The case for *Evidence-Based* Teaching

Newbubbles:

Annual Teacher Training Conference

Croydon 2013

- What is 'evidence-based teaching' (EBT)?
- Where is the evidence?
- Classroom methods which are most effective?
- Ideas in education which are myths or things with little effect.
- EBT in teacher-training.

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Resources

The Evidence-Based Teachers Network (EBTN)

A network of teachers who are implementing evidence-based methods in their classrooms and policies.
To Join: www.ebtn.org.uk

Books

- John Hattie: *Visible Learning* and *Visible Learning for Teachers*
- Geoff Petty: *Evidence Based Teaching*
- Ceri B Dean: *Classroom Instruction that Work* (2nd edition)
- Eleanor Dommett: *Learning & the Brain*
- Mike Bell: *How Brains Learn* (ebook)
- Philip Adey/Justin Dillon: *Bad Education*
- *(A longer list can be found on the EBTN website under the "books" tab)*
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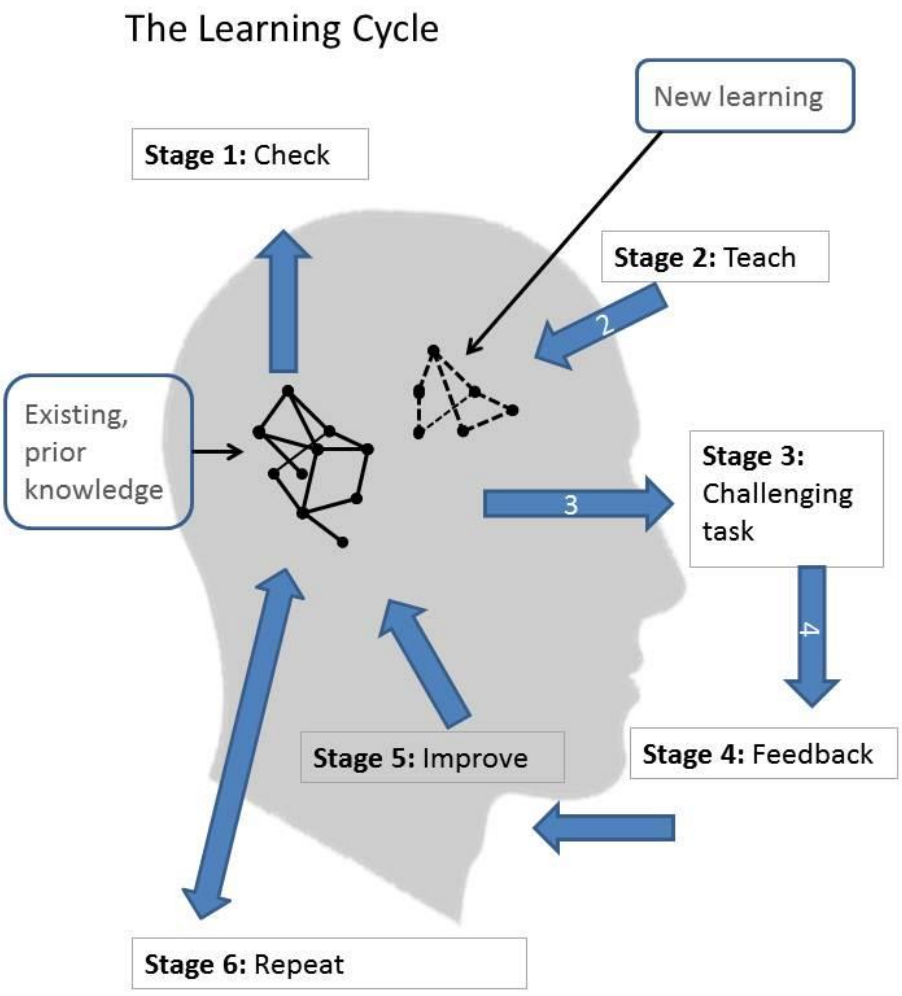
Websites

- Geoff Petty's website with dozens of useful resources: www.geoffpetty.com
- Best Evidence Encyclopaedia www.bestevidence.org.uk
- Education Endowment Foundation www.educationendowmentfoundation.org.uk/toolkit
- Read *Classroom Instruction that Works* online at http://books.google.co.uk/books/about/Classroom_Instruction_that_Works.html?id=c25kDO0adxwC

Videos

"The *Evidence-Based* Teacher's Toolkit" offers a number of films suitable for staff training sessions: Available from www.evidencebasedteaching.co.uk (DVD and network licences available).

- ***Top Ten Methods*** describes the top ten methods and shows clips from classrooms of the methods in use.
- ***How Brains Learn*** is a teacher-friendly and jargon-free explanation of why some classroom methods work so well.
- ***Edu-wash*** describes 25 myths, fads and low effect methods to avoid in education
- ***Learning difficulties: Different brains*** looks at how brains are different and what can be done to help.


