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Child Development and Learning Difficulties Lab

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Raising educational outcomes for students with SEND: Challenges and solutions

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Centre for Educational Neuroscience

CDLD

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Special Educational Needs

1) Communication and Interaction,
   - Autism
   - Speech language and communication needs
2) Cognition and Learning,
   - Learning Disabilities: Dyslexia, Dysgraphia, Dyscalculia, moderate/severe/profound learning disabilities.
   - Neurodevelopmental conditions: Down syndrome, Williams syndrome, Sotos syndrome,….
3) Social, Emotional and Mental Health
   - ADHD
   - SEBD
4) Physical and/or Sensory Needs.
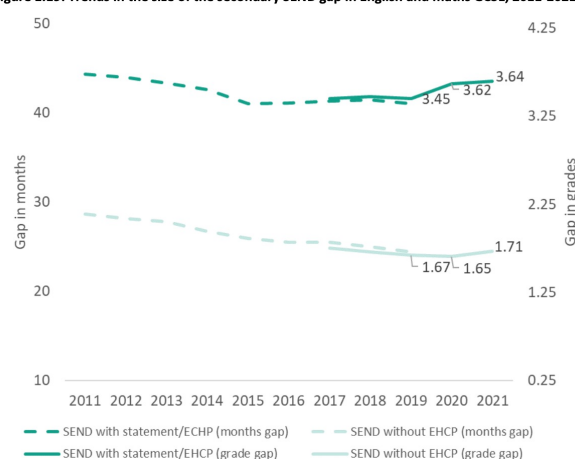   - Blindness, vision impairment, hearing impairment, deafness.

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Number of students with SEND currently in school in UK

EHC plans
389,171
pupils in schools in England. Up by 9.5% from 2022
▶ What is this?

EHC plans (percent)
4.3
percent of pupils with an EHC plan. Up from 4.0% in 2022
▶ What is this?

SEN support/SEN without an EHC plan
1,183,384
pupils in schools in England. Up by 4.7% from 2022
▶ What is this?

SEN support/SEN without an EHC plan (percent)
13.0
percent of pupils with SEN support. Up from 12.6% in 2022
▶ What is this?

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- Educational outcomes for those with SEND are often lower compared to those without SEND

- This gap has become larger as a result of the COVID-19 pandemic

Figure 1.19: Trends in the size of the secondary SEND gap in English and maths GCSE, 2011-2021

Gap in months — Gap in grades
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
3.45 3.62 3.64
1.67 1.65 1.71

- - SEND with statement/ECHP (months gap)   - - SEND without EHCP (months gap)
— SEND with statement/EHCP (grade gap)   — SEND without EHCP (grade gap)

(Tuckett et al., 2021, Education Policy Institute)

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- Educational outcomes for those with SEND are often lower compared to those without SEND
- Starts in primary school (Year 6, NPD data)
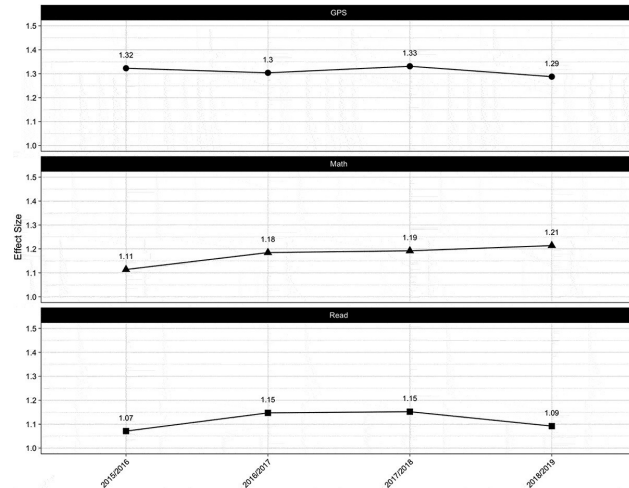
(Daniel, 2024, University of Durham)

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- Early Years Foundation Stage Profile:

in 2021/22, 19% of children with SEN achieved a good level of development, which is 6 percentage points lower than the figure for 2018/19 of 25%

