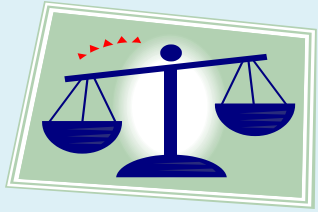


An Evidence-Based Approach for Enhancing Learning: 10 Key Strategies

*Dr David Mitchell
University of Canterbury
New Zealand*

2014



Evidence-based Teaching

What are evidence-based teaching strategies?

“clearly specified teaching strategies that have been shown in controlled research to be effective in bringing about desired outcomes in a delineated population of learners.”

What Really Works in Special and Inclusive Education

Using evidence-based
teaching strategies

DAVID MITCHELL

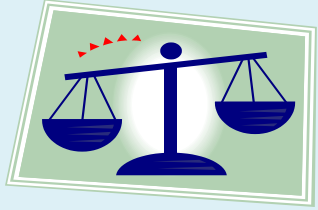
2ND EDITION

WHAT REALLY WORKS in Special and Inclusive Education

Using evidence-based teaching strategies

David Mitchell

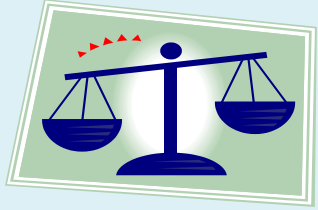




Evidence-based Teaching

What do we mean by evidence?

1. Treatment fidelity
2. Behavioural outcomes are clearly described
3. Learner characteristics are clearly described
4. Variables are controlled
5. Freedom from contamination
6. Acceptable side effects
7. Sound theory underlying the intervention
8. Adequate follow-up
9. Research has been carried out in natural conditions
10. Published results have been reviewed by peers
11. Research has been replicated
12. Intervention is cost effective
13. Research is accessible



Evidence-based Teaching

What do we mean by evidence?

Meta-analyses

- synthesise results from a range of similar studies

Effect size

***** Convincing: 0.7 or greater:*

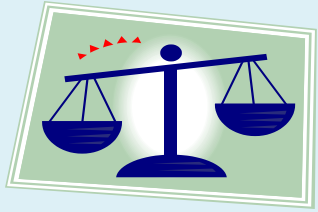
percentile scores increase from 50 to 76+, for example

**** Good: 0.31-0.69*

percentile scores increase from 50 to 62-75

** Modest: 0.2-0.3*

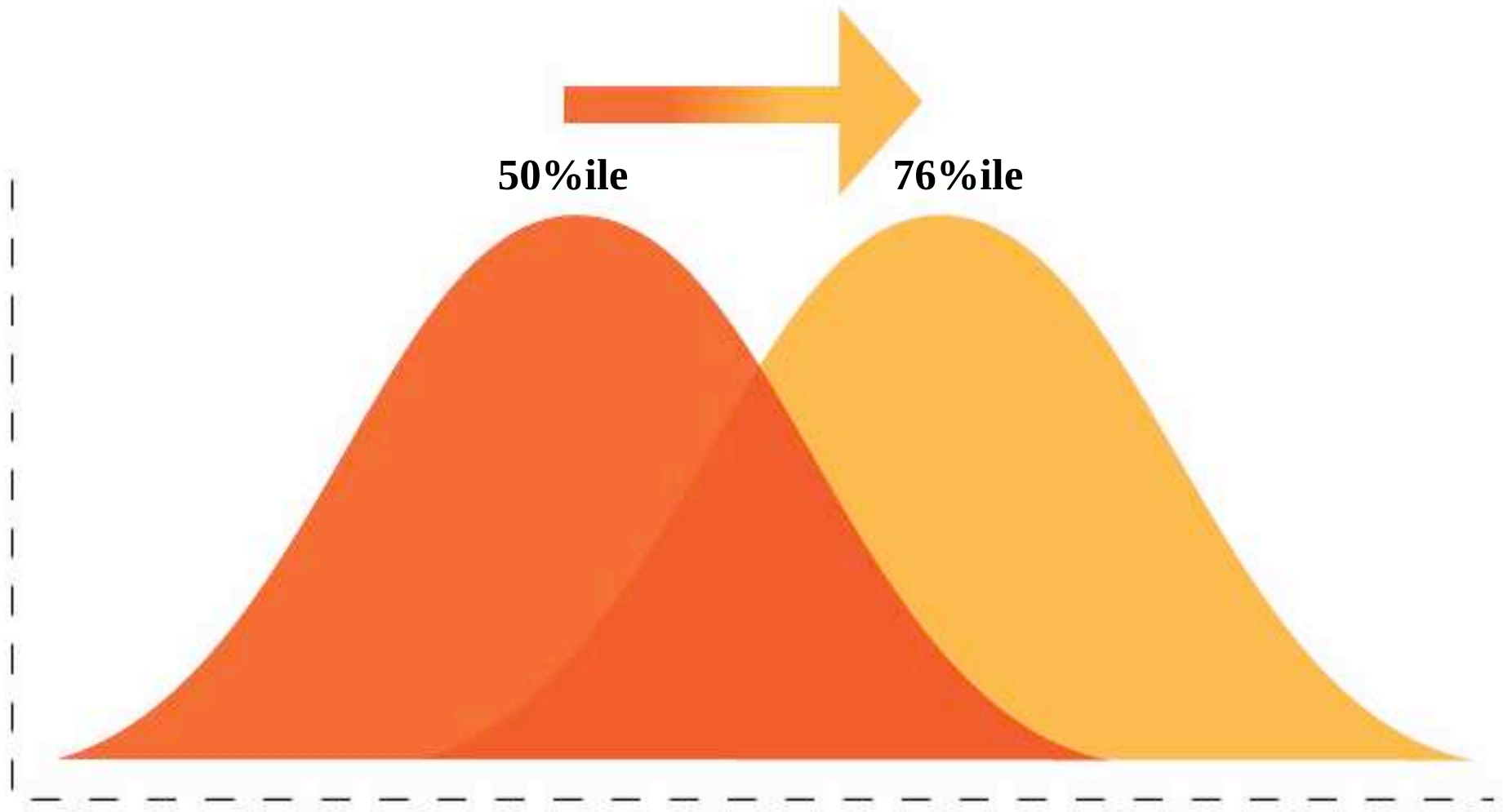
percentile scores increase from 50 to 58-61

