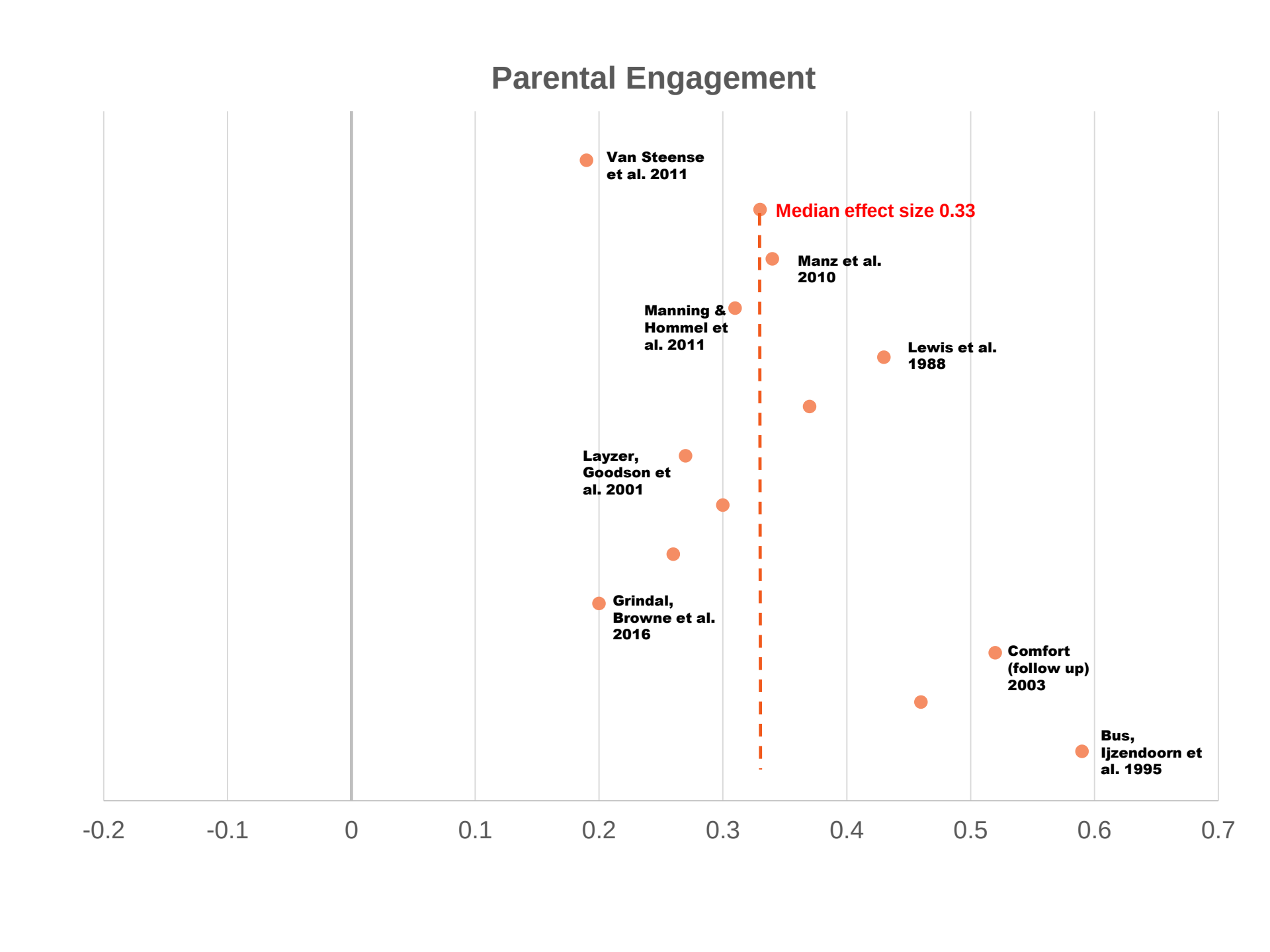


- Findings from 15,000 studies
- Best ‘buys’ on average from research
- Currently used by over 65% of England’s schools

http://educationendowmentfoundation.org.uk/toolkit

The Early Years Toolkit

Communication and language approaches	£	🔒🔒🔒🔒	+6 months
Digital technology	£ £ £	🔒🔒	+4 months
Earlier starting age	£ £ £ £ £	🔒🔒	+6 months
Early literacy approaches	£	🔒🔒🔒🔒	+4 months
Early numeracy approaches	£	🔒🔒🔒	+5 months
Extra hours	£ £ £ £ £	🔒🔒	+3 months
Parental engagement	£ £ £	🔒🔒🔒	+5 months
Physical development approaches	£	🔒🔒	+2 months
Physical environment	£ £	🔒	0 months
Play-based learning	£	🔒	+3 months
Self-regulation strategies	£	🔒🔒	+7 months
Social and emotional learning strategies	£ £ £	🔒	+3 months