- KS1: teachers assessment expected standard met (%)

Percentage	2018/19		2021/22	
Teacher Assess-ment	SEN	No SEN	SEN	No SEN
Reading TA	30	83	26	75
Writing TA	22	78	17	66
Maths TA	33	84	29	75

DfE, June 2023

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Challenge 1: current evidence base

- Identifying behavioural profiles and genetic syndromes
- Identifying sub-types, dimensions of variation, comorbidities, age of onset
- Identifying principal causes (genetic, environmental)
- Identifying best behavioural and clinical biomarkers and prognoses

Despite variability, phonological deficit is core to dyslexia

Theory-of-mind reasoning different in ASD

Children with Williams syndrome appear very social but this masks high anxiety

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Gaps

What areas has research focused on?

DS, FXS and WS combined

- Diagnosis 18%
- Cognition 22%
- Co-occurring conditions 23%
- Biology and brain 13%
- Risk factors <1%
- Treatments and interventions 9%
- Services 9%
- Lifespan issues 3%
- Societal issues 1%
- Research infrastructure <1%

TREATMENTS AND INTERVENTIONS

MENTAL HEALTH

MEDICAL ISSUES

TRAINING AND AWARENESS

OPPORTUNITIES FOR ADULTS

Cristescu, Scerif, Pellicano, Van Herwegen, & Farran (2024). Shape Research, Change Lives: Setting priorities in genetic syndrome research.

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Challenge 2: Teacher knowledge

- Teachers have limited understanding of certain types of SEND

✓	1 Not familiar at all	2 Slightly familiar	3 Moderately familiar	4 Very familiar	5 Extremely familiar	
Autism	1	20	36	90	82	919
ADHD	7	33	55	87	47	821
Dyslexia	2	34	71	74	48	819
DLD	35	54	64	48	28	667
DCD	26	65	74	44	20	654
Dyscalculia	30	67	82	37	12	618
Down syndrome	43	64	65	41	16	610
William syndrome	159	34	19	14	3	355

UK Survey
299 participants (132 teachers, 69 TAS, 28 other educators, school leadership 38, SENCo/INCO 72 maths lead 19)

(*V*an Herwegen, Outhwaite, & Herbert, L. (2024). *British Journal of Special Education)*

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Professionals' knowledge and beliefs

"Professionals highlighted relevant areas of difficulty for these children, but they did not recognise some of the less phenotypical difficulties that children with a specific disorder may experience. In addition, there was a disconnect between the difficulties identified by the professionals and the type of specialist support that may be necessary."

Views of professionals about the educational needs of children with neurodevelopmental disorders

Jo Van Herwegen [a], Maria Ashworth [a], Olympia Palikara [b]

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A persistent research-practice gap remains

- Pegram et al. (2022) found that out of 138 different interventions used across 10 Welsh schools, 67% had no published research evidence to support them.

- Teacher recognise importance of research evidence but are not confident to engage with it (Coldwell et al., 2017).

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Teachers and Continued Professional Development around SEND

- Online survey for school staff (n= 1178) from mainstream and special schools

- SEND–related CPD is not a priority

- Little evidence of strategic responses to external or internal drivers within schools

- SEND CPD is not evaluated and thus no needs analysis.

School leaders	143
Sencos and SEN managers	597
Classroom Teachers	151
Teaching Assistants	39
Specialist teachers and professionals	144
Other	103

Wall, Van Herwegen et al., (2019)

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Challenge 3: Translation

Evidence-based resources and frameworks done by organisations (e.g. The Communication Trust, The Dyslexia-SpLD Trust, The Autism Education Trust, The Council for Disabled Children)

