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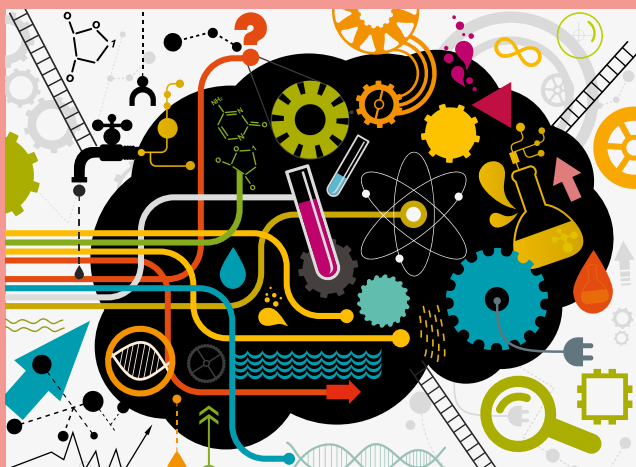
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Cover image: Schools Week

MESSAGE FROM THE EDITOR

2018 was a milestone for us at **researchED**: five years since our first conference in Dulwich, London, and no one could have predicted where it would take us. In the last year alone, we've been to New Zealand, Pretoria, Toronto, the Netherlands, Sweden, Philadelphia, and dozens of other places in the UK and beyond. The national UK conference sold out at 1300 attendees, with a waiting list of 600 more. In 2019 we're not slowing down, with all of those countries on our event list, plus many more cities and countries: Dubai, Cape Town, Vancouver, Geneva, and more to be announced. It seems teachers and educators around the world are waking up to evidence.

What has struck me most about this global conversation is how international the dilemmas are that educators face. Different cultures and nations lead to different contexts; but the human dimension is universal. This presents us with a terrific opportunity: to share our collective wisdom as a community of practice to drive the quality, standards, efficiency and morality of what we collectively do.

We live in interesting times, at an intersection of unprecedented communicative powers where conversations are dense, instantaneous and international. Where once a teacher's voice reached the back of the room at best, now 'around the world it flies in the twinkling of an eye'. If we can hook this new agora to structured evidence, experience, reason and wisdom, then there are prizes to be won for everyone. If we don't succeed then we face more of the same for decades to come: more folk teaching, more inequity, more waste and the same outcomes for the same children.

But I have hope we can choose the former. Never before has the international education community been so animated by the need to root its craft in evidence. And that's what **researchED** stands for. I hope you enjoy issue 3.

Tom Bennett

researchEDitor

Founder of **researchED**



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TO SLEEP, PERCHANCE TO LEARN



Joe Kirby

Joe Kirby is a teacher and deputy head who writes extensively on translating research into the classroom. Here he looks at how understanding sleep can help us make gains in helping students to learn and achieve.

Nature's blunder?

Sleep seems like a biological puzzle. It makes animals conspicuously vulnerable. Is the land of Nod a spectacular blunder on the part of evolution?

All animals sleep in some way, even jellyfish. Cheetahs, the fastest land creatures on earth, sleep for up to 18 hours a day. So do most newborn babies, with the fastest growing brains on earth. Sleep is even more vital than food: animals die of sleep deprivation before starvation. Sleep must serve some evolutionary purpose, but what?

Fifty years of research on the sleeping brain has revealed useful insights. Sleep restores our brain and body cells.^{1,2} Sleep consolidates our memories and our learning.^{3,4} Sleep plays a vital role in our emotions, moods, decisions, cognition, health and immune systems.^{2,5,6} Sleep regulates our metabolism, appetite and gut microbiomes.^{2,7} Thousands of studies show that sleep enhances every major organ and every biological function, according to world-leading experts on sleep.^{2,6}

Sleep deprivation

Sleeplessness increases our stress hormones and worsens decision-making.⁸ Underslept people are more moody, irritable, tense and anxious.⁹ Sleep deprivation impairs attention and inhibits learning.^{10,11,12} The Great British sleep survey suggested that sleep-deprived people are five times more likely to feel lonely and seven times

more likely to experience feelings of helplessness.¹³ Sleep deprivation is linked with obesity, diabetes, stroke, heart attack and cancer.^{2,6} It causes enduring damage.¹⁴

Teenagers are now chronically sleep deprived, researchers are finding. Teenagers should sleep for nine to ten hours, but many sleep far less.¹⁵ Poorer neighbourhoods tend to be noisier, making a good night's sleep harder for our poorest students.¹⁶ Sleep deprivation makes teens more hostile, creates learning difficulties and impairs academic performance and has lasting detrimental cognitive effects.^{17,18}

Sleep habits

Changing sleep behaviour patterns is hard, but sleep habits can be honed. A starting point is taking what we've learned from the science of sleep and sharing it with students. What have scientists discovered about how to get better sleep?

Sleep deprivation
makes teens more
hostile, creates
learning difficulties
and impairs academic
performance and has
lasting detrimental
cognitive effects

Most important is to stick to a sleep schedule. Going to bed and waking up at the same time each day (including weekends) helps. It's hard to adjust to changing sleep patterns. Sleeping later on weekends can't catch us up and makes it harder to wake up on Monday morning.^{2,6} Setting a bedtime alarm is also recommended by sleep experts.^{2,6}

Science also tells us that caffeine and alcohol reduce sleep quality.^{2,6} We should avoid drinking these things in the evenings.

Screens reduce sleep quality, too.^{2,6,19} Three things we can do, then: plug our phone, tablet and laptop chargers outside our bedrooms; stop using screens an hour before bedtime; and get a non-digital alarm clock.

Possibilities in schools

How might schools share this research with teachers and students?

One possibility is a CPD session on sleep for teachers and tutors. As teachers, we could do with applying this research in our own everyday lives! It is particularly

difficult for those of us with young children ourselves. Books like *Go the F*** to Sleep* testify to the importance of knowing how sleep habits help children get into healthy sleeping patterns.

Another option is an assembly on sleep from senior leaders to show why and how to improve sleep patterns. Or a parents' assembly on sleep to share the advantages of a sleep schedule and the damage of sleep deprivation, screens, alcohol and caffeine drinks.

Or how about a simple sleep survey to identify students who admit to struggling with sleep deprivation? A final possibility is sleep nudges: messages sent to parents and even students to remind them of making changes in their sleep schedule, patterns and habits – perhaps to those who opt in to supportive reminders after self-identifying as experiencing problematic sleep.

Roger Federer, who has won a men's world-record 20 Grand Slam singles tennis championships, sleeps 11 hours a night. Perhaps, as an Irish proverb has it, sleep is better than medicine.

REFERENCES

1. Killgore, W. D. (2010) 'Effects of sleep deprivation on cognition', *Progress in Brain Research* 185 (1) pp. 105–29.
2. Walker, M. (2017) *Why we sleep: the new science of sleep and dreams*. London: Penguin
3. Ellenbogen, J. M., Payne, J. D. and Stickgold, R. (2006) 'The role of sleep in declarative memory consolidation', *Current Opinion in Neurobiology* 16 (6) pp. 712–22.
4. Fattinger, S., de Beukelaar, T., Ruddy, K., Volk, C., Heyse, N., Herbst, J., Hanloser, R., Wenderoth, N., Huber, R. (2017) 'Deep sleep maintains learning efficiency of the human brain', *Nature Communications* 8: 15405.
5. Irwin, M., Maslovich, A., Gillin, J. C., Willoughby, R., Pike, J. and Smith, T. L. (1994) 'Partial sleep deprivation reduces natural killer cell activity in humans', *Psychosomatic Medicine* 56 (6) pp. 493–498.
6. Winter, W. C. (2017) *The sleep solution*. London: Penguin.
7. Spiegel, K., Tasali, E., Penev, P., Van Cauter, E. (2004) 'Brief communication: sleep curtailment in healthy young men is associated with decreased leptin levels, elevated ghrelin levels and increased hunger and appetite', *Annals of Internal Medicine* 141 (11) pp. 846–850.
8. Harrison, Y. and Horne, J. A. (2000) 'The impact of sleep deprivation on decision making: a review', *Journal of Experimental Psychology: Applied* 6 (3) pp. 236–249.
9. Minkel, J. D. (2010) 'Affective consequences of sleep deprivation' [PhD Thesis], *Publicly Accessible Penn Dissertations* 218.
10. Curcio, G., Ferrara, M. and De Gennaro, L. (2006) 'Sleep loss, learning capacity and academic performance', *Sleep Medicine Reviews* 10 (5) pp. 323–37.
11. Alhola, P. and Polo-Kantola, P. (2007) 'Sleep deprivation: impact on cognitive performance', *Neuropsychiatric Disease and Treatment* 3 (5) pp. 553–567.

12. Lo, J. C., Ong, J. L., Leong, R. L., Gooley, J. J. and Chee, M. W. (2016) 'Cognitive performance, sleepiness, and mood in partially sleep deprived adolescents: the need for sleep study', *Sleep* 39 (3) pp. 687–98.
13. Sleepio (2012) *The Great British sleep survey: new data on the impact of poor sleep*. Available at: www.greatbritishsleepsurvey.com.
14. Kurth, S., Dean, D. C., Achermann, P., O'Muirheartaigh, J., Huber, R., Deoni, S. C. L. and LeBourgeois, M. K. (2016) 'Increased sleep depth in developing neural networks: new insights from sleep restriction in children', *Frontiers in Human Neuroscience* 10 (1) p. 456.
15. Crowley, S. J., Wolfson, A. R., Tarokh, L., Carskadon, M. A. (2018) 'An update on adolescent sleep: new evidence informing the perfect storm model', *Journal of Adolescence* 67 (1) pp. 55–65.
16. Huffington, A. (2016) *The sleep revolution: transforming your life, one night at a time*. London: WH Allen.
17. Talbot, L. S., McGlinchey, E. L., Kaplan, K. A., Dahl, R. E. and Harvey, A. G. (2010) 'Sleep deprivation in adolescents and adults: changes in affect', *Emotion* 10 (6) pp. 831–841.
18. Short, M. and Louca, M. (2015) 'Sleep deprivation leads to mood deficits in healthy adolescents', *Sleep Medicine* 16 (8) pp. 987–93.
19. Chang, A. M., Aeschbach, D., Duffy, J. F. and Czeisler, C. A. (2015) 'Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness', *Proceedings of the National Academy of Sciences* 112 (4) pp. 1232–1237.

The **Institute for Teaching** is a specialist graduate school for teachers. Our courses have a single purpose – to help teachers to keep getting better.

We're dedicated to developing evidence-based practice, and our faculty are always exploring the best education research and thinking. Here's what they've been reading recently:

Harry Fletcher-Wood, Associate Dean, Fellowship in Teacher Education

The Power of Moments – Chip and Dan Heath

This book clearly summarises the evidence on how to make experiences feel powerful, memorable and worthwhile – these are all aims for our Fellows programme.

Applying Cognitive Science in Education – Frederick Reif

We've found Applying Cognitive Science in Education very helpful when thinking about how to make our curriculum logical and meaningful.

Peps Mccrea, Associate Dean, Masters in Expert Teaching

The Unified Learning Model – Shell et al

This model bravely attempts to unite cognitive and motivational sciences in a framework we can use to design for, and facilitate learning.

Peak: Secrets from the New Science of Expertise – Anders Ericsson and Robert Pool

Peak is a grand tour of Ericsson's decade-long research into expertise across performance professions – definitely worth a read!