Parental Engagement
Van Steense et al. 2011
Median effect size 0.33
Manz et al. 2010
Manning & Hommel et al. 2011
Lewis et al. 1988
Layzer, Goodson et al. 2001
Grindal, Browne et al. 2016
Comfort (follow up) 2003
Bus, Ijzendoorn et al. 1995
-0.2
-0.1
0
0.1
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0.6
0.7

Summaries

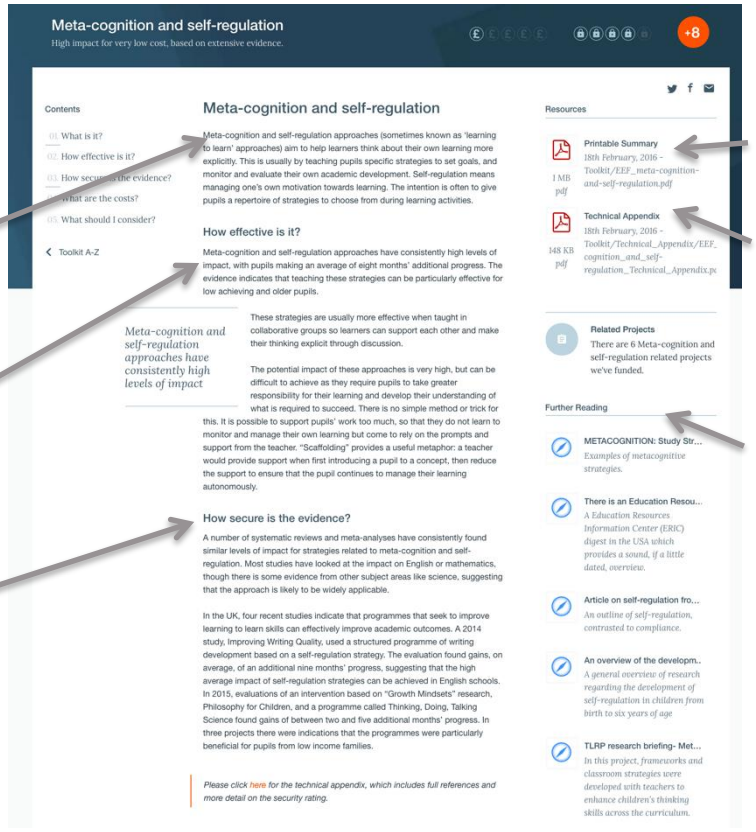
What is it?

How effective is it?

How secure is the evidence?

What are the costs?

What should I consider?



Printable summary

Technical Appendix

Further reading

Case studies/ video

Related EEF projects

Digital technology

Digital technology

£ £ £ £ £ | 🔒🔒🔒🔒🔒 | +4 months

Download Approach

What is it?

The use of digital technologies to support children's development and learning. This includes approaches where:

- children use technology themselves, either as part of their planned experiences or as part of teaching activities such as instructional games;
- technology, such as interactive whiteboards or digital cameras, is used by early years professionals to support their interactions with children; and
- technology is used to support professional development.

How effective is it?

Overall, studies investigating the use of digital technology find that it is associated with moderate learning gains, on average an additional four months' progress over the course of a year. Evidence suggests that technology should be used to supplement, rather than replace, other teaching activities and interactions. Introducing new technology on its own is unlikely to have an impact; it must be accompanied by a change in pedagogy to improve learning.

A number of structured programmes and instructional games for four to five year old children that aim to supplement the teaching of early literacy or mathematics skills have been evaluated and have shown positive impacts on learning. There is also evidence from the USA that the use of technology can support the professional development of early years teachers in mathematics. A study from the USA showed that providing video examples of effective practice for early years professionals to apply and develop can directly benefit children's learning.