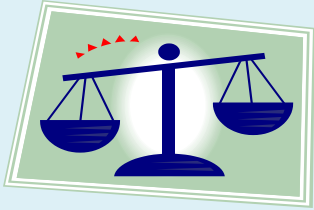


Evidence-based Teaching

What do we mean by evidence?

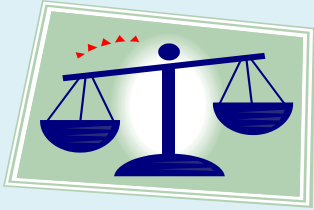
Effect size = 0.7





Using Evidence-based Teaching Strategies

Strategy	Rating
✓Cooperative group teaching	****

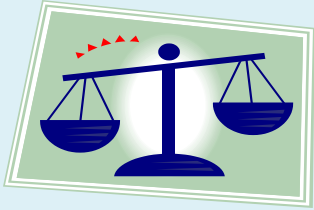


Using Evidence-based Teaching Strategies

1. Co-operative Group Teaching

?Help learners to learn from each other?

Learners work together in small groups, helping each other to carry out individual and group tasks.



Using Evidence-based Teaching Strategies

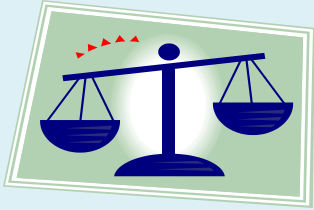
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Two types of groups

- * Mutual assistance groups
- * Cooperative groups (jig-saw puzzle)



Using Evidence-based Teaching Strategies

1. Co-operative Group Teaching

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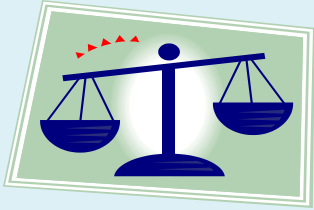
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- * Mutual assistance groups
- Cooperative groups (jig-saw puzzle)

What are the teacher's roles in cooperative group teaching?

- * Design appropriate group tasks
- * Teach group process skills
- * Deal with problems



Using Evidence-based Teaching Strategies

1. Co-operative Group Teaching

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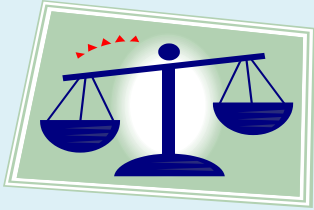
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Ability vs mixed ability groups



Using Evidence-based Teaching Strategies

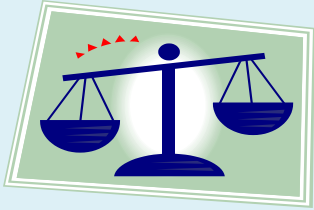
1. Co-operative Group Teaching

The evidence

Hattie: Effect size for all learners: 0.59

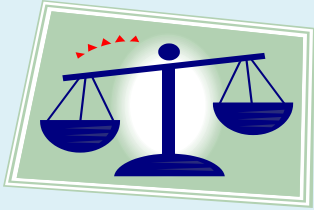
1987 US study:

- elementary school
- students with learning disabilities
- 22 3rd and 4th grade classes:
 - * 9 used Cooperative Reading and Composition in heterogeneous groups
 - * 13 controls
- Students in Cooperative classes did best on reading & writing



Using Evidence-based Teaching Strategies

Strategy	Rating
✓ Cooperative group teaching	****
✓ Peer tutoring	****

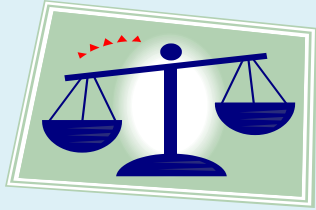


Using Evidence-based Teaching Strategies

2. Peer Tutoring

utilise peers to teach each other?