Katy Patten, Associate Dean, Transforming Teaching

Secondary Curriculum and Assessment Design – Summer Turner

This is a helpful guide for leaders improving curriculum design in their schools – we're drawing on it in year 2 of our Transforming Teaching Programme.

Creating the Schools Our Children Need: Why What We're Doing Now Won't Help Much (And What We Can Do Instead) – Dylan William

There's no simple and universal blueprint to create great schools but this book explores what research tells us about how we can improve our chance of success – from curriculum choices to teacher PD, as well as how we can evaluate new initiatives.

ATTACHMENT THEORY: WHAT DO TEACHERS NEED TO KNOW?



Nick Rose

Attachment theory is frequently cited as an important part of a teacher's understanding of how to manage and understand behaviour in the classroom. Nick Rose unpacks some of the background to this area and looks at how it maps on to practice in a meaningful way.

- Social referencing – the infant looks at the parent or carer to see how they respond to something novel in the environment. The infant looks at the facial expressions of the parent or carer (e.g. smiling or fearful), which influence how they behave in an uncertain situation.

Attachment figures aren't simply individuals who spend a lot of time with the infant, or the one who feeds the infant; they are typically the individuals who respond the most sensitively – for example, often playing and communicating with the infant. For many infants, the principal attachment figure is their mother, but fathers, grandparents or siblings may also fulfil this role. By about 18 months, most infants enjoy multiple attachments, though these may be somewhat hierarchical, with a primary attachment figure of particular importance. The behaviour relating to attachment develops over early childhood – for example, babies tend to cry because of fear or pain, whereas by about two years of age they may cry to beckon their caregiver (and cry louder or shout if that doesn't work!).

Bowlby believed these early experiences of attachment formed an internal 'working model' which the child used to form relationships with secondary attachment figures – and later, friendships with peers and eventually romantic and parenting relationships in adult life.

Mary Ainsworth: types of attachment

There are individual differences in the behaviour related to attachment. Famous observation studies by Mary Ainsworth (who worked with John Bowlby during the 1950s) identified that in normal children there were a range of attachment types:

- **Stranger anxiety** – the infant responds with fear or distress to arrival of a stranger.
- **Separation anxiety** – when separated from parent or carer the infant shows distress; and upon that attachment figure's return, a degree of proximity-seeking for comfort.

- **Secure attachment:** The majority of infants, across different cultures, tend to have an attachment style typified by strong stranger and separation anxiety along with enthusiastic proximity-seeking with the parent upon reunion.

- **Insecure-avoidant:** Slightly more common in Western cultures, an insecure-avoidant attachment tends to be characterised by avoiding or ignoring the caregiver and showing little emotion (whilst experiencing inward anxiety) when the caregiver leaves the room, and displaying little enthusiasm when the caregiver returns.
- **Insecure-resistant:** Perhaps more common in 'collectivist cultures', an insecure-resistant (sometimes also called insecure-ambivalent) attachment tends to be characterised as showing intense distress during separation, and being difficult to comfort when the caregiver returns. Infants with this attachment type may also show some rejection or resentment towards the caregiver after a separation.
- **Disorganised attachment:** Added in the 1990s, infants with a disorganised attachment tend to show no consistent pattern in behaviour towards their caregiver. For example, they may show intense proximity-seeking behaviour one moment, then avoid or ignore the caregiver the next.

If you are interested in some of the history and the origins of attachment theory, the work of John Bowlby and Mary Ainsworth are good places to start. There's a nice summary in Inge Bretherton's 1992 article 'The origins of attachment theory'.¹

Many children may display behaviour suggesting an insecure attachment type which may make it harder to form peer friendships, and this likely underlies an association between insecure and disorganised attachment and higher levels of behaviour problems. However, it's not certain that differences in attachment are specifically the cause of behaviour problems. For example, a meta-analysis by Fearnon et al.² found that socioeconomic status accounted for a considerable portion of the variance in behaviour problems in childhood.

So, whilst there's reasonable evidence to suggest that these individual differences in attachment correlate to differences in behaviour within school, it is very important to note that these differences are not

The teacher isn't in a position to either make the clinical judgement or investigate the cause of problematic behaviour they suspect may relate to a safeguarding concern.

'pathological' in a clinical sense. Given that about 30–35% of representative populations have an 'insecure' attachment, NICE suggests that it is unhelpful to view insecure attachment as an 'attachment problem'.

Reactive attachment disorder (RAD)

A popular misconception about attachment is a conflation between the 'types of attachment' that children possess and an 'attachment disorder'. CoramBAAF, a leading charity working within adoption and fostering, suggests that even when used by those trained to do so, attachment classifications cannot be equated with a clinical diagnosis of disorder. While the insecure patterns may indicate a risk factor in a child's development, they do not by themselves identify disorders. The term 'attachment disorder' refers to a highly atypical set of behaviours indicative of children who experience extreme difficulty in forming close attachments. NICE suggests that the prevalence of attachment disorders in the general population is not well established, but is likely to be low. However, there are substantially higher rates among young children raised in institutional care or who have been exposed to abuse or neglect. The 2003 Office for National Statistics report for the Department of Health³ estimated that somewhere between 2.5% to 20% of looked after children had an attachment disorder (depending on whether a broad or narrow definition was used).

There is a broad distinction between two classifications of RAD:

- **Inhibited attachment disorders:** Characterised by significant difficulties with social interactions such as extreme detachment or withdrawal – usually attributed to early and severe abuse from 'attachment figures' such as parents.
- **Disinhibited attachment disorders:** Characterised by diffuse attachments, as shown by indiscriminate familiarity and affection without the usual selectivity in choice of attachment figures – often attributed to frequent changes of caregiver in the early years.

Reactive attachment disorder is a psychiatric condition and often accompanied by other psychiatric disorders. CoramBAAF advises caution, arguing that the lack of clarity about the use of attachment concepts in describing children's relationship difficulties can create confusion. A diagnosis of an attachment disorder can only be undertaken by a psychiatrist.

Unfortunately, there are also no widely applicable, evidence-based set of therapies for RAD. However, there has been significant concern expressed about some therapies. One example is 'holding therapy', involving holding a child in a position which prevents escape whilst engaging in an intense physical and emotional confrontation. CoramBAAF argues there is nothing in attachment theory to suggest that holding therapy is either justifiable or effective for the treatment of attachment disorders. Less controversial therapies involve counselling to address the issues that are affecting the carer's relationship with the child and teaching parenting skills to help develop attachment.

What should teachers be doing?



This is why we can question the apparent excitement about attachment theory at the moment: there's nothing a teacher can do that they shouldn't already be doing.

Firstly, given the relationship between attachment disorders and abusive or neglectful relationships, perhaps some teachers are worried that they need to know about attachment disorder in order to fulfil their statutory safeguarding responsibilities. However, it's important to note that whilst some children with RAD have suffered abuse or neglect, that doesn't mean that problematic behaviour is evidence of such. The teacher isn't in a position to either make the clinical judgement or investigate the cause of problematic behaviour they suspect may relate to a safeguarding concern. If a student is behaving in a way which concerns you, then report that concern to your designated member of SLT (as you would any safeguarding concern). Whether or not you might think a child has an insecure attachment or a disordered attachment isn't really your professional call.

Secondly, it may be that some teachers feel they need to know more about attachment in order to support students with behaviour problems in school. However, the advice for working with RAD students isn't really any different from good behaviour management generally. Teachers should not confuse their role in loco parentis with being the primary caregiver for a child. For example, the Center for Family Development is an attachment centre based in New York specializing in the treatment of adopted and foster families with trauma and attachment disorder. In their *Overview of Reactive Attachment Disorder for Teachers* they point out that, as a teacher, you are not the primary caregiver for a child you teach.

You cannot parent this child. You are the child's teacher, not therapist, nor parent. Teachers are left behind each year, [it's] normal. These children need to learn that lesson.⁴

They recommend approaching behaviour through explicit teaching of consequences: that there's a consequence associated with good behaviour and there's a consequence for poor behaviour.

Further suggestions include:

- Create a structured environment with extremely consistent rules.
- Be consistent and specific when giving praise or confronting poor behaviour.
- Provide the child with choices, but choices provided by you, the teacher.
- Maintain your professional boundaries (avoid attempting to create 'friendship' or 'intimacy' with the child).
- Keep calm and avoid losing your temper; communicate directly, positively, and firmly.
- When implementing consequences, remain unemotional and assume a tone that says, effectively, 'That's just the way business is done – nothing personal.'

In short, teachers should do the same things that they do when working with any student with challenging behaviour. Whether the challenging behaviour is due to an issue with attachment isn't really the issue.

In summary

Whilst there's a relationship between insecure attachment and behaviour problems in the classroom, teachers are not qualified to diagnose a student's attachment type nor engage in any kind of therapy with that student. There is a condition called 'reactive attachment disorder' which has a higher incidence within looked-after students. Again, teachers are not qualified to make this psychiatric diagnosis.

There is an important difference between the professional role of a teacher and the role of a primary

caregiver, and it's vital that recent interest in attachment theory within the profession doesn't blur that line. Where teachers are concerned that behaviour presented in the classroom might indicate abuse or neglect, they are already obliged by law to report these concerns (but not investigate them or try to involve themselves in resolving them).

In terms of managing the behaviour of students with attachment problems so that they can overcome the difficulties of their family background and experience success within school, the guidance suggests things like a structured environment, consistent rules, professional distance and focusing feedback on behaviour not the child – advice that forms the basis of good behaviour management regardless of the cause of problematic behaviour.

It may be the case that specific children with RAD will have different strategies which will help them achieve in school. However, that's also the case for any student with SEND. Perhaps what is important for teachers is not specific training in attachment theory to help them diagnose attachments, but a clear understanding of their school's SEND system and time to read, implement and work with SEND coordinators to ensure any specific strategies suggested by an educational psychologist or child psychiatrist are employed effectively.

This article first appeared on Nick's blog, www.evidenceintopractice.wordpress.com

REFERENCES

1. Bretherton, I. (1992) 'The origins of attachment theory: John Bowlby and Mary Ainsworth', *Developmental Psychology* 28 (5) pp. 759-775.

2. Fearon, R. P., Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Lapsley, A. M. and Roisman, G. I. (2010) 'The significance of insecure attachment and disorganization in the development of children's externalizing behavior: a meta-analytic study', *Child Development* 81 (2) pp. 435-456.

3. Meltzer, H., Gatward, R., Corbin, T., Goodman, R. and Ford, T. (2003) *The mental health of young people looked after by local authorities in England*. Office for National Statistics/Department of Health. London: The Stationery Office.

4. Center for Family Development (2007) *An overview of reactive attachment disorder for teachers*. Available at: www.bit.ly/2CL9t7D (Accessed 25 Jan 2019).



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We've managed to do so much with almost nothing. So far we have just about broken even with ticket sales (at deliberately affordable prices) and event-by-event sponsorship. Our ambition is to start to build a small core team who can run these days, and our website, so that we can grow, and offer more free resources and low-cost days to the education communities. Your donation would fund the time of this core team, plus help us to rebuild and maintain our website, which is crucial for sharing free resources from conference days.

We believe that we are on the edge of an evidence revolution in education. But it won't happen by itself.

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We'd be deeply grateful for any assistance you can give, because while all of our efforts are done for the greater good, it is often desperately hard for an entirely volunteer-driven organisation to be sustainable. Your donation can help us to continue to do the good work we do, and to build and grow so that we can do more in the future.