The degree to which digital technology should be used in early years education is highly contested. Some studies suggest that excessive use of digital technology (e.g. more than 1-2 hours a day, including television) is linked to attention problems, sleep and eating disorders and obesity. However, no high quality evaluations have assessed the link between extended use of technology and educational outcomes in the early years.

Further Reading

ICT in early childhood education review - New Zealand Council for Educational Research

A report on the role and potential of ICT in early childhood education.

Follow Link

Using Early Childhood Education to Bridge the Digital Divide - RAND

A report arguing for the importance of technology literacy in a child's ability to succeed in school and later life.

Follow Link

Recognizing the potential of ICT in early childhood education - Unesco

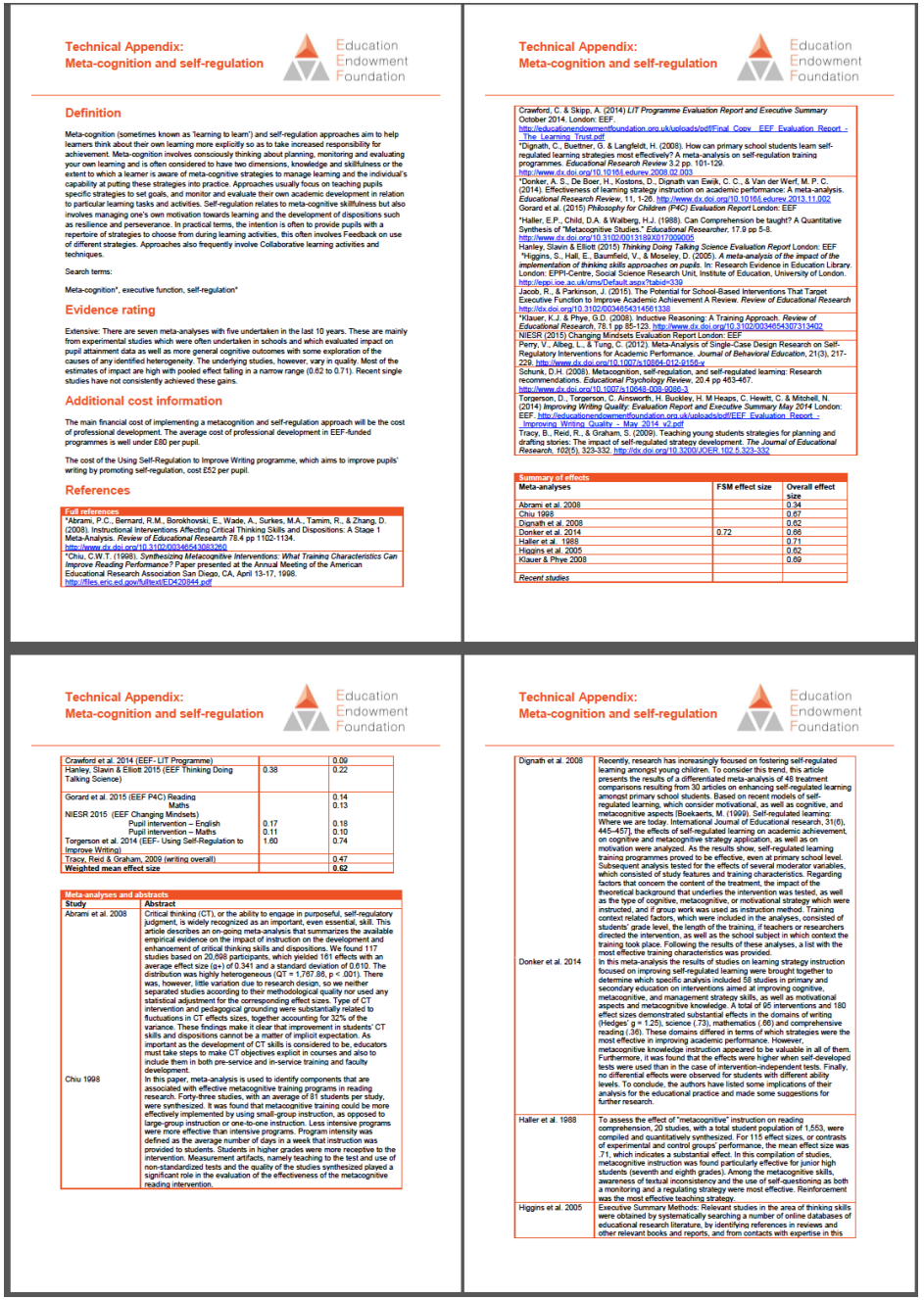
A report on the potential of ICT in for early childhood education.