The Learning Cycle
New learning
Stage 1: Check
Stage 2: Teach
2
Existing, prior knowledge
Stage 3: Challenging task
3
4
Stage 5: Improve
Stage 4: Feedback
Stage 6: Repeat

John Hattie: Visible Learning
Table of Effect Sizes

A comparison of 150 different things which are claimed to be effective in education.
Ranked by 'effect-size'. ES of 0.5 is equivalent to 1 GCSE or A-level grade or equivalent.

Rank	Influence	Effect size
1	Self-reported grades/student expectations	1.44
2	Piagetian programmes	1.28
3	Response to intervention	1.07
4	Teacher credibility	0.90
5	Providing formative evaluation to teachers	0.90
6	Micro-teaching (Videoing the teacher)	0.88
7	Classroom discussion	0.82
8	Comprehensive interventions for learning disabled students	0.77
9	Teacher clarity	0.75
10	Feedback to students	0.75
11	Reciprocal teaching	0.74
12	Teacher-student relationships	0.72
13	Spaced vs mass practice	0.71
14	Metacognitive strategies	0.69
15	Acceleration (Moving students up or giving higher-level work)	0.68
16	Classroom behaviour	0.68
17	Vocabulary programmes	0.67
18	Repeated reading programmes	0.67
19	Creativity programmes	0.65
20	Prior achievement	0.65
21	Self-verbalisation and self-questioning	0.64
22	Study skills	0.63
23	Teaching strategies	0.62
24	Problem-solving teaching	0.61
25	Not labelling students (eg as 'dyslexic', 'gifted' etc)	0.61
26	Comprehension programmes	0.60
27	Concept mapping (Mind-mapping)	0.60
28	Cooperative vs individualistic learning	0.59
29	Direct instruction	0.59
30	Tactile stimulation programmes	0.58
31	Mastery learning	0.58
32	Worked examples	0.57
33	Visual perception programmes	0.55
34	Peer tutoring	0.55
35	Cooperative vs competitive learning	0.54
36	Phonics instruction	0.54

37	Student-centred learning	0.54
38	Classroom cohesion	0.53
39	Pre-term birth weight	0.53
40	Keller's mastery PIS	0.53
41	Peer influences	0.53
42	Classroom management	0.52
43	Outdoor/adventure programmes	0.52
44	Home environment	0.52
45	Socio-economic status	0.52
46	Interactive video methods	0.52
47	Professional development	0.51
48	Goals	0.50
49	Play programmes	0.50
50	Second/third chance programmes	0.50
51	Parental involvement	0.49
52	Small group learning	0.49
53	Questioning	0.48
54	Concentration/persistence/engagement	0.48
55	School effects	0.48
56	Motivation	0.48
57	Quality of teaching	0.48
58	Early interventions	0.47
59	Self-concept	0.47
60	Pre-school programmes	0.45
61	Writing programmes	0.44
62	Expectations	0.43
63	School size	0.43
64	Science	0.42
65	Cooperative learning	0.42
66	Exposure to reading	0.42
67	Behavioural organisers/adjunct questions	0.41
68	Mathematics	0.40
69	Reducing anxiety	0.40
An ES of 0.4 is the average – so anything below this should not be a priority or significant use of resources.		
70	Social skills programmes	0.39
71	Integrated curricula programmes	0.39
72	Enrichment	0.39
73	Principals/schools leaders	0.39
74	Career interventions	0.38
75	Time on task	0.38
76	Psychotherapy programmes	0.38
77	Computer-assisted instruction	0.37
78	Adjunct aids	0.37
79	Bilingual programmes	0.37
80	Drama/arts programmes	0.35

81	Creativity	0.35
82	Attitude to mathematics/science	0.35
83	Frequent/effects of testing	0.34
84	Decreasing disruptive behaviour	0.34
85	Various teaching on creativity	0.34
86	Simulations	0.33
87	Inductive teaching	0.33
88	Ethnicity	0.32
89	Teacher effects	0.32
90	Drugs	0.32
91	Enquiry-based teaching	0.31
92	Accountability systems	0.31
93	Ability grouping for gifted students	0.30
94	Homework	0.29
95	Home visiting	0.29
96	Exercise/relaxation	0.28
97	Desegregation	0.28
98	Teaching test-taking/coaching	0.27
99	Use of calculators	0.27
100	Volunteer tutors	0.26
101	Lack of illness	0.25
102	Mainstreaming	0.24
103	Values/moral education programmes	0.24
104	Competitive vs individualistic learning	0.24
105	Programmed instruction	0.23
106	Summer school	0.23
107	Finances	0.23
108	Religious schools	0.23
109	Individualised instruction	0.22
110	Visual/audio-visual methods	0.22
111	Comprehensive teaching reforms	0.22
112	Teacher verbal ability	0.22
113	Class size (eg 25>20)	0.21
114	Charter schools (Academies)	0.20
115	Aptitude/treatment interactions	0.19
116	Extra-curricular programmes	0.19
117	Learning hierarchies	0.19
118	Co-teaching/team teaching	0.19
119	Personality	0.18
120	Within-class grouping	0.18
121	Special college programmes	0.18
122	Family structure	0.18
123	School counselling effects	0.18
124	Web-based learning	0.18
125	Matching learning styles	0.17
126	Teacher immediacy	0.16