Thanks for reading!

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WHY ALL THE FUSS ABOUT RANDOMISED TRIALS?



Hamish Chalmers

Hamish Chalmers is a teacher and a lecturer in applied linguistics at the University of Oxford. Here he demystifies the opportunities and challenges that randomised controlled trials – RCTs – offer education and the classroom. They are often seen as a gold standard in research, and being aware of the differences between these qualities is essential to appreciating their value.

In the past five years or so, randomised controlled trials (RCTs) have firmly entered the lexicon of educational research. They are fast becoming the preferred method by which to evaluate the effects of educational interventions in the UK. One-third of English state schools have taken part in RCTs funded by the Education Endowment Foundation, and RCTs are routinely referred to in order to guide policy decisions. But what is so special about RCTs that they are enjoying such privilege?

In 1957, pioneering experimental social scientist Donald Campbell laid down the fundamental principle of experimentation, saying that 'The very minimum of useful scientific information involves at least one formal comparison and therefore at least two careful observations'.¹ In education research this means that to understand the effects of a new teaching approach we need to compare what happens when pupils are taught using it with what happens when they are taught using an alternative approach.

It is impossible for one group of pupils to be taught simultaneously using more than one approach. Therefore, we need to create comparison groups that are approximations of each other. This has been attempted in several ways. For example, data from one group of pupils

can be compared with data from another group (PISA rankings are a good example of this). Alternatively, pupil outcomes before a new intervention is introduced can be compared with outcomes afterwards (average reading attainment in the UK before and after the introduction of the phonics screener, for example). Or, groups of pupils can be matched on characteristics such as age and socioeconomic status, then each group taught using different approaches and their outcomes compared.

As any primary school pupil can tell you, a key requirement of any scientific experiment is that it is a fair test. One way of helping to make an educational experiment fair is to ensure that the groups of children being compared are as similar as possible. The designs described above fall short of this basic requirement. For example, PISA ranking relies on data from different children in different countries to assert the relative effectiveness of different approaches to teaching. Comparing attainment before and after an intervention does not account for changes in the children over time (the children at the beginning of the intervention are essentially different people by the end of it). Matched groups of children may be similar on characteristics we know about, but what about important things we don't know about or haven't measured?

A fair test requires that comparison groups have similar proportions of pupils who share characteristics that could affect the way they respond to the interventions being compared. That's all well and good if you are confident that you can identify every conceivably influential characteristic of your pupils. Although even if that were possible, would this result in a fair distribution of all influential characteristics? The only honest answer is 'We can't know.' In addition to characteristics that we can identify, there are likely to be some that we can't. How do we account for things like personal enthusiasm for a subject, relevant experience outside of school, individual idiosyncrasies, and so on? These are all

potentially important characteristics that we have no clear way to identify and quantify, and therefore no way to deliberately distribute equally across groups.

Differences among pupils emphasise the complexity of human beings. These differences and the resulting complexity is why random allocation to comparison groups is so powerful. Random allocation takes into account how messy human beings are and distributes the mess fairly. By deciding at the flip of a coin who goes in one group and who goes in the other, random allocation creates groups that differ only as a result of the play of chance. This is not the same as saying that groups are 'equal' (they probably won't be in some respects), but it does mean that the groups are not *systematically* different, and that any differences result from pure coincidence. As a result, we can be more confident than with other research designs that any differences in outcomes between comparison groups are due to differences in the interventions and not because of non-random differences (biases) between the pupils in the comparison groups.

Failing to properly account for systematic differences between comparison groups can massively influence how we interpret the results of educational research. Consider driver's education, a popular way to try to reduce car crashes among young drivers. Data from non-randomised comparisons has been used to promote this intervention. Researchers looked at the rates of car crashes among youths who had taken these classes and youths who had not, and they found that the latter were more than twice as likely to have been involved in a car crash than the former.² When driver's education was evaluated in a series of RCTs, however, very little difference in accident rates was detected between drivers randomly allocated to attend the classes and drivers randomly allocated to not take those classes.³ So, which evidence do you trust more? The non-randomised studies did nothing to account for possible differences between people who took the classes and those who did not. The RCT ensured that, even if not identical, the comparison groups differed only by chance.

As it turns out, there is a good explanation for why these two approaches came to conflicting conclusions. In a separate study, researchers found that people who take driver's education courses tend to display psychological characteristics that are compatible with safer attitudes to road use. The drivers in each group in the non-randomised studies were *systematically* different from each other.

Failing to properly account for systematic differences between comparison groups can massively influence how we interpret the results of educational research.

The difference in results in the driver's education studies had a plausible explanation. However, we are not always able to unpick causal relationships so easily. Even so, teachers must still take decisions about their practice. In a study of an after-school programme designed to reduce anti-social behaviour in primary school children,⁴ non-randomised evaluations of the programme suggested that it helped. On the basis of that finding, schools were preparing to roll out the programme to all children. When it was evaluated in an RCT, however, researchers found that instances of anti-social behaviour increased in children who had taken part in the programme compared to their peers who had not. Unlike the driver's education studies, there was little to explain why this was. Nonetheless, schools were faced with a choice over what to do. Should they trust the results of the non-randomised study, and roll out the programme to all children? Or should they trust the results of the RCT and cancel it? As with the driver's education example, their choice was between a study in which they could not confidently say whether like was being compared with like, and one in which they knew that researchers had used the best method available for creating unbiased comparison groups. Logic prevailed and they chose to cancel the programme.

Random allocation to comparison groups is the only defining feature of an RCT, and it is the only feature that prevents allocation bias. This simple feature is why RCTs are the preferred method for assessing programme effectiveness. When faced with decisions about practice, all else being equal, teachers and policy makers must decide whether they trust the findings of these fair tests or the findings of studies for which no similar reassurance is possible.

REFERENCES

1. Campbell, D. T. (1957) 'Factors relevant to the validity of experiments in social settings', *Psychological Bulletin* 54 (4) pp. 297–312, p. 298.
2. MacFarland, R. A. (1958) 'Health and safety in transportation', *Public Health Reports* 73 (8) pp. 663–680.

3. Vernick, J. S., Li, G., Ogaitis, S., MacKenzie, E. J., Baker, S. P. and Gielen, A. C. (1999) 'Effects of high school driver education on motor vehicle crashes, violations, and licensure', *American Journal of Preventive Medicine* 16 (1S) pp. 40–46.

4. O'Hare, L., Kerr, K., Biggart, A. and Connolly, P. (2012) *Evaluation of the effectiveness of the childhood development initiative's 'Mate-Tricks' pro-social behaviour after-school programme*. Available online at: www.goo.gl/sVUtFJ (Accessed 10 July 2018).

researchED

WORKING OUT WHAT WORKS



What is researchED?

ResearchED is an international, grassroots education-improvement movement that was founded in 2013 by Tom Bennett, a London-based high school teacher and author. ResearchED is a truly unique, teacher-led phenomenon, bringing people from all areas of education together onto a level playing field. Speakers include teachers, principals, professors, researchers and policy makers.

'I didn't build researchED,' says Tom, 'it wanted to be built. It built itself. I just ran with it.'

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AN INTERVIEW WITH...



PROFESSOR PAUL KIRSCHNER

Paul A Kirschner is Distinguished University Professor at the Open University of the Netherlands and Visiting Professor of Education at the University of Oulu, Finland. He is an internationally recognised expert in the fields of educational psychology and instructional design. He is past President of the International Society for the Learning Sciences and former member of the Dutch Educational Council. He is also a member of the Scientific Technical Council of the Foundation for University Computing Facilities, chief editor of *Journal of Computer Assisted Learning* and associate editor of *Computers in Human Behaviour*.

His seminal paper, 'Why minimal guidance during instruction does not work: an analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching', was published in 2006, co-written with John Sweller and Richard E Clark. One of the most cited papers in education, it revolutionised the attitudes of many towards the effectiveness of enquiry versus direct instruction.

researchEDitor Tom Bennett spoke to him in the British Museum, London, where they discussed that paper, what led him to write it, and the fallout afterward.

TB: What was your own education like, and how did that then lead to the career where you are?

PK: Okay, my own education. I was a top student at elementary, junior high and high school. I used to get excellent in everything except conduct. It started out with good, and then it dropped to fair and then poor. 'If Paul could only learn to keep his mouth shut...' – this type of thing. That was until I was 12 years old.

But I was also a very good student. I mean I never got below an A in things like mathematics and stuff like that. Same thing in junior high school. I went to the best high school in the United States: the Bronx High School of Science. 10,000 children took an entrance test and 900 were chosen to do it. You couldn't take the test, unless they thought you were good enough to do it. I also got good grades there and then went on to university. I started as an electrical engineer at Syracuse University.

TB: Really?

PK: Yeah, but it was a university – a semi-Ivy League university – and while I was protesting the Vietnam War, they were protesting that they wanted to have girls in the dormitory wards.

TB: [laughs]

PK: My problem was 'Can I afford to buy a Toyota?' and their problem was 'Should Dad buy me a Corvette?' – something like that.

So I transferred to a different university: the State University of Stony Brook. Primarily known for being busted twice by the Suffolk County police department for marijuana, it had a very advanced engineering school. I got there after a year of getting As in Syracuse and went on to just struggling to get by at Stony Brook. So I decided there's one of two things I could do: I could either really buckle down and really work hard – but I had no idea how to do that because I've never done that; or I could do something else. So I decided to just think of something else. What can I do? Psychology – that's almost a science!

TB: [laughs] That's quite a leap though.

PK: Yeah, so what I did was I took some more physics and chemistry courses and a few biology courses, and so when I graduated Stony Brook I ended up with a bachelor's in psychology and a teaching certificate for chemistry, mathematics and general science in high school.

And I had no idea what I wanted to do. All I knew was that I didn't want to go and get a master's somewhere in the United States. So I left for a year to get my head together. I went away from my family parents and friends...and never came back. That was 1973. And after I'd worked as a carpenter and a cook, and head of a restaurant in Amsterdam and planning on emigrating to New Zealand to become a teacher there, Catherine [his partner] decided at the last moment that she didn't want to emigrate. She said, 'Why don't you go back to university?'

I went back to university – the City University of Amsterdam – and got a master's in educational psychology. After that, first at an educational publisher and then at the Open University of the Netherlands, I went to work on my specialisation: text characteristics and learning processes. That's the study of what you can do with text to try to ensure that people study in a way that facilitates their learning. And the rest, as they say, is history.

TB: Indeed. But why not teach?

PK: I realised one thing while teaching, namely that teaching was too frustrating for me. So I wanted to learn why the normal children that I was trying to reach – independent of how I explained things to them – weren't learning. It was very frustrating for me because I myself was a very good student; I didn't understand why they didn't understand and couldn't understand.

TB: Were you teaching at this point?

PK: Middle school. Yeah, and so that was the reason I thought I didn't want to be a teacher. I don't want to go back to university and the United States and get my master's whatever and get my permanent certification as a teacher – it was just too frustrating for me. So after bumming around for a few years in Europe and the East (hippie time), I went back to school in the Netherlands – Amsterdam. My driving force was to understand how

people study, how people learned and how you could make effective, efficient and enjoyable learning experiences for them.

And that's what I've been doing since I started my university career in the Netherlands – 1976. We're now 43 years later and I have been doing that exact same thing with different names for different jobs for those 43 years.