One learner (a ?tutor) assists another learner (a ?tutee?) with a task.



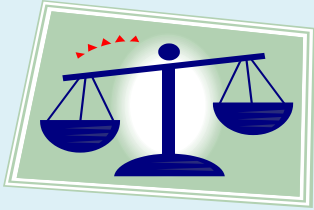
Using Evidence-based Teaching Strategies

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Using Evidence-based Teaching Strategies

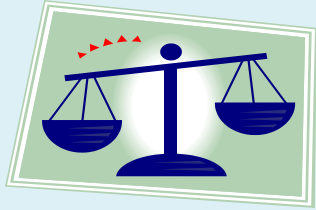
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One learner (a ?tutor) assists another learner (a ?tutee?) with a task.

Who benefits from peer tutoring?

How does peer tutoring work?



Using Evidence-based Teaching Strategies

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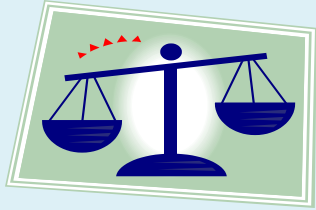
utilise peers to teach each other?

One learner (a ?tutor) assists another learner (a ?tutee?) with a task.

Who benefits from peer tutoring?

How does peer tutoring work?

How can we reduce any risks of peer tutoring?



Using Evidence-based Teaching Strategies

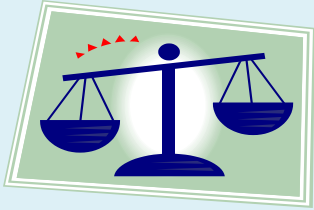
2. Peer Tutoring

The evidence

Hattie: Effect size for all learners: 0.55

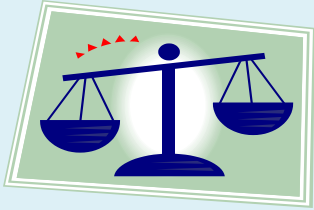
New Zealand study:

- * 11-year-olds tutored 6-year-olds
- * 10 weeks: 4 20-minute sessions per week
- * Responsive feedback emphasised
- * Both tutees and tutors made gains in writing rate and accuracy



Using Evidence-based Teaching Strategies

Strategy	Rating
✓1.Cooperative group teaching	****
✓2.Peer tutoring	****
✓3.Parent involvement & support	****

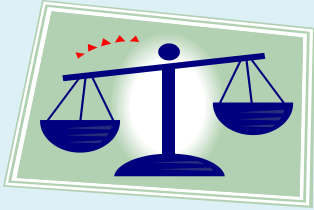


Evidence-based Teaching

3. Parent Involvement & Support

?respect parents?rights, skills and needs?

Parents play a very important role in educating and supporting learners with special needs.



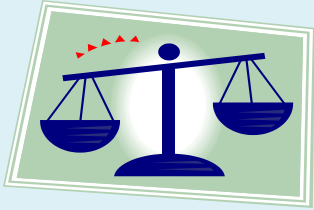
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They should be involved in developing individual education programs and have a major say in their children's placement.



Evidence-based Teaching

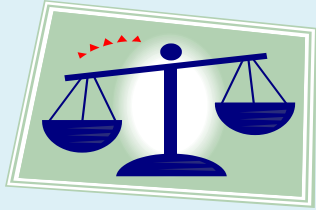
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Parents play a very important role in educating and supporting learners with special needs.

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Some will need counselling.