Follow Link

A digital essay on Use of Digital Technology in Early Childhood Education - Alanya Jackson

Technical Appendices

- Definition
- Search terms
- Evidence rating
- Additional cost information
- References
- Summary of effects
- Abstracts of meta-analyses



Technical Appendix:
Meta-cognition and self-regulation

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Definition

Meta-cognition (sometimes known as 'learning to learn') and self-regulation approaches aim to help learners think about their own learning more explicitly so as to take increased responsibility for achievement. Meta-cognition involves consciously thinking about planning, monitoring and evaluating your own learning and is often considered to have two dimensions, knowledge and skillfulness or the extent to which a learner is aware of meta-cognitive strategies to manage learning and the individual's capability at putting these strategies into practice. Approaches usually focus on teaching pupils specific strategies to set goals, and monitor and evaluate their own academic development in relation to particular learning tasks and activities. Self-regulation relates to meta-cognitive skillfulness but also involves managing one's own motivation towards learning and the development of dispositions such as resilience and perseverance. In practical terms, the intention is often to provide pupils with a repertoire of strategies to choose from during learning activities, this often involves Feedback on use of different strategies. Approaches also frequently involve Collaborative learning activities and techniques.

Search terms:

Meta-cognition*, executive function, self-regulation*

Evidence rating

Extensive: There are seven meta-analyses with five undertaken in the last 10 years. These are mainly from experimental studies which were often undertaken in schools and which evaluated impact on pupil attainment data as well as more general cognitive outcomes with some exploration of the causes of any identified heterogeneity. The underlying studies, however, vary in quality. Most of the estimates of impact are high with pooled effect falling in a narrow range (0.62 to 0.71). Recent single studies have not consistently achieved these gains.

Additional cost information

The main financial cost of implementing a metacognition and self-regulation approach will be the cost of professional development. The average cost of professional development in EEF-funded programmes is well under £80 per pupil.

The cost of the Using Self-Regulation to Improve Writing programme, which aims to improve pupils' writing by promoting self-regulation, cost £52 per pupil.

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*Chiu, C.W.T. (1998). *Synthesizing Metacognitive Interventions: What Training Characteristics Can Improve Reading Performance?* Paper presented at the Annual Meeting of the American Educational Research Association San Diego, CA, April 13-17, 1998. http://files.eric.ed.gov/fulltext/ED420844.pdf

Crawford, C. & Skipp, A. (2014) *LIT Programme Evaluation Report and Executive Summary* October 2014. London: EEF. http://educationendowmentfoundation.org.uk/uploads/pdf/Final_Copy__EEF_Evaluation_Report_-_The_Learning_Trust.pdf

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Tracy, B., Reid, R., & Graham, S. (2009). Teaching young students strategies for planning and drafting stories: The impact of self-regulated strategy development. *The Journal of Educational Research*, *102*(5), 323-332. http://dx.doi.org/10.3200/JOER.102.5.323-332

Summary of effects

Meta-analyses	FSM effect size	Overall effect size
Abrami et al. 2008		0.34
Chiu 1998		0.67
Dignath et al. 2008		0.62
Donker et al. 2014	0.72	0.66
Haller et al. 1988		0.71
Higgins et al. 2005		0.62
Klauer & Phye 2008		0.69
Recent studies		

Crawford et al. 2014 (EEF- LIT Programme)		0.09
Hanley, Slavin & Elliott 2015 (EEF Thinking Doing Talking Science)	0.38	0.22
Gorard et al. 2015 (EEF P4C) Reading		0.14
Maths		0.13
NIESR 2015 (EEF Changing Mindsets)		
Pupil intervention – English	0.17	0.18
Pupil intervention – Maths	0.11	0.10
Torgerson et al. 2014 (EEF- Using Self-Regulation to Improve Writing)	1.60	0.74
Tracy, Reid & Graham, 2009 (writing overall)		0.47
Weighted mean effect size		**0.62**