TB: What was it like going from natural/physical science to something like educational psychology?

PK: Well, there was a step in-between: I made the change at Stony Brook. You have to realise this was 1968 and the cognitive revolution had just started. And for me, the cognitive revolution began with Gagné's third edition of *The Conditions of Learning*. Up to that moment, psychology was behaviouristic, and that was Stony Brook also. Dave Ausubel with meaningful verbal learning was (I think) 1966, so the seminal works in cognitive psychology hadn't actually happened. Baddeley and Hitch was after that, so at that point in time I went over to behaviouristic psychology. And behaviouristic psychology is very, very 'hard' science. I mean, I even had my own lab rat.

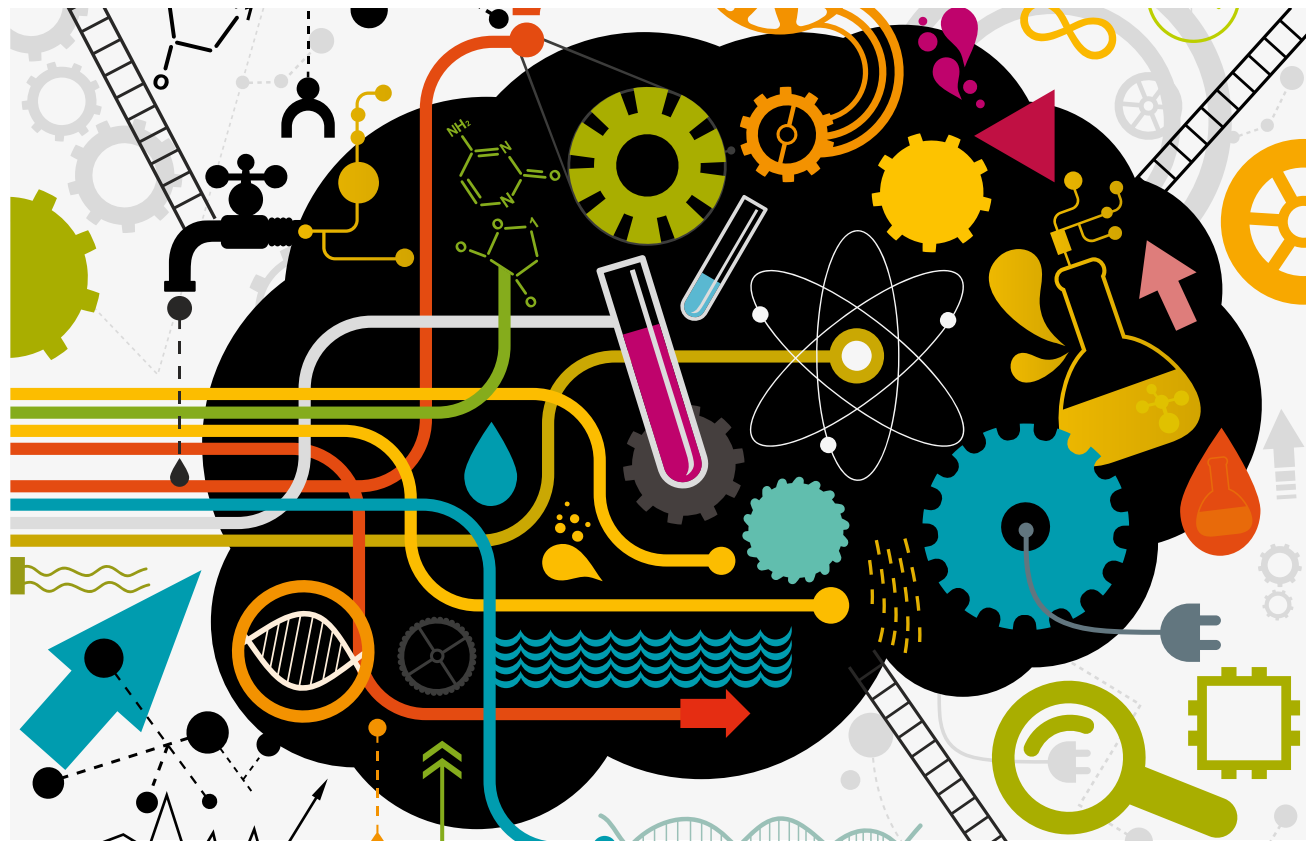
I didn't teach it anything, except 'press this bar and food comes' – kind of like how to open the refrigerator door. And I copied the lab manuals of the semester before mine because I didn't like doing that to an animal. And when they would starve it in the holiday to see if it would learn better if it's hungrier, I would come in every day and feed my rat and make sure that it wasn't hungry, and do those types of things.

TB: I'm sure the rat was grateful.

PK: It was a very exact psychology at that point in time. The idea of a brain, and processing and learning like that, it was a stimulus response. It was based upon Skinner and the like. So it was a very 'hard' social science. When I started studying again, ten years later in the Netherlands, it had made the transition to cognitive psychology and in that point in time I was dealing with things like the use of adjunct questions from Ernie Rothkopf – as well as his work on mathemagenic activities – all of those types of things, so it was a re-introduction, a re-christening in the psychology, but then in the cognitive psychology. And I've been there ever since.

TB: I have to zoom in a little bit on your seminal work with John Sweller. How did that come about?

PK: Dick [Richard E] Clark's story is different from my story. There's an interview with him where he says how it happens. The way it happened – at least as far as I can remember – was like this. At an international conference, there were these people pontificating about constructivism and inquiry-based learning. John made a comment there. I had met him before that and had long discussions with him in the Netherlands. Afterwards I said to John something to the effect of 'These people don't understand what's actually going on. It's not that they're unwilling, it's just they don't understand it.' From that came the idea of writing this paper. The original title was 'Inquiry learning isn't', which John thought was just a little too quizzical and whimsical for his taste.



TB: It's more you?

PK: Yeah it's definitely me. So we started working on that and talking to each other. And at a certain point, he said, 'Well I know that Dick Clark has been doing some review work' on things like that for *Review of Educational Research* and other journals. 'He would be a good person to bounce it off.' I also knew Dick, so I went up to him at a conference and asked: 'You know, John and I are doing this and we would like to have you as a critical reader and bounce some things off of you.' He said yes, and we sent him the first version of it and he came back with the question: 'I'm a bit embarrassed to ask, but could I be the third author? This is an incredible thing that you are doing.' For John and me the answer was a no-brainer: 'Of course!'

So that's how it happened. We first thought of going to *Educational Researcher* from the APA. We didn't send it to them; we just asked if they wanted it. They were lukewarm. Eventually we chose *Educational Psychologist*, which 'accepted' it with major changes. Two of the reviewers gave very strong critical advice and they helped us a lot – it made the paper quite a lot better. The third reviewer was a diehard constructivist and nothing we could've done would've satisfied that person.

TB: That's perhaps unsurprising...

PK: So I got in touch with the editor. This was around the time it went over from Lyn Corno to Gale Sinatra, so I got in touch with Gale and said, 'This is the situation: we have two critical and constructive reviewers and we can meet their demands and it will become a great article; but if we want to meet the demands of the third, it will never happen. So if you're going to make use of that third

reviewer and treat that seriously, then tell me that now and save us the effort – we'll go to another journal.' It wasn't meant as a threat; it was more a promise: 'We'll make use of the first two, make it a much better paper, and then go somewhere else.' And she said, 'No, no, do the paper.' She really liked it and so we did that. It got accepted and the rest is history. One of the most cited papers – and when Daniel Willingham comes back on Twitter and says it's one of the most important articles in the 21st century, it's kind of something you've always dreamed about.

TB: That was my next question actually: what was your reaction to that kind of praise?

PK: There are certain papers in your life that you read, that I read, and then you say, 'Okay, those are *the* papers.' I mean, if you're talking about levels of processing, it's Craik and Lockhart, you know? That's something you dream about: that you're going to write such a paper. But you also know that it's never going to happen in your lifetime, because there are very few that reach that status. But serendipitously, this came to be; and it became a paper that I'm incredibly proud of. And it's just an incredible feeling.

TB: Were you surprised by its success?

PK: I knew it would...raise dust, make an impact and be controversial, because at that point in time everything you heard was inquiry, discovery and constructivist, new learning and all of those types of things. But I didn't know it would be picked up by that many people. And I didn't know that it would lead to debates at different conferences, and a book on constructivist versus instructivist learning by Sig Tobias and Tom Duffy. Those types of things, I had no idea at all.

TB: What have been the biggest criticisms of that paper?

PK: There were two: one was Deanna Kuhn, who said we didn't understand children.

TB: Obviously!

PK: The second was that we in some way, shape or form had created a straw man that was easy to knock down – although the only thing we did was cite people and what they had actually written. And you can see it now, although the criticism has become less. The diehard constructivists have died out, maybe? But what you see in their places are apologists – inquiry learning people, discovery learning people, who then add a heavy dose of directive instruction, explicit instruction, and then somehow still call it inquiry-based learning. Where's the discovery gone in discovery learning? If you read the review articles, they say inquiry only works if there's enough explicit instruction – to which I say, 'Well that's called direct instruction.' You explicitly teach children about something, teach them how to solve problems with what they've learnt, and then give them problems to solve after they have the knowledge and skills to do it. So, they still call themselves constructivists and/or adept at discovery, or inquiry, or experiential learning. But what they're actually doing is making use of certain aspects of discovery, either after explicit instruction or with the aid of 'just in time' explicit instruction. It's no longer discovery learning.

TB: Which raises another point: I'm fascinated by I guess what you might call the ecosystem educational research inhabits – why some things 'land' and some things don't. You've written about the idea that constructivist learning goes away, comes back, goes away, comes back...

PK: Always with a different name. Actually Rich Mayer wrote a great article about this: 'Should there be a three-strikes rule against pure discovery learning?'

I want to be very humble about it: John, Dick and I didn't do anything earth shattering. I mean, what we did was talk about what good teaching is and put it in a theoretical framework that could be understood. And we took constructivist ways of teaching, constructivist pedagogies, and put them against the same framework and showed that it can't work and why it can't work. So what we are saying is that nothing more and nothing less than good instruction from good teachers works. We told them why that is the case from an information-processing and cognitive load point of view – our cognitive architecture. We said why that was the case and that's possibly what makes it so strong, so robust, and so long-lasting, because we didn't come up with a new fad or a new name for something – we just explained why and how good teaching works.

TB: But nobody has made a single significant or serious pushback against this paper?

PK: No! But that's the author speaking here.

TB: So why are people still so resistant to this?

PK: Because it doesn't fit in with their idea of explicit instruction. There are at least two or three reasons for it.

Firstly, people don't understand what explicit instruction is. They think that you are talking about standing in front of the class and lecturing. So there are even teachers who actually do a lot of explicit teaching – and possibly do it well – who are pushing back against it because they have this strange idea of what it is. They're creating a straw man that doesn't exist, because nobody does that nowadays. Even in a lecture hall with 600 people, nobody does that. All they have to do is read Barak Rosenshine's work on direct instruction and they might possibly see that they are doing direct instruction! But that's the first reason.

The second reason is that it doesn't fit the zeitgeist. It's like the zeitgeist is a kind of laissez-faire approach: 'Give that child room', 'The school/classroom is a prison' – that type of thing. A romantic version of the child a la Rousseau.