Evidence-based Teaching

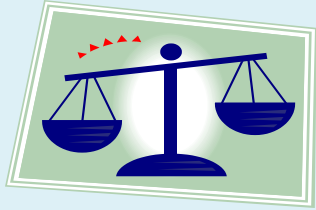
3. Parent Involvement & Support

The evidence

Hattie: parents' expectations: Effect size 0.80

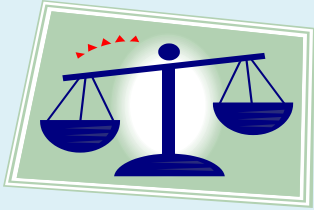
Incredible Years programme: a New Zealand study:

- 214 parents
- at least 9 sessions, videotape modelling + discussion
- significant improvements in children's behaviour (effect sizes 0.50-0.77)
- both Maori and non-Maori parents satisfied



Using Evidence-based Teaching Strategies

Strategy	Rating
✓1. Cooperative group teaching	****
✓2. Peer tutoring	****
✓3. Parent involvement & support	****
✓4. Cognitive strategy instruction	*** _{1/2}

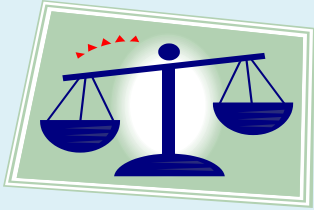


Evidence-based Teaching

4. Cognitive Strategy Instruction

?teach learners ways of thinking?

Help children how to learn, as well as what to learn.



Evidence-based Teaching

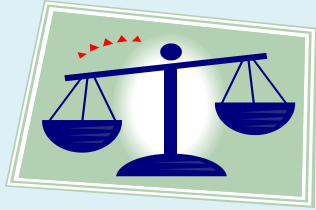
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Teach such skills as:

- *visualizing*
- *planning*
- *self-regulation*
- *remembering*
- *analyzing*
- *predicting*
- *thinking about their thinking*



Evidence-based Teaching

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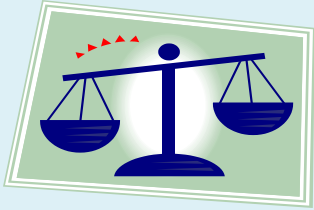
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General strategy instruction: think ahead, think during, think back



Evidence-based Teaching

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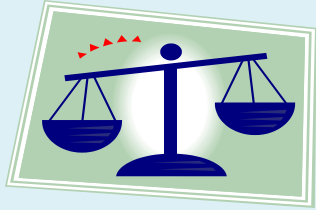
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- *predicting*
- *thinking about their thinking*

General strategy instruction: think ahead, think during, think back

Specific strategy instruction, e.g., story-writing:

W W W What=2, How=2



Evidence-based Teaching

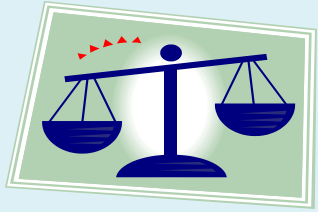
4. Cognitive Strategy Instruction

The evidence

Hattie: Teaching metacognition: Effect size = 0.69

US review of several studies of teaching mathematics to middle and secondary school students with learning disabilities:

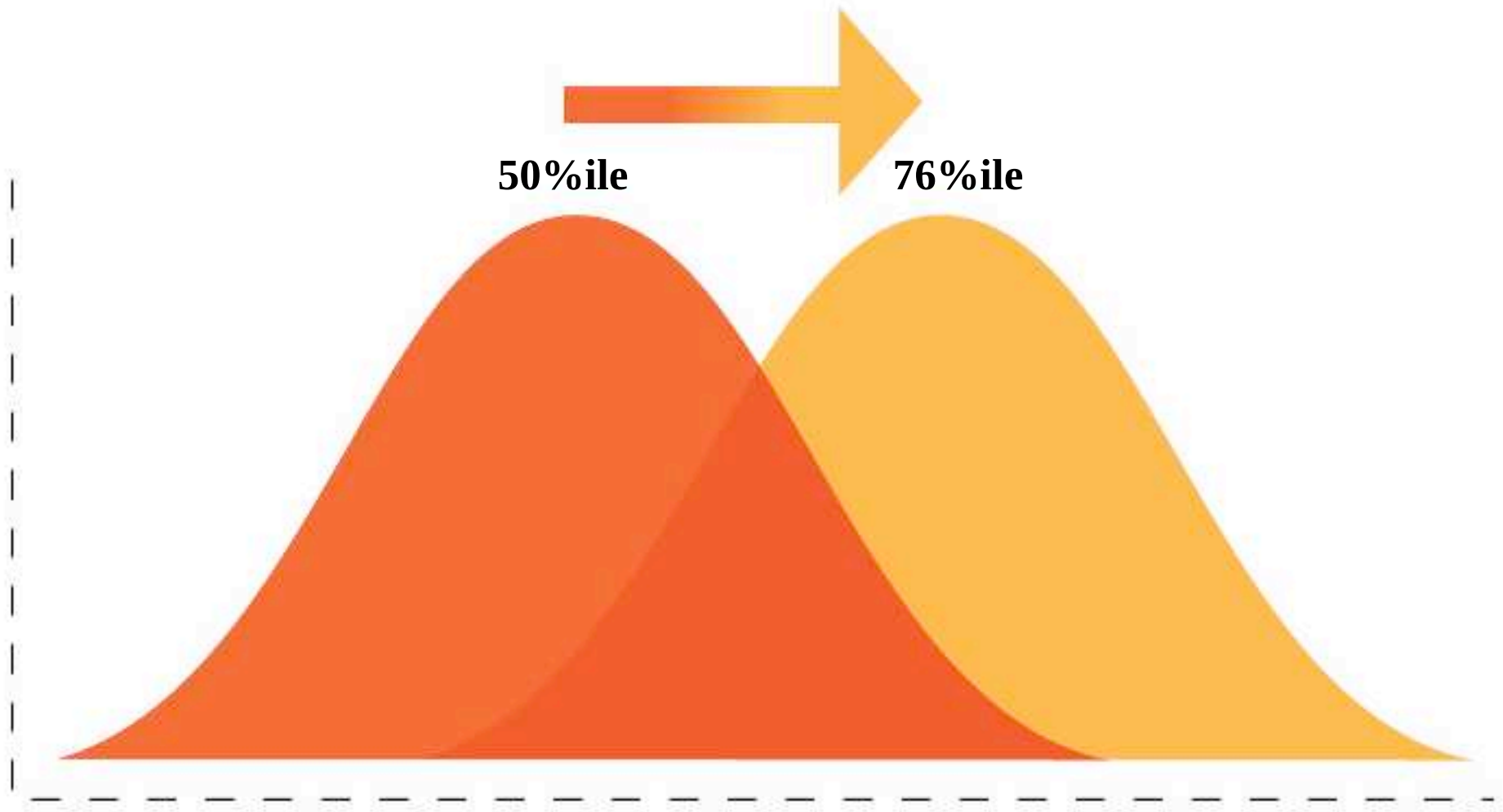
- Students taught to READ, PARAPHRASE, VISUALIZE, HYPOTHESIZE, ESTIMATE, COMPUTE AND CHECK
- Results: students improved mathematical problem-solving