Meta-analyses and abstracts

Study	Abstract
Abrami et al. 2008	Critical thinking (CT), or the ability to engage in purposeful, self-regulatory judgment, is widely recognized as an important, even essential, skill. This article describes an on-going meta-analysis that summarizes the available empirical evidence on the impact of instruction on the development and enhancement of critical thinking skills and dispositions. We found 117 studies based on 20,698 participants, which yielded 161 effects with an average effect size (*es*) of 0.341 and a standard deviation of 0.610. The distribution was highly heterogeneous (QT = 1,767.88, p < .001). There was, however, little variation due to research design, so we neither separated studies according to their methodological quality nor used any statistical adjustment for the corresponding effect sizes. Type of CT intervention and pedagogical grounding were substantially related to fluctuations in CT effects sizes, together accounting for 32% of the variance. These findings make it clear that improvement in students' CT skills and dispositions cannot be a matter of implicit expectation. As important as the development of CT skills is considered to be, educators must take steps to make CT objectives explicit in courses and also to include them in both pre-service and in-service training and faculty development.
Chiu 1998	In this paper, meta-analysis is used to identify components that are associated with effective metacognitive training programs in reading research. Forty-three studies, with an average of 81 students per study, were synthesized. It was found that metacognitive training could be more effectively implemented by using small-group instruction, as opposed to large-group instruction or one-to-one instruction. Less intensive programs were more effective than intensive programs. Program intensity was defined as the average number of days in a week that instruction was provided to students. Students in higher grades were more receptive to the intervention. Measurement artifacts, namely teaching to the test and use of non-standardized tests and the quality of the studies synthesized played a significant role in the evaluation of the effectiveness of the metacognitive reading intervention.
Dignath et al. 2008	Recently, research has increasingly focused on fostering self-regulated learning amongst young children. To consider this trend, this article presents the results of a differentiated meta-analysis of 48 treatment comparisons resulting from 30 articles on enhancing self-regulated learning amongst primary school students. Based on recent models of self-regulated learning, which consider motivational, as well as cognitive, and metacognitive aspects (Boekaerts, M. (1999). Self-regulated learning: Where we are today. International Journal of Educational research, 31(6), 445–457), the effects of self-regulated learning on academic achievement, on cognitive and metacognitive strategy application, as well as on motivation were analyzed. As the results show, self-regulated learning training programmes proved to be effective, even at primary school level. Subsequent analysis tested for the effects of several moderator variables, which consisted of study features and training characteristics. Regarding factors that concern the content of the treatment, the impact of the theoretical background that underlies the intervention was tested, as well as the type of cognitive, metacognitive, or motivational strategy which were instructed, and if group work was used as instruction method. Training context related factors, which were included in the analyses, consisted of students' grade level, the length of the training, if teachers or researchers directed the intervention, as well as the school subject in which context the training took place. Following the results of these analyses, a list with the most effective training characteristics was provided.
Donker et al. 2014	In this meta-analysis the results of studies on learning strategy instruction focused on improving self-regulated learning were brought together to determine which specific analysis included 58 studies in primary and secondary education on interventions aimed at improving cognitive, metacognitive, and management strategy skills, as well as motivational aspects and metacognitive knowledge. A total of 95 interventions and 180 effect sizes demonstrated substantial effects in the domains of writing (Hedges' *g* = 1.25), science (.73), mathematics (.66) and comprehensive reading (.36). These domains differed in terms of which strategies were the most effective in improving academic performance. However, metacognitive knowledge instruction appeared to be available in all of them. Furthermore, it was found that the effects were higher when self-developed tests were used than in the case of intervention-independent tests. Finally, no differential effects were observed for students with different ability levels. To conclude, the authors have listed some implications of their analysis for the educational practice and made some suggestions for further research.
Haller et al. 1988	To assess the effect of "metacognitive" instruction on reading comprehension, 20 studies, with a total student population of 1,553, were compiled and quantitatively synthesized. For 115 effect sizes, or contrasts of experimental and control groups' performance, the mean effect size was .71, which indicates a substantial effect. In this compilation of studies, metacognitive instruction was found particularly effective for junior high students (seventh and eighth grades.) Among the metacognitive skills, awareness of textual inconsistency and the use of self-questioning as both a monitoring and a regulating strategy were most effective. Reinforcement was the most effective teaching strategy.
Higgins et al. 2005	Executive Summary Methods: Relevant studies in the area of thinking skills were obtained by systematically searching a number of online databases of educational research literature, by identifying references in reviews and other relevant books and reports, and from contacts with expertise in this