Organised by 'Universal, Targeted, Specialist', it covers strategies, identification and frameworks to assess school provision and staff knowledge
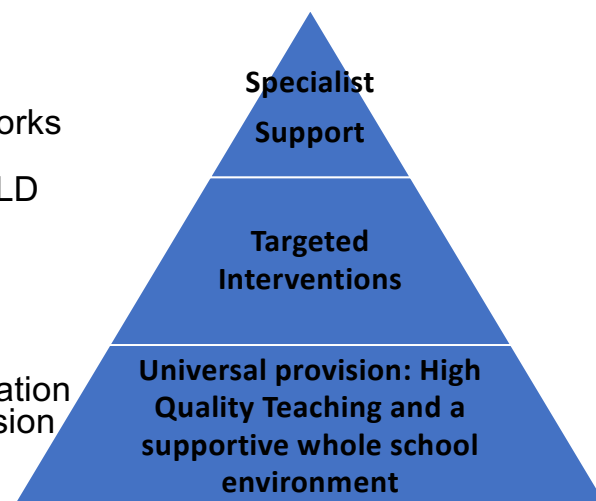
Specialist Support

Targeted Interventions

Universal provision: High Quality Teaching and a supportive whole school environment

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Universal **(Tier 1)**
- **EEF**

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Targeted (Tier 2)

• **Interventionsforliteracy.org.**

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nasen SEND Gateway

Whole School SEND

Find WSS Resources

What Works

https://www.sendgateway.org.uk/whole-school-send/what-works/

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Challenge 4: diagnostic labels

Issues of diagnostic labels and needs
- Diagnoses are highly comorbid (20-80%)
- Many symptoms in common: problems in working memory, phonological processing, executive functions, inattention
- Symptom variability is very high for children with the same diagnosis
- Routes to diagnosis are haphazard
- CALM Study (Gathercole): treat individual behaviours, not disorder categories
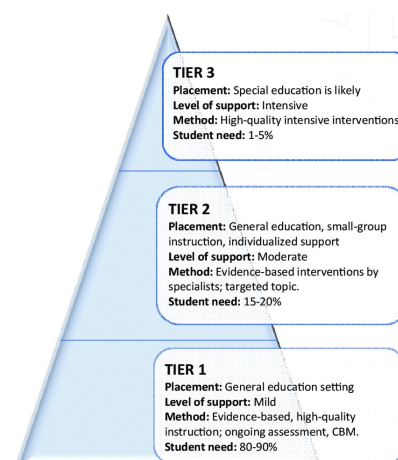
Currently: many different sites for different needs, many reviews are diagnosis based.

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In summary

Current evidence base:
- Doesn't disentangle targeted interventions (Tier 2 & 3) from universal provision (Tier 1).

- Doesn't always focus explicitly on SEND alone (e.g., below average attainment)

- Doesn't look across different SEND needs (e.g., dyslexia AND speech language needs)

TIER 3
Placement: Special education is likely
Level of support: Intensive
Method: High-quality intensive interventions
Student need: 1-5%

TIER 2
Placement: General education, small-group instruction, individualized support
Level of support: Moderate
Method: Evidence-based interventions by specialists; targeted topic.
Student need: 15-20%

TIER 1
Placement: General education setting
Level of support: Mild
Method: Evidence-based, high-quality instruction; ongoing assessment, CBM.
Student need: 80-90%

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MetaSENSE as a solution

1) Examine what works to improve academic outcomes for pupils with SEND.

- Which targeted interventions work best to improve academic outcomes for which SEND groups?
- What intervention characteristics are associated with greater effectiveness, and for which SEND groups?

2) Identify any gaps in the research.

- What evidence is missing and for whom?
- Which types of new interventions should be developed, and for which SEND categories?

3) Identify methodological issues.

- Recommendations for future intervention evaluations.
- Identification of external validity issues in the existing literature.

4) How do educational professionals currently select which targeted interventions to use and what are current barriers to their implementation or provision of more effective strategies outlined in the meta-analysis?

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Methodology

- Phase 1: synthesise evidence of what works to raise educational outcomes for different pupils with SEND aged 4 to 25 in a systematic review followed by a meta-analysis
    - PRISMA guidelines
    - pre-registered on the Open Science Framework (currently embargoed)

- Phase 2: identify barriers that educational professionals face in implementing the most effective practices indicated by the evidence through in-depth interviews.

- Phase 3: co-produce a database that will allow practitioners and parents to make research informed decisions.

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Slide 21

PRISMA flow diagram

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Identification of studies via databases and registers

Identification of studies via other methods

Identification

Records identified from:

Databases (n = 120,369)

Records removed *before screening*:

Duplicate records removed.