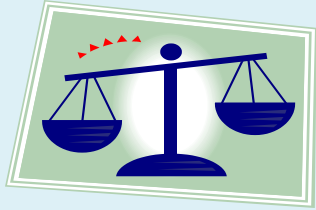


Evidence-based Teaching

What do we mean by evidence?

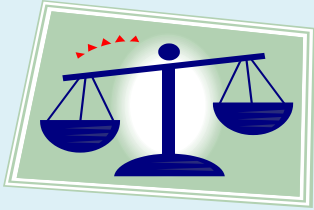
Effect size = 0.7





Using Evidence-based Teaching Strategies

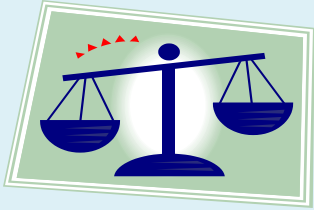
Strategy	Rating
✓1. Cooperative group teaching	****
✓2. Peer tutoring	****
✓3. Parent involvement and support	****
✓4. Cognitive strategy instruction	*** _{1/2}
✓5. Memory strategies	****



Evidence-based Teaching

5. Memory Strategies

help learners remember important information?

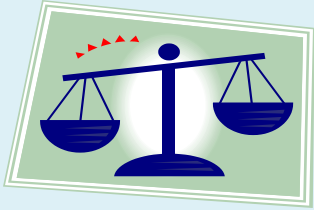


Evidence-based Teaching

5. Memory Strategies

help learners remember important information?

Teach short-term and long-term memory strategies



Evidence-based Teaching

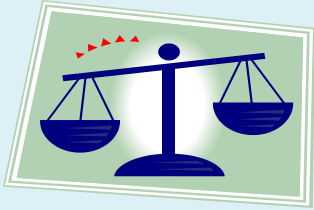
5. Memory Strategies

help learners remember important information?

Teach short-term and long-term memory strategies

Some methods:

- *key facts in primary memory*
- *mnemonics*
- *attending to important features of a task*
- *rehearsal*
- *mental representations*
- *chunking*



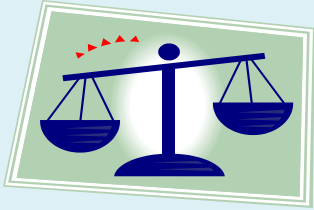
Evidence-based Teaching

5. Memory Strategies

The evidence

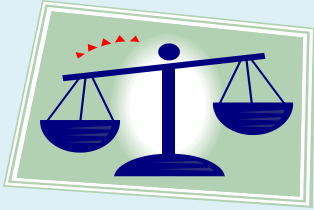
Mnemonics:

e.g. a recent meta-analysis on using mnemonics with learners with mild disabilities: effect size = 1-38



Using Evidence-based Teaching Strategies

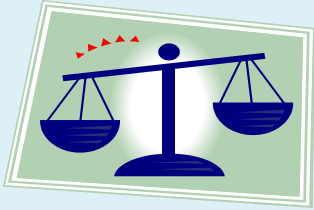
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✓4. Cognitive strategy instruction	*** _{1/2}
✓5. Memory strategies	****
✓6. Review and practice	****



Evidence-based Teaching

6. Review and Practice

?practice makes perfect?