What we tried to do

- Summarise the evidence from meta-analysis about the impact of different strategies on learning (*tested attainment*) – series of related 'umbrella' reviews
  - As found in research studies
  - These are averages
- Apply quality criteria to evaluations: rigorous designs only
- Estimate the *size* of the effect
  - Standardised Mean Difference = 'Months of gain'
  - On tested attainment only
- Estimate the *costs* of adopting
  - Information not always available

Key issues

- The Toolkit *does not* provide definitive claims of ‘what works’ BUT attempts to give a best estimate of what has work***ed***

- Caution is needed since the applicability of an intervention to a new context may not be as effective
  - causal mechanism may not be identified
  - researcher-led interventions may differ from school-led
  - needs to be a solution to a problem to increase probability of benefit

- There is a lack of a clear causal link between general additional spending and learning

Current developments

Formalising methodology (translating/simplifying existing models)

- Cochrane/ Campbell/ EPPI
- PRISMA for reviews
- CONSORT for trials
- GRADE Guidelines for evidence

New comparable and updatable meta-analyses for each strand

- Identifying factors affecting current effect size estimates
- Design (sample size, randomisation, clustering)
- Measurement issues (outcome complexity, outcome alignment)
- Intervention (duration, intensity)

International partnerships

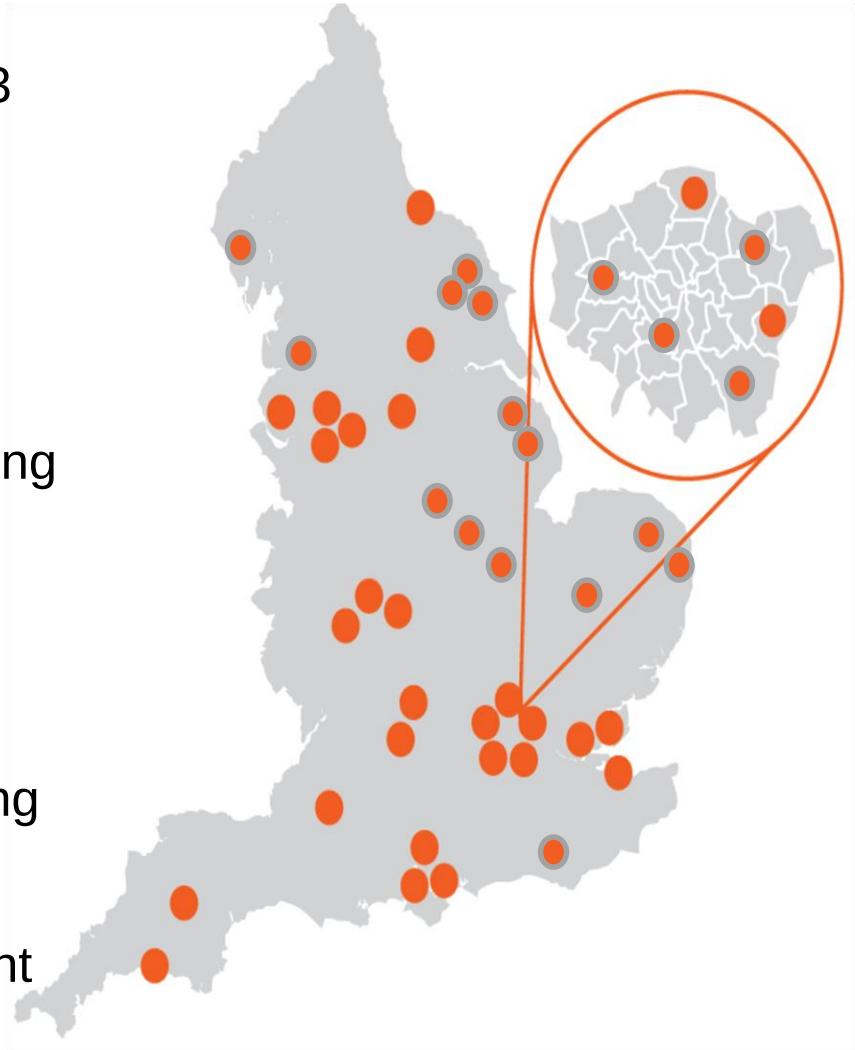
- Australia – 3 RCTs commissioned
- Latin America (Spanish and Portuguese versions of the toolkit
- Scotland

Disciplined innovation

More than 170 programmes working with 1:3 schools and approximately 1 million children that:

- Build on existing evidence
- Improve outcomes for FSM pupils
- Generate significant new understanding of ‘what worked’.
- Can be replicated cost effectively if proven to work.