In their idea, it's kind of like we need to give our flowers room to grow and bloom. But as E D Hirsch stated, current science essentially demolishes the romantic tradition in educational thought which holds that education should develop naturally for the individual child. He states that while romanticism has produced great poetry, it has led to terrible educational ideas that have done a lot of harm to our Western nations.

And this zeitgeist problem is also seen with things like multitasking. It's hip to think that people can do a lot of things because we see children and adolescents doing it. That's what Marc Prensky did. He saw children multitasking but he never studied whether they were actually processing more things at once or whether they were doing it in a way that didn't affect the outcomes. In other words: did they learn better? Did it lead to more mistakes or did it take more time to complete identical tasks?

The idea that we can multitask fits our view of the world and people believe it. But try saying the following to one of these believers: 'Have you ever watched the news on television and had your partner walk in and ask you something? And you give them an answer, and then you've missed what has happened in the news. You heard it; you possibly even saw it. But you were thinking about something else.'

Or maybe explain it like this: 'You're having a discussion with a colleague at work and, while talking, you look at your computer screen to read an email that's just arrived (the pop-up on the screen caught your eye). And at that point, your colleague asks you a question – and you have to excuse yourself because you were reading that email.'

'What you were reading wasn't rocket science and what your colleague was speaking to you about probably wasn't rocket science (unless you work at the European Space Agency). You definitely heard their voice (you didn't all of a sudden become deaf) but you couldn't process what they were saying because you were processing the text of the email. In both cases, you weren't capable of semantically decoding one stimulus while you were at the same time semantically decoding a different one.'

At this point, the believer in multitasking will probably admit to having experienced this. But up to that point, they had the idea that they really could multitask.

Knowledge and skills are necessary to do anything further. Without those, you can't solve problems, you can't creatively design anything, you can't carry out a good argument and you can't discuss things. Our brains are limited in how much they can take up at one time and how they can process that.

The same is true for learning styles. How many times do we have to tell teachers that learning styles don't exist? How many times do we need to present empirical research showing the contrary and they still think it exists? 93% of British teachers still think that there are learning styles and that catering to them improves learning.

TB: What's the main takeaway for a teacher from your paper with Dick and John?

PK: Knowledge and skills are necessary to do anything further. Without those, you can't solve problems, you can't creatively design anything, you can't carry out a good argument and you can't discuss things. (Although I know a lot of people who argue without having absolutely any knowledge!) I think the main takeaway is that our brains are limited in how much they can take up at one time and how they can process that effectively, efficiently and joyfully. And if you want a learner to do that then you need to design the learning experience in a way that is synchronous with our human cognitive architecture – how our brains function. Conversely, if you do anything that contradicts how your brain functions, it won't work. But if you do things that fit, that synchronise with human cognitive architecture, then learning will happen either more quickly with less effort – that's my idea of efficient – more effectively, learning more deeply and learning enjoyably. Learning isn't always fun, of course, but following these principles leads to achieving a greater feeling of achievement and success.

TB: Satisfaction.

PK: Satisfaction, yeah. But I like 'effective, efficient and enjoyable'. And anything that you do as a teacher – and this is possibly a second major takeaway – should be aimed at reaching at least one of those three and never to the detriment of the other two. So, if you have thought of something that makes something more effective, but it's incredibly less efficient, then it probably won't work. If you can make it more efficient but they learn less, you shouldn't do it. I'm an atheist, but that's kind of my holy trinity: effectivity, efficiency and enjoyment.

TB: Would you change anything about the paper now?

PK: If I was re-writing it now I would possibly make more use of (or substantial use of) things like David Geary's work on biological primary and secondary learning. We didn't put that in because the paper was made in 1995, but his real work was in 2002, 2006.

Maybe I'd also make a slight change to talking about the cognitive load theory in it, because I've stopped using the three types of cognitive load – intrinsic, extraneous and

germane – for a number of reasons. John is also more in that direction now at the moment. This is because there's a certain amount of load that's intrinsic to the task, which is based upon the complexity of the task, and a certain amount related to your own expertise – because as you become more expert, the complexity goes down.

And people have to realise that complexity is not the same thing as difficulty. You can have a very simple quantum mechanical problem, but for me it's difficult because I don't know quantum mechanics. It's simple in terms of how many information elements there are and how much interaction there is between the elements. So that determines the intrinsic load. Then you have extraneous load, which is everything that deals with how you learn it: the techniques you use, the technology, all of the other things in the learning process.

And you can say, 'Why have you got rid of germane load?' Germane cognitive load is defined as 'load caused by instruction that helps someone to learn'. And you can say extraneous load is 'load that is caused by something in the environment, usually instruction, that hinders learning'. But the problem with that is that you can't determine what is germane unless it is ex post facto or post hoc. I can only say what has helped learning if I determine the student has learned. It becomes a kind of circular way of reasoning. If someone learned from it then apparently the load was germane; but if someone didn't learn from it, then apparently that was extraneous load.

I can measure the intrinsic load by looking at how many new information elements there are for this person and what the interaction is between them. Take playing scales on piano. I play no piano, so playing the scales is hard enough for me. A scale contains eight notes but it goes in one direction, or it goes in the other direction. The hardness/softness doesn't change and it keeps a steady tempo, so that's a low-complexity task. On the other hand, imagine playing a melody with fewer notes but with a greater variation in the tempo, the hardness/softness and the order of the notes. The interaction between elements is so much greater. This task is quite a lot more complex than playing a scale. So it's always a combination of the number of elements, the number of new elements, and the amount of interaction. You can measure that beforehand; you can see it and put it into it a formula and say, 'Okay, this is the intrinsic load of this task.' And I can make a task more or less complex by adding or subtracting information elements or changing the level of interaction between the elements.

But I can't do that with the other types of load – germane and extraneous – because they arise from the way the task is presented and the way you instruct in it. And if someone learns, then apparently the load that was created (and that was measured) was germane. If they didn't learn, then apparently what you've caused was, in the old model, extraneous. And so it doesn't make sense to keep talking about three types of cognitive load if I can only measure one. That was one of the major criticisms of the cognitive load model. As Slava Kalyuga noted, germane load is essentially indistinguishable from intrinsic load because it's associated with task-related processes which are sources of intrinsic load, and therefore germane load as a concept is redundant. The dual intrinsic/extraneous framework is sufficient and non-redundant.

TB: What are your thoughts on David Geary's biologically primary learning?

PK: It was incredibly insightful; but if you read it, it was so incredibly basic – you could kick yourself and say, 'Why didn't I write that?'

TB: [laughs] Yeah.

PK: There are certain things that are evolutionarily determined because if they weren't there, the species would've died. For example: recognising someone's face, communicating with a parent, having a sense of community and wanting to be with others, etc. Without these, a baby is doomed to die. So a child that doesn't recognise its parent's face won't reach adulthood and won't procreate. It's incredibly basic that such a thing exists. This leads to things Geary discusses like folk psychology, folk biology and folk physics that are there because we need them to survive.

For example, in the wild, if a bush moved unexpectedly then we needed a flight reflex to get away. Because while it might have been a rabbit, it might actually have been a tiger. And if you didn't have that reflex, you were probably consumed by the tiger. That's biologically primary learning: you don't have to teach a child that. Some people say that because we learn a first language that way, we can learn a second language like that. But they don't understand – the second language is different: writing, reading, those things aren't necessary for your primary survival. Those are secondary knowledge bases, and we need to teach those things more explicitly. And that's something that's usually the result of schools. It's such an incredibly simple theory in the most positive sense of the word, as in, 'Why didn't I think of that and write it down?' That's how good it is.

TB: You're only allowed one major breakthrough! [laughs]

PK: That's the type of paper it is. It's an incredible eye-opener, and it gets to the core of something – like John's cognitive load theory. It brings together things like information processing from Baddeley and Hitch. You have sensory information, and you have long-term and short-term memory. And information held in the short-term memory is lost if you don't repeat it after a certain period of time. And what happens if you read your slides to your audience while they also read them silently to themselves? You're asking them to semantically process what they are reading and hearing at the same time. They just can't do

that! They'll learn less, but you think they're learning more because you're saying it twice, in two different ways.

TB: A lot of teachers think they're teaching with greater impact that way.

PK: But you're not! If you had a picture that they were iconically interpreting in what is known as a visuospatial sketchpad, while on the other hand the words that they're hearing is being semantically decoded in what's called the phonological loop, then that's dual coding from Allan Paivio. This, along with cognitive load theory, is one of the foundations of the multimedia principle in Rich Mayer's cognitive theory of multimedia learning. Once again it's one of those theories that is so robust, it can explain almost anything. It explains why certain things work for experts and not for novices: the expertise reversal effect. It's at the roots, it's foundational. It's about Geary's work and John's work, and it's incredibly foundational because they both deal with the essence of learning. Firstly: how our brain evolved and what that means for learning and education, and secondly, how does our cognitive architecture function and what does that mean for learning and education? What do you need that's more fundamental than that?

TB: One last question: what are you working on now?

PK: Two things. I just published an article, which I hope will have an impact and that's called 'From cognitive load theory to collaborative cognitive load theory'. It expands cognitive load theory to collaborative learning situations.

TB: That will grab a lot of people.

PK: I hope so. It came about from the fact that I used have a chair in computer-supportive collaborative learning and one of the things that intrigued me was what I call transaction costs and transactive activities. That's when you're working with someone else on something, and you have to expend time, effort, energy on communicating about and coordinating what you're doing with others. Those are intrinsic costs to the task of learning collaboratively. If the task itself isn't complex enough that the benefits of working together with other don't exceed the transaction costs caused by working together, then people won't work together.

That's one of the many things that's problematic for teachers using collaborative learning. They really don't either think about or are capable of designing tasks that are complex enough to require collaboration. They can't or don't make tasks where the benefits of working together are greater than the costs caused by transactive activities. And you'll see that they'll say things like 'you have to contribute five things to the discussion group' because people don't communicate and contribute enough.

The second is my little secret. All I'll say is that it deals with modern assessment. I'm trying to find funding to do the research, but don't want to alert any hijackers on the horizon.

REFERENCES

1. Kirschner, P. A., Sweller, J., Kirschner, F. and Zambrano, J. (2018) 'From cognitive load theory to collaborative cognitive load theory', *International Journal of Computer-Supported Collaborative Learning* 13 (2) pp. 213–233.

CURRICULUM THINKING

THREE MASTERCLASSES



JOHN TOMSETT



TOM SHERRINGTON



MARY MYATT

DESCRIPTION

This is an opportunity for teachers and leaders to participate in three 90 minute masterclasses delivered by three prominent thinkers in the area of curriculum design and implementation. Each masterclass will include an extended presentation with interactive elements and time for questions and discussion. The event concludes with a panel session where participants can pose further challenges and questions.

Presenters' books will be offered to participants, included in the ticket price.

EVENT AGENDA

- 09.00 Arrival
- 09.30 **MARY MYATT MASTERCLASS:** Fundamental curriculum design principles including ideas from Mary's book *Curriculum: Gallimaufry to Coherence*
- 11.00 Break
- 11.15 **TOM SHERRINGTON MASTERCLASS:** Curriculum structures and elements, ideas from the *Learning Rainforest* including 'teaching to the top' and Mode A and Mode B teaching
- 12.45 Lunch - provided
- 13.15 **JOHN TOMSETT MASTERCLASS:** Delivering a great curriculum: evidence + values + people including examples of curriculum initiatives at John's Huntington School and ideas from his book *Love over Fear*
- 14.45 Panel.
- 15.30 Event concludes

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EVERYONE'S A TEACHER OF S.E.N.D.