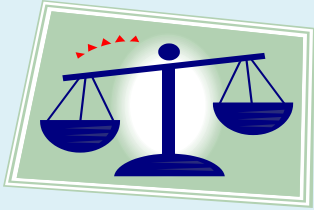
Evidence-based Teaching

6. Review and Practice

?practice makes perfect?

Three key ideas:

provide opportunities to engage with the same
idea at different *times*



Evidence-based Teaching

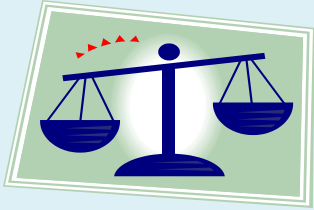
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Evidence-based Teaching

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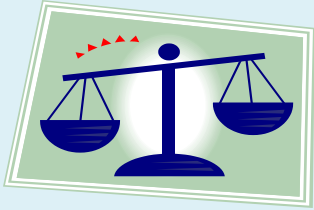
?practice makes perfect?

Three key ideas:

provide opportunities to engage with the same idea at different *times*

provide opportunities to practice new skills in different *contexts*

give appropriate homework



Evidence-based Teaching

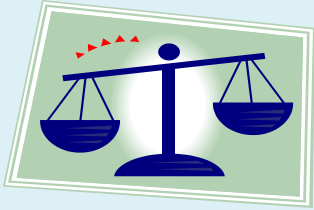
6. Review and Practice

The evidence

Hattie: spaced practice: Effect size = 0.71

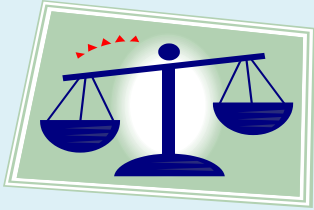
A 2001 meta-analysis of 93 studies of adolescents with learning disabilities:

- explicit practice the single most important strategy



Using Evidence-based Teaching Strategies

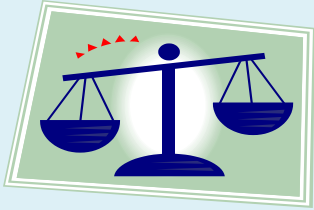
Strategy	Rating
✓7. Behavioural approaches	****



Evidence-based Teaching

7. Behavioural Approaches

?control antecedents and consequences to change behaviors?

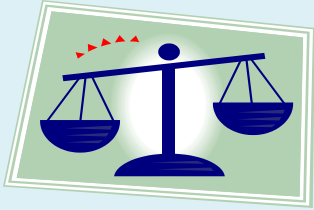


Evidence-based Teaching

7. Behavioural Approaches

?control antecedents and consequences to change behaviors?

Focus on events that occur before or after children do something.



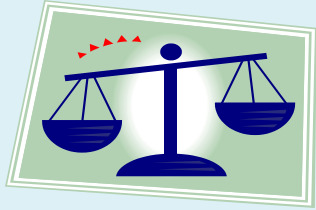
Evidence-based Teaching

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Positive reinforcement is most important.



Evidence-based Teaching

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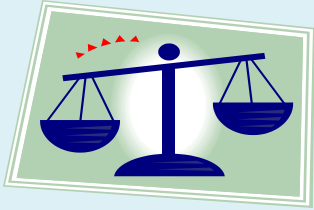
?control antecedents and consequences to change behaviors?

Focus on events that occur before or after children do something.

Positive reinforcement is most important.

Functional behavioral assessment:

- Analyse what purposes are served by undesirable behaviours
- Design an appropriate behavioural intervention programme to replace undesirable behaviours with more acceptable ones and extinguish undesirable behaviours.



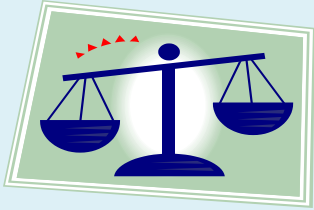
Evidence-based Teaching

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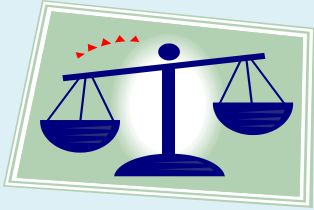
Comprehensive review of meta-analyses involving 20 strategies:

- Behaviour modification placed third:
- Social outcomes: Effect size = 0.69
- Academic outcomes: Effect size = 1.57



Using Evidence-based Teaching Strategies

Strategy	Rating
✓6. Review and practice	****
✓7. Behavioural approaches	****
✓8. Formative assessment & feedback	****

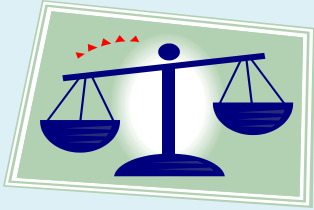


Evidence-based Teaching

8. Formative Assessment and Feedback

?regularly check and inform learners of their progress?