(n = 64,805)

Records identified from:

Clearinghouses (n = 185)

Screening

Records screened (n = 55,564)

Records excluded (n = 51,338)

Reports sought for retrieval (n = 4,226)

Reports not retrieved (n = 22)

Reports sought for retrieval (n = 185)

Reports not retrieved (n = 0)

Reports assessed for eligibility (n = 4,204)

Reports excluded (n=3779):
Duplicate (n=46)
Non-English language (n=85)
Review or report (n=412)
Not a quant evaluation (n=315)
Non-psychosocial (n=73)
Non-relevant outcome (n =694)
Parent or teacher focus (n=38)
No control group (n = 654)
Non-SEND (n = 625)

Reports assessed for eligibility (n = 185)

Reports excluded (n=175):
Pre 2000 (n=3)
Duplicate (n=25)
Review or report (n=10)
Not a quant evaluation (n=3)
Non-psychosocial (n=2)
Non-relevant outcome (n =15)
Parent or teacher focus (n=1)
No control group (n = 2)
Non-SEND (n = 105)

Included

Studies included in review (n = 467)

Reports of included studies (n = 435)

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Main findings: Narrative review

- Number of studies has increased but is low
- Most studies from USA, only 21 studies from UK
- Most focus on primary school students (58%)
- The majority of the studies (84%) included a control group that had SEND
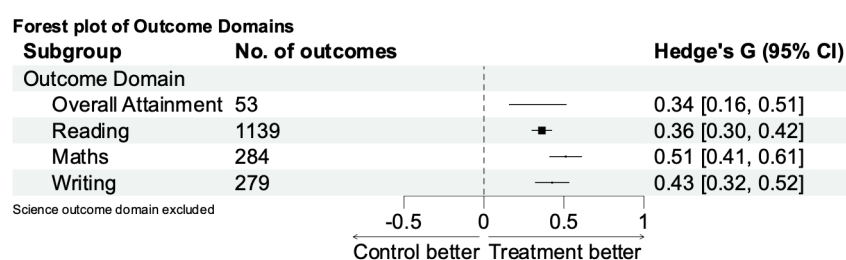

NUMBER OF INTERVENTION BY PUBLICATION YEAR

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Main findings: Aim 1 – What Works?

We find targeted interventions work for all outcome domains and work with moderate to large mean effects:

Overall effect: g= .44 (equivalent to 5 months progress)

Forest plot of Outcome Domains

Subgroup	No. of outcomes		Hedge's G (95% CI)
Outcome Domain			
Overall Attainment	53		0.34 [0.16, 0.51]
Reading	1139		0.36 [0.30, 0.42]
Maths	284		0.51 [0.41, 0.61]
Writing	279		0.43 [0.32, 0.52]

Science outcome domain excluded

-0.5   0   0.5   1

Control better   Treatment better

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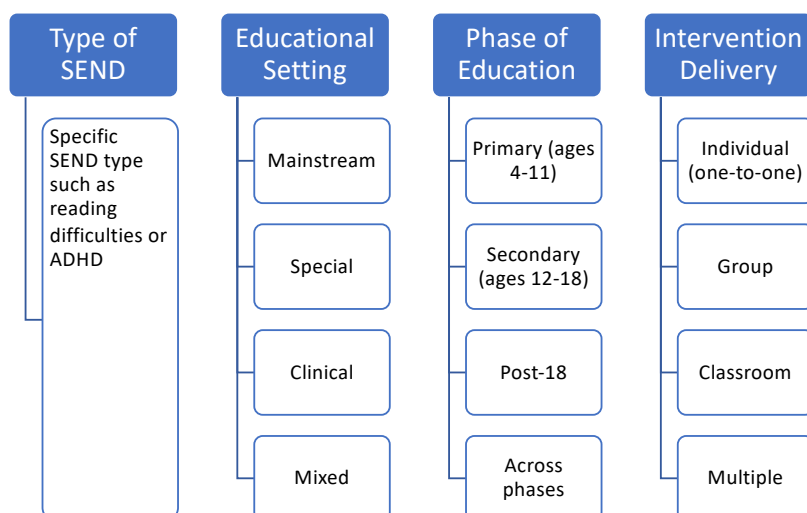# Key findings 1

Growing body of evidence

Targeted interventions can raise educational outcomes by an average of five months of progress compared to those receiving teaching-as-usual or active control interventions. There is evidence that some interventions can be effective.