Karen Wespieser

Karen Wespieser, Director of Operations at the Driver Youth Trust, talks about a change in the way we understand SEND discussions

Defining the label of SEND and then applying it to children and young people is a complex issue and can be arbitrary. In 2010 the number of pupils identified with SEND in the UK was five times the EU average. This led Ofsted to review how children were being identified and supported in schools. They concluded that 'as many as half of all pupils identified for School Action [support] would not be identified as having special educational needs if schools focused on improving teaching and learning for all'.²

The Children and Families Act (2014), the catalyst for the largest reforms in decades, mandated a new system of identification. The Act describes someone as having a SEND when 'they have a learning difficulty or disability which calls for special educational provision to be made for them' (Section 20). It then defines 'special educational provision' as 'provision that is additional to or different from that which would normally be provided for children or young people of the same age in a mainstream education setting' (Section 21).

Such a definition is problematic, however, because what 'learning difficulty' and 'additional' or 'different' provision mean is open to subjective interpretation. As a result of these changes to the definition, the number of children and young people identified as having a SEND declined from over 1.5 million in 2010 to around 1.2 million in 2016.³ The figure has been rising again since 2017 and latest data shows it at nearly 1.3 million, or 14.6% of pupils.⁴

It is interesting to note, however, that while the proportion of children and young people identified as having a SEND declined between 2010 and 2016, the number of children who have an education, health and care plan (EHCP) remained consistent at 2.8%. As the figures began to increase in 2017, the proportion with EHCPs also rose and currently stands at 2.9%.

A small Twitter debate erupted following the 2018 **researchED** National Conference when someone pointed out: '110 workshops – SEND mentioned twice, dyslexia once and a session about reversing therapeutic-based practice. In a profession where 14 per cent of our students have SEND...' But does professional development need to be explicitly about special educational needs and disabilities (SEND) in order to improve the teaching of this group of young people?

The latest data from the government's annual survey of newly qualified teachers (NQTs) found that assessing the progress of SEND pupils was one of only three areas where fewer than 50% of NQTs gave a rating of 7-10 out of 10.¹ The proportion of NQTs who reported that their initial teacher training (ITT) had prepared them well to teach SEND pupils wasn't much higher: just over half (53%) felt prepared (ibid.). Whilst improving ITT is clearly an important issue that needs addressing, it isn't one for **researchED**. However, if initial teacher education isn't equipping the school workforce with this information, then surely professional development events like **researchED** could?

Yet, as with many SEND-related discussions, maybe this is actually an issue of labels. Whilst there may not be many workshops *labelled* SEND at **researchED** events, there are often plenty that addressed key ideas of how best to teach SEND students in the mainstream classroom.

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What is often missed in discussions about SEND is that the vast majority of children and young people with SEND will be in a mainstream school. Data from the Department for Education⁵ shows that of the 1,178,235⁶ SEND learners in state-funded compulsory education, 56% (650,455) are in state-funded primary schools and 34% (399,800) are in state-funded secondary schools. Far fewer of these learners are educated in special schools (only 10% – 114,755) or in pupil referral units (1% – 13,315), although the incidence of SEND in these settings is substantially higher.

Whilst many papers and commentators focus on children and young people who have EHCPs or attend special schools, the vast majority of SEND children and young people receive their education in a mainstream school. Therefore, all teachers need to ensure their professional development includes how best to teach this cohort.

For this reason, using a specific label to identify where SEND professional development is taking place is a potential distraction. It risks an 'us and them' mentality and, despite the statistics above, faced with a choice, many teachers may still not recognise a gap in their knowledge. But does this matter?

Good teaching is essential for all pupils, and all teachers are teachers of SEND. We therefore need to find a balance; whilst the NQT data above highlights a need for more specialist training on various learning difficulties to develop teaching skills further, we also need to ensure all CPD builds in inclusive elements and refers to children with SEND so it is not 'bolted on'.

Some of the best evidence we currently have has grown from educational psychologists and neuroscientists whose research was first picked up by teachers working with young people with special educational needs. For example, Professor John Sweller's research on cognitive load theory or Professor Allan Paivio's work on dual coding – both stalwarts of **researchED** presentations, and both, I would argue, provide useful tools in teaching children with SEND.

So whilst I would not necessarily argue that there needs to be more SEND-focused sessions, I do believe that there could be more emphasis on SEND in the questions that are asked of the research and practice that is shared.

The vast majority of SEND children receive their education in a mainstream school. Therefore, all teachers need professional development that includes how best to teach this cohort.

For example, School Minister Nick Gibb's **researchED** speech⁷ at the 2018 national conference included celebratory remarks about early literacy and the 87% who reach the expected standard in the Year 1 phonics screening check. He did not mention the worrying discrepancies between regions and local authorities where a child with an EHCP in Inner London is 50% more likely to reach the expected standard in the phonics screening check compared to a child in the North West, East or West Midlands.⁸

If we are all teachers of SEND, we may not need our own conferences or conference stream, but we do all need to be asking these questions.

Recommendations for further reading

Sweller J., Ayres P. and Kalyuga, S. (2011) *Cognitive load theory*. Berlin: Springer-Verlag.

Paivio, A. (1986) *Mental representations: a dual coding approach*. Oxford: Oxford University Press.

Weinstein, Y., Sumeracki, M. and Caviglioli, O. (2018) *Understanding how we learn: a visual guide*. London: Routledge.

REFERENCES

1. Ginnis, S., Pestell, G., Mason, E. and Knibbs, S. (2018) *Newly qualified teachers: annual survey 2017*. Department for Education. London: The Stationery Office.

2. Ofsted (2010) *The special educational needs and disability review*. Manchester: Ofsted.

3. Department for Education (2016) *Special educational needs in England: January 2016*. London: The Stationery Office.

4. Department for Education (2018) *Special educational needs in England: January 2018*. London: The Stationery Office.

5. Ibid.

6. This is a smaller number than the total number of SEND pupils as it excludes nursery and independent school pupils.

7. Gibb, N. (2018) 'School standards minister at researchED' [Speech], *researchED National Conference 2018*. Harris Secondary Academy, St Johns Wood, London. 8th September.

8. Selfridge, R. (2018) *Effective specialist support and ringfenced funding is needed to support those who struggle to learn to read*. London: Driver Youth Trust.

EVERYTHING STARTS WITH THE CURRICULUM

Nuno Crato



We are starting to see policy makers and politicians engage with evidence bases and relatively recent discussions about research that are dominating the discourse between educators. In this article, Nuno Crato, former Minister of Education and Science in Portugal 2011-2015, describes his experience of leading education policy reform in a direction frequently characterised by how much it stresses recent ideas about curriculum, learning and assessment.

In June 2011, Portugal was coming to grips with the most serious financial crisis of its recent history. The state was broken and unable to adopt the common short-term solutions for monetarily independent countries. The country had joined the euro 12 years earlier and the state was unable to finance its debt. In May 2011, a bailout had been agreed with the IMF and the EC, and the government had fallen. Elections were held and a new prime minister had been appointed: the social democrat Pedro Passos Coelho. I was in Berlin at a stopover for a conference trip when I received a phone call and an invitation to join the government.

I am not a politician and did not join any party, but my strong educational convictions were well known by the new prime minister. I barely knew him, but he gave me total support for the reforms I had been preaching for years through books, opinion articles, and press interviews. These reforms are easy to enumerate: a strong, demanding, and well-structured knowledge-

based curriculum, frequent student evaluation, rigorous initial teacher training, school autonomy, support for failing students, vocational paths, and results-based school incentives. In a practical way, they were a continuation and acceleration of Portugal's progress in education. But in the discourse, they were a paradigm shift from a competences-based and a student-centred education, to a knowledge-based, more direct teaching approach.

Since 2000, our country had been progressively abandoning the romantic and failed ideas that dominated the school reforms of the '80s and '90s: loose curriculum, no students' external evaluation, no memorisation, spurning high culture, emphasising popular culture, and so on. In 1995, the TIMSS results had been a wakeup call and then, step by step, different governments put in place a couple of reforms that went essentially in one direction: more attention to the results.

This was done by introducing some exams, discussing school results, setting up rules for teachers' evaluation. But so far it had been done in a very inconsistent way. At the same time, the education apparatchiks were still preaching the benefits of a loose curriculum and trying to impose non-directive teaching methods.

By 2011, teachers were tired of this constant interference. For years, many new fads were imposed: competences instead of knowledge, learning in context, discovery learning – you name it. Paradoxically (or maybe not!) the ministry was controlling processes but resisting evaluating results.

The reforms we introduced in 2011 and in the subsequent years were greeted by teachers and parents as a welcome increase in quality and rigour. Unions and opposition political parties contained their resistance and only later became hostile. But I think the results speak for themselves.

From 2011 to 2015, Portugal not only continued to improve its educational system, but also accelerated that improvement.

Since the first cabinet meeting, it became clear to me that the governmental priorities in education were going to be dominated by the need to reduce expenditure. The agreement that had been signed with the troika (IMF, ECB and EC) had singled out education for a significant budget reduction. Teachers represented about one-third of civil servants in the country and salaries in schools, universities, our ministry services, and research centres represented about half of state salary budgets.

We clearly had to design a way out; 'obtain more with less' became the motto. To put this into practice without hurting education simply meant we had to concentrate our efforts on the essentials. And the essentials are not teachers' salaries, school buildings, or computer equipment. The essentials are students' learning, students' skills development, and students' ethical growth. In a word: students.

We would build upon previous progress. In my opinion, this progress was due essentially to one key factor: increased attention to results.

Changes started at the turn of the century. In 1996 and 1997, first-wave TIMSS results were released and revealed the appalling situation Portuguese students were in. In 2001, a fierce political and legal battle forced the ministry to disclose nationwide school grades, showing finally that some schools were able to raise their students to reasonable levels while others were unable to do the same. More interestingly, the school divide did not coincide with socioeconomic status of the students. This led to a national debate in which it became clear to parents that schools were different, and some were

doing a better job than others. The ministry, school principals, and teachers were put under healthy pressure – they were challenged to do better.

In 2006, a new minister introduced exams at the end of compulsory education (at the time, 9th grade). In 2009, another minister introduced standards as a way of making the curriculum clearer and more detailed. The narrative was still relatively romantic: to encourage students to learn in a joyful environment, and so on. But the practical changes were clear.

2011: Everything starts with the curriculum

Portugal used to have a very centralised and rigid curriculum. In the school year 2011/12 we decided to assign more school time for reading and mathematics. We also gave more freedom to schools to reorganise the school timetable according to their needs.

But this was only the first change. Throughout this first year we prepared the ground for the second one by restructuring the mandatory curriculum structure to give more class time to the fundamental subjects. To begin with this meant reading and mathematics, then history, geography, sciences, then English. This was made at the expense of vague and unstructured subjects/themes such as 'learning in company', the 'project area', 'civic education' and the sort. Although these topics may have corresponded to important activities and ethical development, they were not structured. Frequently they were just a source of vague politically correct indoctrination – or simply a waste of time. They were not grounded in any substantive subject knowledge.