Probe for knowledge and understanding within lessons



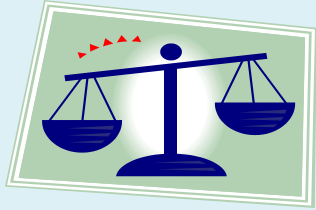
Evidence-based Teaching

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Adjust teaching methods



Evidence-based Teaching

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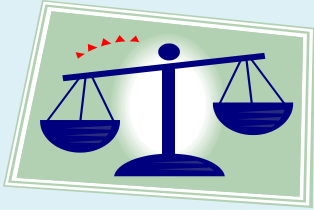
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Probe for knowledge and understanding within lessons

Adjust teaching methods

Feedback should be:

- timely
- explicit
- focused on learner's strategies
- able to be used by the learner



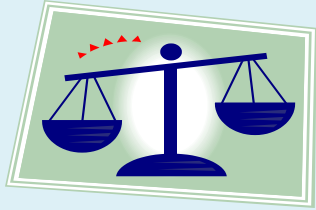
Evidence-based Teaching

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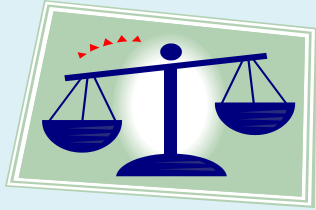
Hattie: formative evaluation: Effect size = 0.90

feedback: Effect size = 0.73



Using Evidence-based Teaching Strategies

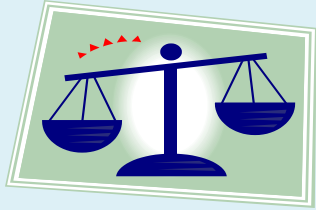
Strategy	Rating	
✓6. Review and practice	****	
✓7. Behavioural approaches	****	
✓8. Formative assessment & feedback	****	
✓9. Optimal physical environment	****	



Evidence-based Teaching

9. Optimal Physical Environment

?provide a physical environment that enables learning?



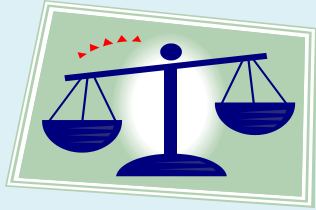
Evidence-based Teaching

9. Optimal Physical Environment

?provide a physical environment that enables learning?

Pay attention to

- * the design and arrangement of furniture



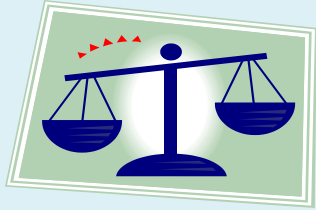
Evidence-based Teaching

9. Optimal Physical Environment

?provide a physical environment that enables learning?

Pay attention to

- * the design and arrangement of furniture
- * acoustics



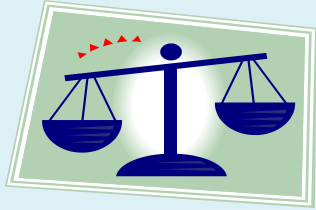
Evidence-based Teaching

9. Optimal Physical Environment

provide a physical environment that enables learning?

Pay attention to

- * the design and arrangement of furniture
- * acoustics
- * lighting



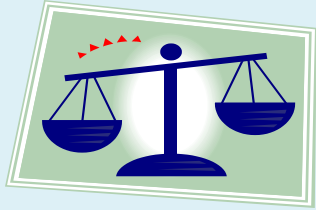
Evidence-based Teaching

9. Optimal Physical Environment

provide a physical environment that enables learning?

Pay attention to

- * the design and arrangement of furniture
- * acoustics
- * lighting
- * temperature



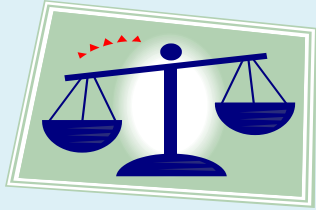
Evidence-based Teaching

9. Optimal Physical Environment

provide a physical environment that enables learning?