Higher effect size for maths than for reading

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Main findings: Meta-analysis (methodology)

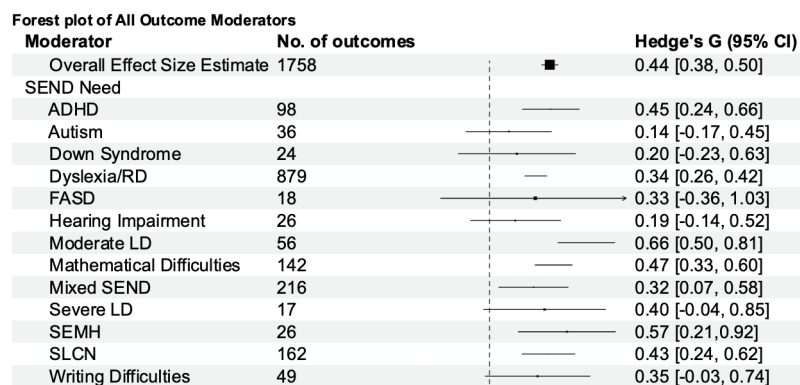| Type of SEND	Educational Setting	Phase of Education	Intervention Delivery
Specific SEND type such as reading difficulties or ADHD	Mainstream	Primary (ages 4-11)	Individual (one-to-one)
	Special	Secondary (ages 12-18)	Group
	Clinical	Post-18	Classroom
	Mixed	Across phases	Multiple

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Main findings: Aim 1 – What Works?

Generally positive findings for different SEND groups:

- Interventions work for specific learning difficulties (reading & mathematical difficulties)

- Evidence in favour of ADHD, MLD, SEMH, SLCN.

- Other SEND groups have less available evidence.

Forest plot of All Outcome Moderators

Moderator	No. of outcomes	Hedge's G (95% CI)
Overall Effect Size Estimate	1758	0.44 [0.38, 0.50]
SEND Need		
ADHD	98	0.45 [0.24, 0.66]
Autism	36	0.14 [-0.17, 0.45]
Down Syndrome	24	0.20 [-0.23, 0.63]
Dyslexia/RD	879	0.34 [0.26, 0.42]
FASD	18	0.33 [-0.36, 1.03]
Hearing Impairment	26	0.19 [-0.14, 0.52]
Moderate LD	56	0.66 [0.50, 0.81]
Mathematical Difficulties	142	0.47 [0.33, 0.60]
Mixed SEND	216	0.32 [0.07, 0.58]
Severe LD	17	0.40 [-0.04, 0.85]
SEMH	26	0.57 [0.21,0.92]
SLCN	162	0.43 [0.24, 0.62]
Writing Difficulties	49	0.35 [-0.03, 0.74]

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Key findings 2

The type of setting in which an intervention was delivered – mainstream or special – had no effect on reading or writing outcomes, but students in mainstream schools showed larger positive mathematical outcomes following an intervention than those in special schools.

Intervention effects did not vary according to delivery

If you have the choice between two interventions, then these factors will not play a role.

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Key findings 3

Research needs to be more targeted:
- Research on improving outcomes for SEND to date is skewed: most studies focus on reading interventions, very little known about particular SEND groups other than dyslexia/ reading difficulties.

- Very few studies focus on what works in secondary school.

- Some promising interventions but larger UK based trials needed (most have less than 50 participants).

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Phase 2: Methods interviews

- Online interviews 35-45 minutes
- Interviewees were asked to reflect on:
  - The targeted intervention approaches they use to support for students with SEND
  - How they arrived at these approaches
  - What evidence they use to implement
  - How they monitored the effectiveness of the interventions, in terms of the assessment strategies they used but also when and how they reviewed which targeted approaches should be replaced.