In parallel, we set up new standards, and by that we meant detailed lists of learning outcomes. Those lists needed to be precise, well structured, and conducive to sequential learning. Moreover, the listed contents should

be precise enough to convey unambiguously to students, teachers, parents, textbook authors, and examiners what the desired outcomes were. This definition stands in sharp contrast to the previously adopted 'competences' approach. In fact, one of our major criticisms (made in a series of documents¹) of this French-Swiss-imported approach from Perrenoud² and other authors was that their learning outcomes were impossible to pinpoint and to evaluate. Another major criticism we made was the undervaluation of knowledge, which was considered important only when leading to practical competences.

When needed, we also adjusted the curricular programmes. In our tradition, a 'programme' is a reasoned general explanation of subject content for a given discipline at a given school year or cycle of years. The new standards complemented the programmes, but sometimes the programme itself had to be adjusted.

Underlying these reforms there was a firm belief in students' capacity to learn more and to progress further. Consequently, the new curriculum was much more ambitious, much more demanding, and much more rigorous.

Evaluation helps students

To learn is one thing, but how do we learn that we have learnt? The second major area of progress we made was to generalise, improve, and increase the frequency of standardised tests. In 2015 we put in place standardised tests in the 4th, 6th, 8th, and 12th grades. These tests were closely aligned with the curricular standards. They were public, and schools' average results were made public, and action was taken as a result. Failing and near-to-failing students received special help and schools received resource incentives whenever they were able to show that these resources were used to improve students results. We put in place a complex system of credits that would reward and encourage those who could simultaneously reduce retention and improve students' results in standardised tests.

The educationalist apparatchiks abhorred these changes, but they were unable to rely on their well-rehearsed, fallacious arguments. Results were obviously improving, and not only for the elite students: the number of failing and near-to-failing students decreased, and drop-out rates decreased. Teachers predominantly saw end-of-cycle tests as a boon to their efforts to encourage students to learn.

Alternatives help students

One of the most propagated but false dilemmas in education is the so-called opposition between rigour and inclusion – the idea that we cannot sharply improve education for all. It is the argument that if we are demanding, then we are increasing students' inequalities; and if we want to help all of them to progress, then we should be guided by the weakest students' needs and learning pace.

This dilemma assumes many forms, but it's a false dilemma. Can't we aim at high standards for all and give extra help to struggling students? Of course we can – and that's what we did in 2012. Through a series of legal

dispositions, the ministry gave more freedom to schools, allowing and encouraging them to assign teacher hours for this type of extra support. Simultaneously, we allowed the creation of something akin to 'temporary tracking'. Struggling kids were not pulled out of their regular classes, but had additional studying hours with dedicated teachers. For each student, this was temporary. It lasted for months and not for years. I'm convinced this type of measure helped everybody.

Vocational training for students willing to finish schooling with a professional certificate was the second most successful measure. Following various international experiences, we created two types of vocational paths. One regular, the other for students with special academic difficulties. This helped everybody.

2015: Things can change rapidly when we pay attention to the essentials

When PISA and TIMSS results came out in December 2016, many people were surprised by the dramatic progress of Portuguese students. For the first time in our history, we exceeded the OECD average for PISA, and we did so in all three PISA areas: mathematics, reading, and sciences. In TIMSS we outperformed many more-advanced countries, jumping from 475 points to 541 points in 4th grade maths. When we started, in 1995, only two countries were below us in the rankings. Now, we had 36 countries below us. And among these, Finland – which was no minor success for us.

In many countries, from Spain to the UK and Argentina, the press highlighted these results. On December the 6th, 2016, *The Economist* interviewed me and highlighted the importance of standards, testing and support to under-achieving students.

One of the most reassuring results emphasised by the PISA 2015 report was the fact that Portugal was one of the very few countries/regions able to simultaneously increase the number of top performers and reduce the number of low performers. I hope readers will forgive me for being proud of our students' results.

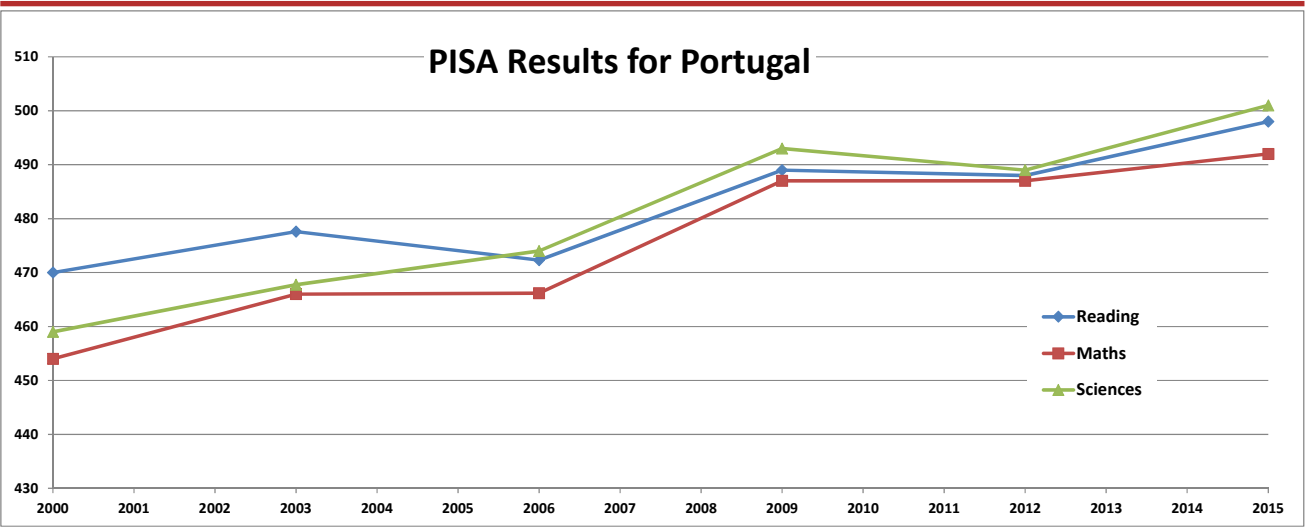


Fig. 1: PISA Results for Portugal

PISA results for Portugal since the beginning of this international survey show a continuous increase. There was a substantial improvement in all three areas immediately after the introduction of significant attention to rigour and academic results. In 2001/2002, the country started publicizing school's results. In 2006, the ministry introduced new exams for 9th grade. In 2011/2012, we introduced standardised assessment for 4th and 6th grades and a new and more rigorous curriculum.

REFERENCES

1. See, for example, my Crato, N. (2006) *Eduquês em discurso directo: uma crítica da pedagogia romântica e construtivista*. Lisbon: Gradiva.
2. Perrenoud, P. (2011) *Construire des compétences dès l'école*. Montrouge: ESF Éditeur.

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COGNITIVE LOAD THEORY IN THE CLASSROOM



Tom Needham

Cognitive load theory is rapidly becoming one of the most talked-about theories of how we learn. But what are the implications for how we teach? Teacher and blogger Tom Needham outlines the basics, and what they could mean for you, in the first of this three-part series.

However, if the pieces were arranged randomly, then this gap in performance disappeared: experts and novices performed the same. With the random configurations, experts could not rely upon recalling thousands of game configurations as the pieces did not conform to or fit game patterns that they had stored in long-term memory. Similar results have also been found in other domains, including recall of text and algebra. The conclusion of these studies was that when solving problems or engaged in cognitive work, experts within a field rely upon their larger and more-developed long-term memory deposits, patterns of information that are also called schemata. While short-term memory has a limited capacity, long-term memory capacity is vast and seemingly endless.

Recognising the fact that novices have less relevant knowledge stored in their long-term memory, Sweller et al. explain: 'Novices need to use thinking skills. Experts use knowledge.'² Because 'thinking skills' rely upon working memory, an aspect of cognition that has a small and fixed capacity for holding and manipulating items, novices soon reach the limits and, due to excessive cognitive load, find tasks difficult or impossible as a result. The implications of these findings are striking for teachers. In a general sense, we should be spending much – if not most – of our time as teachers trying to increase our students' domain-specific background knowledge so that we can help them overcome the seemingly unalterable capacity in their short-term memory and recall, apply and use relevant knowledge from their long term memories. Sweller et al. posit that 'we should provide learners with as much relevant information as we are able'³ and that 'assisting learners to obtain needed information during problem solving should be beneficial'.⁴ They also posit that 'providing [learners] with that information directly and explicitly should be even more beneficial'.⁵ Explicit teaching, at least for novices, is almost certainly preferable to asking students to discover things for themselves. If we are not explicit, there is a chance that students will not retain and understand what we are

Six years ago, I read *Why Don't Students Like School?* by Daniel Willingham, a text that not only made me reconsider almost all aspects of how I was teaching but also acted as a springboard into the depths of educational research. His explanation of the importance of memory and the conceptual distinction between working and long-term memory revolutionised how I thought about instruction and made it abundantly clear that I had not been focusing upon the vital notion of retention. Cognitive load theory is also based on the conceptual difference between working and long-term memory and provides a number of strategies to optimise instruction within that framework.

An overview of some of the theory

What is it that makes experts proficient? In 1973, a study¹ was conducted to investigate what made grandmaster chess players superior to other players. While an intuitive answer may have attributed their dominance to more proficient problem-solving abilities, the application of a generic 'means-ends' analytical approach or the fact that they weighed up and considered a wider range of alternative strategies, the reality was a difference in their memories. Players, both expert and novice, were shown a chessboard with pieces arranged in plausible and typical game situations for five seconds. When asked to recall the positions of the chess pieces, expert players were significantly and consistently better than novices.

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In order to develop in expertise, students need to increase their knowledge; and in order for them to increase their knowledge efficiently, they need direct and explicit teaching.

The worked example effect

In short, the worked example effect refers to the idea that if you want novices to succeed in a particular domain, they would be better off studying the solutions to problems rather than attempting to solve them. Asking students to repeatedly write extended answers to questions ‘unnecessarily adds problem-solving search to the interacting elements, thus imposing an extraneous cognitive load’.⁶ In the absence of well-developed background knowledge, students flounder because they have little stored in their long-term memories to help them. Comments in class such as ‘I don’t know how to start’ and ‘What do I write?’ are sometimes indicative of this scenario.

I teach English, and responding analytically to texts is a complex activity containing multiple components, many of which are abstruse for novice learners. If you try to describe these elements, you are forced to use abstract phrases such as ‘sophisticated analysis’ and ‘judicious use of quotations’; and, in the absence of examples, these terms merely serve to mystify the process further. This is the language of mark schemes, terminology that may make sense to experts but leaves novices confused. Creating worked examples – in English this may mean sentences, paragraphs or essays – exemplifies these opaque terms, converting the abstract into the concrete.

Sweller et al. argue that ‘worked examples can efficiently provide us with the problem-solving schemas that need to be stored in long-term memory’.⁷ Studying worked examples is beneficial because it helps to build and develop students’ background knowledge within their long term memories, information that can then be recalled and applied when attempting problems. The grandmasters in the chess study were successful because of the breadth and depth of their background knowledge. Similarly, English teachers find writing (one of the problems in our domain) easy because we have long-term memories that contain myriad ‘problem solving schemas’ and mental representations of analytical responses to texts.

If we accept the notion that short-term memory capacity is pretty much fixed – as well as the idea that we cannot really teach generic higher-order thinking skills – then building domain-specific background knowledge may be our most important job as teachers. Studying worked examples is more effective and efficient than merely attempting problems. Deconstructing and studying model sentences, paragraphs and essays should, in the long run, be superior to merely writing them.