Pay attention to

- * the design and arrangement of furniture
- * acoustics
- * lighting
- * temperature
- * ventilation

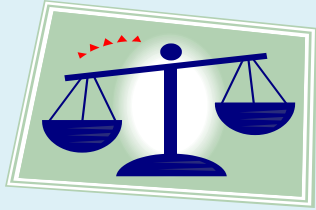


Evidence-based Teaching

9. Optimal Physical Environment

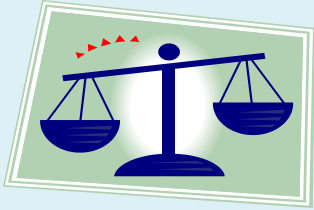
The evidence

- * New York study: students in over-crowded schools scored lower in maths and reading
 - * Swedish study: air cleaning reduced absenteeism from 8.3% to 3.7%
 - * New Zealand study: sound field amplification system improved children with Down syndrome' perception of speech
- US study of a school located next to train track



Using Evidence-based Teaching Strategies

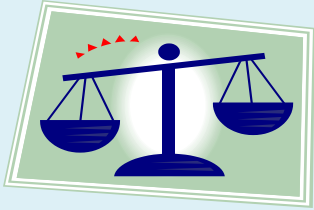
Strategy	Rating	
✓6. Review and practice	****	
✓7. Behavioural approaches	****	
✓8. Formative assessment & feedback	****	
✓9. Optimal physical environment	****	
✓ 10. Classroom climate	***	



Using Evidence-based Teaching Strategies

10. Classroom Climate

?create a positive, motivating classroom climate?

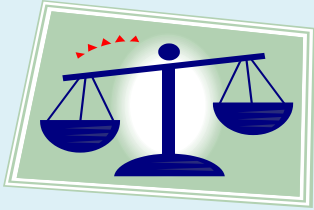


Using Evidence-based Teaching Strategies

10. Classroom Climate

?create a positive, motivating classroom climate?

Aim for high levels of student engagement



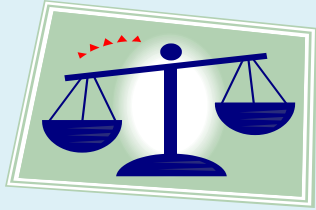
Using Evidence-based Teaching Strategies

10. Classroom Climate

create a positive, motivating classroom climate?

Aim for high levels of student engagement

Create an emotionally safe environment that children can trust



Using Evidence-based Teaching Strategies

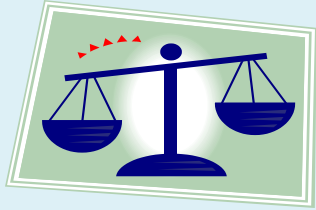
10. Classroom Climate

?create a positive, motivating classroom climate?

Aim for high levels of student engagement

Create an emotionally safe environment that children can trust

Help learners set appropriate goals



Using Evidence-based Teaching Strategies

10. Classroom Climate

?create a positive, motivating classroom climate?

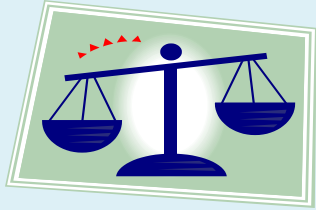
Aim for high levels of student engagement

Create an emotionally safe environment that children can trust

Help learners set appropriate goals

Provide a motivating learning environment

Establish clear rules and boundaries



Using Evidence-based Teaching Strategies

10. Classroom Climate

The evidence

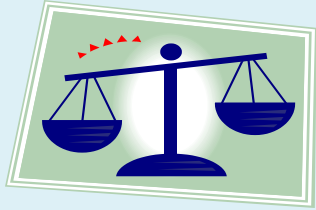
Dutch review of 99 studies of affective teacher-student relationships (ATSRs):

- * ATSRs had medium to large influence on student engagement and small to medium influence on student achievement
- * ATSRs more important for at-risk students and those with learning difficulties



Evidence-based Teaching: an Evaluation Scale e.g. Strategy #1

Criterion	Indicators	Evaluation
The teacher regularly uses <u>co-operative group teaching</u> in which all learners work together in small groups of 6-8, helping each other to carry out individual and group tasks. Groups are usually mixed ability. The teacher teaches group process skills and carefully supervises group interaction.	1.In most lessons the teacher uses co-operative group activities. 2.The teacher uses a combination of (a) mutual assistance groups and (b) 'jig-saw type groups. 3.Mostly, groups are comprised of learners with mixed abilities. 4.The teacher teaches group process skills and carefully supervises group activities.	A.All indicators are regularly met. B.The teacher occasionally uses both forms of co-operative group activities with ability and mixed ability groups. C.The teacher occasionally uses mutual assistance groups. D.None of the indicators are met.



Evidence-based Teaching

Reference

Mitchell, D. (2014). *What really works in special and inclusive education: Using evidence-based teaching strategies. Second edition.* Abingdon Oxon: Routledge.