  Follow-up questions and probes were used to generate further explanation from participants.

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Conclusions: interviews

- **Research evidence**: educational practitioners varied in their understanding of evidence-informed practice and how to go about it. Barriers included access to research but also training to understand this evidence. All practitioners mentioned the need for a trusted source of research evidence.
- **Intervention approaches**: they welcomed approaches that could be implemented flexibly and adapted to the needs of the individual students, as well as those that require less training.
- Few **differences between the educational practitioners** but the ability for flexibility was greater for primary than for secondary school staff. Those developing policies and training as well as those designing interventions should consider these structural differences between primary and secondary educational settings.

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Key findings 4

Interviews revealed that practitioners experienced barriers in trying to implement interventions and that they had limited awareness of rigorous scientific methodologies such as the use of control groups and randomised controlled trials (that is, the methods that produce more robust evidence).

Practitioners would benefit from access to research (one stop) and research literacy training
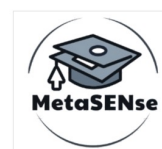
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Introduction Toolkit

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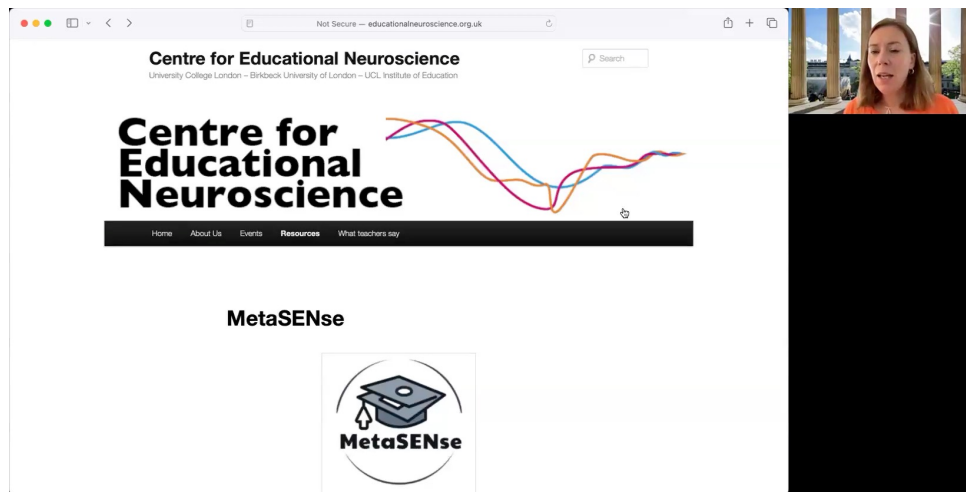Home   About Us   Events   **Resources**   What teachers say

MetaSENse

MetaSENse

Raising educational outcomes for students with SEN and disabilities (MetaSENse)

http://www.educationalneuroscience.org.uk/metasense/

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What interventions can improve mathematical abilities in KS1

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Recommendations

1. Funders and academics should invest in a more balanced evidence base
2. There should be increased opportunities for collaboration between researchers and educational practitioners.
3. Policy makers and higher education providers should ensure that practitioners have more training in evaluating evidence related to interventions and what works in their classrooms.
4. Policy makers should establish a new national database on the outcomes of SEND interventions

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Take home: Raising educational outcomes

- Educational outcomes for SEND are lower and growing number
- Getting clear evidence of what works (tier 2 and tier 3 types of interventions) for different groups of SEND is difficult
- Teachers do not always know how to evaluate what works and for whom
- MetaSENse database.

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Future work

- Critical components of targeted interventions
- Many toolkits and advice: the need for a trusted source?
- Capture more data on what works in schools
- Policy: make training part of EHCPs

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Thank you

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- Prof Julie Dockrell, Dr Rebecca Gordon, prof Chloe Marshall, Prof Michael Thomas,
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- Advisory board: Professor Lani Florian, Professor Alison O'Mara-Eves, Jonathan Kay, Vijita Patel, Dr Jeremy J. Monsen, Dr Erin Early, and Dr Aikaterini Kassavou.

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