Examples: Providing breakfast, addressing pupil well-being, using mobile technology to promote parental engagement, developing teaching approaches to promote assessment for learning…



Early Years: some results

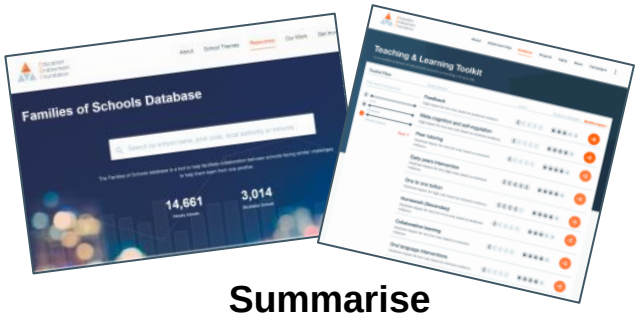
Project	Summary	Age	Toolkit theme	Effect size	Cost	Padlocks and stage
Supporting Parents on Kids' Education in Schools (SPOKES)	A ten-week intervention that teaches parents strategies to support their children's reading	***Reception/Y1***	*Parental engagement and literacy*	***+1 month***	**££££**£	🔒🔒🔒
Abracadabra (ABRA)	An online reading programme to improve early literacy	Y1	Literacy	**+3 months**	**£**£££	🔒🔒🔒🔒
Nuffield Early Language Intervention	Oral language intervention for nursery and reception pupils, delivered by TAs	EYFS	Communication and language	**+4 months**	**£**£££	🔒🔒🔒🔒
Magic Breakfast	Free breakfast for children before the start of the school day	Y2	School organisation	**+2 months**	**£**£££	🔒🔒🔒🔒
Talk of the Town	School and setting wide approach to improve speech, language and communication	Y2 (and 5)	Language and literacy	**0 months**	**££**£££	🔒🔒🔒🔒

Early Years: in progress

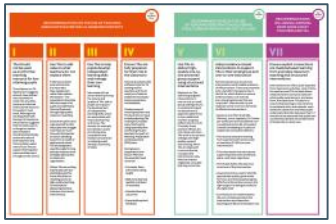
Project	Summary	Age	Developer / Evaluator	Size of trial	Report
Easy Peasy: Learning through play	Play-based learning app for parents	***3-4 years***	*Easy Peasy /* *Durham University*	***1,500 children in 120 settings***	Spring 2019
Maths Champions	Supporting nursery staff to develop children's early numeracy	2-4 year olds	NDNA & Oxford University / York Trials Unit	**2,000 children in 120 settings**	Summer 2018
Peep Learning together programme	Engaging parents in the early years	4-5 year olds	Peeple / Queens University Belfast	**1,500 children in 150 settings**	Summer 2019
URLEY	Using Research Tools to Improve Language in the Early Years	3-5 year olds	University of Oxford, UCL and A+ Education / Behaviour Insights and NIESR	**2,800 children in 120 schools**	Summer 2019

Generating evidence

Using evidence



Summarise existing evidence



Clear and actionable guidance for schools

Publish independent, rigorous evaluations

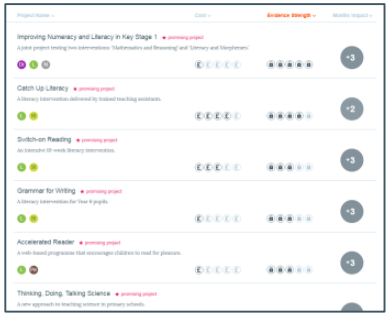
Fund innovative projects

Scale-up evidence-based programmes

Practical support to bring evidence to life

74 reports

109 RCTs



23 Research Schools

12 Advocate-partners

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