127	Home-school programmes	0.16
128	Problem-based learning	0.15
129	Sentence-combining programmes	0.15
130	Mentoring	0.15
131	Ability grouping (v mixed-ability)	0.12
132	Diet	0.12
133	Gender (male/female)	0.12
134	Teacher education	0.12
135	Distance education	0.11
136	Teacher subject matter knowledge	0.09
137	Changing school calendar/timetable	0.09
138	Out of school curricular experiences	0.09
139	Perceptual motor programmes	0.08
140	Whole language	0.06
141	Diversity of students	0.05
142	College halls of residence	0.05
143	Multi-grade/age classes	0.04
144	Student control over learning	0.04
145	Open vs traditional learning spaces	0.01
146	Summer vacation	-0.02
147	Welfare policies	-0.12
148	Retention (repeating a year)	-0.13
149	Television	-0.18
150	Mobility (moving schools)	-0.34

Ten top methods:

For full description see Geoff Petty's "*Evidence Based Teaching*" or Marzano's "*Classroom Instruction that Works*".

1	**Similes and analogies**	This method comes in several parts: 1. using similes, analogies, models etc in your teaching to link the new knowledge to things the students already know about. 2. getting your students to identify similarities and differences between ideas which they can easily muddle up. Similes and analogies can also be used as an active learning method if students create them themselves.
2	**Note-making and summarizing**	This is a process by which your students discover the big picture, the main points from their learning. Examples: • Doing a précis. • Students make notes as you talk, or as they watch a video. • Making a mindmap at the end of a topic Notes made by the learner are more effective that copied notes, books etc.
3	**Developing a Growth Mindset**	Also known as *Attribution Training* (to what do they attribute the results of their learning?) Learners who attribute their performance to things they cannot change (natural ability, quality of teaching etc) do significantly worse that those who attribute it to their effort. • Use language with students which recognises effort, not ability.
4	**Repetition**	Staged repetition: The brain needs repetitions to secure memories. • Will you have to change the way you teach your topic to build in the staged repeats needed for good memories?
5	**Graphical methods**	This means using any method other than spoken or written words. Visual methods are especially effective. For maximum effect, students should generate their own graphics. • Pictures, diagrams, mind-maps, graphical organiser etc
6	**Cooperative learning**	This covers a wide variety of ways that students can work together. Successful methods are usually group ways of using other evidence-based methods such as hypothesis testing, graphic organisers etc. To get the high effect size individuals must be held accountable for their learning.
7	**Goals and feedback**	Setting goals and objectives helps the learner see where they are going. Providing feedback shows them how far they are on this learning journey. Assessment for Learning (AfL) is an example of this. Research shows that summative tests have an overall slight negative effect on learning and should be used as little as possible. Formative Assessment is a highly effective learning device which can take a huge variety of forms. • Peer and self-assessment. Learners mark/assess themselves or other learners. • Formative comments. Verbal or written. (e.g. “three stars and a wish”) • Card sorting. • Assertive questioning
8	**Hypothesis testing**	A “hypothesis” is an unproven explanation, the first step to developing a “theory”. This approach covers active learning methods where students grapple with a problem. • Modern history: “Why did we invade Iraq?” • Building: “Why don’t we have the bedrooms downstairs? • Fitness: “What sort of training routine would suit someone with high blood pressure?” • Teaching: “Why are evidence based methods not taught in PGCE courses?”
9	**Activating prior knowledge**	Students need to be able to link their new learning to something they already know. We need to assess the current level of knowledge and build on it. The old learning needs to be “activated” by bringing it to mind. Nothing new can be learned (other than by rote) unless it is linked to existing concrete knowledge.
10	**Advance organisers**	These show the student what will be covered in the session (or course) and should be referred to during the course. This helps make the links between the detail and the big picture. They work better if presented graphically, either with words or, preferably, pictures. Mind-mapping is a variation.

Myths, fads and low effect-size methods and policies

Myths about the brain

1. Fixed intelligence
2. Fixed learning difficulties
3. Critical periods
4. Enriched environments
5. 10% of the brain
6. Left brain – Right brain
7. Gender differences
8. Learning Styles
9. Neuro-linguistic programming
10. Brain hydration
11. Brain foods

Ineffective methods

1. Play them Mozart
2. Brain Gym
3. Teacher subject knowledge
4. Ability grouping
5. Repeating a year
6. Testing and marking
7. Challenging homework
8. Length of the lesson
9. Late start for adolescents
10. School finances
11. Charter schools

Expensive mistakes

1. Reduce class sizes
2. New buildings
3. Information technology
4. Untrained Teaching Assistants
5. CPD with no follow-up