Research into the worked-example effect in English

In *Cognitive Load Theory*, Sweller et al. refer to English, the humanities and the arts as ‘ill-structured learning domains’⁸ to distinguish them from mathematics and science. They make the point that in maths and science

problems, we can ‘clearly specify the various problem states and the problem-solving operators’⁹ – essentially rules that dictate process and approach. ‘Ill-structured domains’ do not have such rigid constraints. Although there are subjective elements within English and often innumerable ways of approaching a task, different approaches may be considered of equal worth and demonstrate a comparable level of proficiency. The variables within analytical writing can, like the colours within a painter’s palette, be arranged in numerous and diverse patterns; however, these different configurations can be judged to contain equivalent skill and quality. Despite this, the researchers make the important point that ‘the cognitive architecture ... does not distinguish between well-structured and ill-structured problems’,¹⁰ meaning that the findings of *Cognitive Load Theory* apply to all domains. The researchers also explain that ‘the solution variations available for ill-structured problems are larger than for well-structured problems but they are not infinite and experts have learned more of the possible variations than novices’.¹¹ Over the years, teachers have read, thought about and produced innumerable pieces of analysis and, as a result, have developed rich schemata of this kind of knowledge which they can recall, choose from and apply when dealing with problems.

Sweller et al. point out that ‘even though some exposure to worked examples is used in most traditional instructional procedures, worked examples, to be most effective, need to be used much more systematically and consistently to reduce the influence of extraneous problem-solving demands’.¹² A five-year curriculum that systematically and consistently uses worked examples should help students build a rich schemata of ‘possible variations’,¹³ moving them more quickly and efficiently along the continuum from novice to expert than if they had just completed lots of writing tasks. The constant studying of concrete worked examples is far superior to describing proficiency using abstract and often vague descriptors and success criteria. When describing complex performance in the absence of concrete examples (which is the purpose of a mark scheme), the sheer breadth and possible variation of what is being described necessitates a wide lens of representation. While this is advantageous to the expert, allowing complexity to be summarised and condensed, it is obfuscatory and perhaps even meaningless for students. Experts have abundant and detailed schemata that exemplify abstract terms like ‘critical analysis’, ‘judicious references’ and ‘contextual factors’; novices do not.

In *Cognitive Load Theory*, two studies directly relevant to English are referenced. In the first,¹⁴ students were given extracts from Shakespearean plays, half receiving texts with accompanying explanatory notes, the other half receiving no additional notes. Perhaps unsurprisingly, the group who were given the notes performed better on a comprehension task. In the other study,¹⁵ students were given an essay question to answer. One group received model answers to study; the other did not. The study found that ‘the worked example group performed significantly better than the conventional problem-solving group’.¹⁶

London

Denounce (v)	Publicly declare to be evil or wrong
Denunciation (n)	A Romantic poet who denounced exploitation and oppresion, Blake wrote ‘London’ to highlight the omnipresence of suffering in the city
Exploitation (n)	To take advantage of; to use someone
Exploitative (adj)	Blake was appalled at the exploitation of the marginalised
Exploit (v)	
Marginalise (v)	People on the edges of society: the poor, minorities and those thought of as insignificant
Marginalised (adj)	The ‘charter’d’ streets exclude the marginalised and the destitute, benefitting only the wealthy and the privileged
Marginalisation (n)	

Here is a section of a vocabulary table for ‘London’, one of the poems from the GCSE poetry anthology.

What does this look like in English?

If we want students to perform well in complex tasks like writing, we should be giving them the necessary information ‘directly and explicitly’. Echoing Engelmann’s sentiment that we should ‘teach everything students will need’,¹⁷ the work of Sweller et al. also points to the superiority of explicit, direct instruction, approaches that seem more efficient and effective for novice learners. With regards to English, we should be explicitly teaching sentence structures and vocabulary. We should provide this information to students when they are completing extended writing and one way of doing this is through vocabulary tables that contain definitions and examples. Not just examples of how the vocabulary words are used, but also examples of the sentence styles that students should include. Each of these example sentences is a worked example in itself and, with effective teacher questioning and annotation, can be a powerful way of turning abstract and amorphous success criteria (‘use sophisticated sentences’/‘use a range of complex sentences’ etc.) into concrete examples that the learner can ‘study and emulate’.¹⁸

To minimise cognitive load, students have these tables when they are annotating the poem, allowing them to make the link between text and interpretation.

Although *Cognitive Load Theory* contains a number of different effects, the worked example effect is described by the researchers as being ‘the most important’;¹⁹ and, because of this importance, we have incorporated it into all stages and aspects of our curriculum. Almost always, when students are asked to write, they will have studied a related and relevant worked example.

If you would like to know more about cognitive load theory, here are some useful resources:

- 1) Greg Ashman’s blog has many detailed posts about CLT.²⁰
- 2) This succinct and practical summary.²¹
- 3) Oliver Caviglioli’s fantastic graphic overview of *Cognitive Load Theory* by Sweller, Ayres and Kalyuga.²²

Parts of this article first appeared on Tom Needham’s blog. Reproduced with permission

REFERENCES

1. Chase, W. G. and Simon, H. A. (1973) ‘Perception in chess’, *Cognitive Psychology* 4 (1) pp. 55–81.

2. Sweller, J., Ayres, P. and Kalyuga, S. (2011) *Cognitive load theory*. Berlin: Springer, p. 21.

3. Ibid. p. 31.

4. Ibid.

5. Ibid.

6. Ibid. p. 99.

7. Ibid.

8. Ibid. p. 102.

9. Ibid.

10. Ibid.

11. Ibid.

12. Ibid. p. 100.

13. Ibid. p. 102.

14. Oksa, A., Kalyuga, S., & Chandler, P. (2010) ‘Expertise reversal effect in using explanatory notes for readers of Shakespearean text’, *Instructional Science* 38 (3) 217–236.

15. Kyun, S. A., Kalyuga, S. and Sweller, J. (in preparation) *The effect of worked examples when learning English literature*.

16. Ibid. p. 101.

17. Engelmann, S. (2014) *Successful and confident students with direct instruction*. Eugene, OR: NIFDI Press, p.35

18. Sweller, J., Ayres, P. and Kalyuga, S. (2011) p. 100

19. Ibid. p. 108.

20. www.gregashman.wordpress.com

21. www.goo.gl/5QowTA

22. www.goo.gl/ZfLf1x



HOW I BECAME THE LEADER OF EVIDENCE IN MY SCHOOL



Jodie Lomax

Jodie Lomax is a teacher at Culcheth High School. Here she writes about her journey towards becoming a research lead – a relatively recent role in some schools that requires them to be the main facilitator for driving evidence and research use in the classroom.

unaccustomed to, but I was curious about the movement I had been hearing so much of. I was immediately inspired by the largely altruistic online education community. I read about Rosenshine's 'Principles of Instruction'.² I saw 'cognitive load theory' being discussed and I was introduced to the incredible work of the Learning Scientists. I was hooked. This all seemed so simple. So obvious to a degree! Why had I not been taught this during my teaching practice?

During staff meetings and professional development sessions, SLT were increasingly referencing evidence and research to rationalise school policies and procedures. There was an underlying tone of 'research engagement' and the tide of CPD at CHS was changing. I was introduced to the likes of Dylan Wiliam, Rob Coe and Daisy Christodoulou. Finally, things were beginning to become clear. It was a light bulb moment in my teaching career.

Between 2013–2015, Culcheth High School experienced a tumultuous period, going through four headteachers and many senior leadership changes. This 'led to the school lacking direction and being without focused leadership'.¹ September 2015 saw a new lease of life injected into our school community. We had a new senior leadership team, with Chris Hunt being appointed as headteacher; and collectively, the leadership team embarked on a mission to change the culture of the school to ensure that all members of the school community could live up to the school's motto of being 'the best that we can be'.

Having joined the Teacher Development Trust (TDT) in 2015, we went on to achieve the Bronze CPD Quality Award, a clear reflection of the commitment made to put professional development at the forefront of the school improvement agenda. However, more needed to be done; and in order to sustain incremental change and improvements, the SLT decided to appoint a research lead to further support development of teaching, learning and assessment through evidence-based research and best-practice studies.

My journey

During the summer of 2016, I somehow found my way onto EduTwitter. Twitter was not a platform I was

I knew that engaging with research would help me to become a better teacher and enable my colleagues to make better, informed decisions about their own practice.

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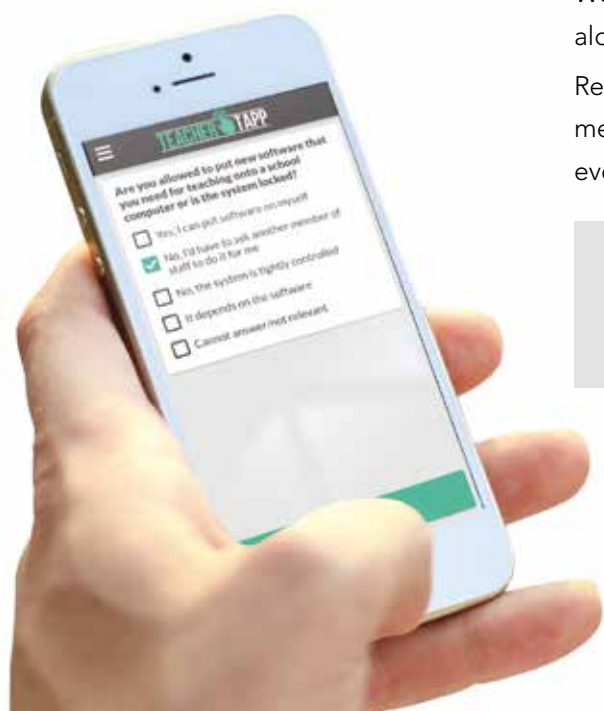
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When the role of research lead was advertised, I knew straight away: this was the role for me. Having worked with trainee teachers for a number of years, I had developed a passion for teacher improvement and I was frustrated to find that some ITT programmes were simply not moving forward. Trainees were engaging with lesson plans that required them to record which 'learning style' their activity would meet and each lesson saw at least three objectives and three outcomes as 'non-negotiable' requirements. I knew that engaging with research would not only help me to become a better teacher but also enable my colleagues to make better, informed decisions about their own practice. Simply put, engaging in research is empowering! Being the research lead has truly revolutionised my teaching. Now I focus on teaching. I focus on the learning that takes place. I focus on assessing that learning and knowing the best ways to plug any gaps.

This was a brand-new role and I was incredibly fortunate that I was given the autonomy from Chris Hunt (headteacher) and Adam Brown (AHT responsible for professional development) to make this role my own. I got to work and immersed myself in Tom Bennett's report on *The School Research Lead* published by the Education Development Trust. This report gave me a really clear picture of what my role could be and the kind of things that I should prioritise in order to pursue the development of an evidence culture at Culcheth High School. I consider myself to be the 'auditor' who is tasked with 'evaluating the whole school's relationship with current research, and then using that baseline evaluation

to generate targets and a vision for where the school needed to be'.³

My first priority was to introduce my colleagues to the fundamental principles of what makes great teaching and the 'must-read' research in a way that was timely and accessible. The newly designed #AlwaysLearning page was born – a portal that contains a range of research summaries, full papers and relevant blogs/articles. This included papers such as *What Makes Great Teaching?*,⁴ Rosenshine's 'Principles of Instruction' and Sweller's study on cognitive load theory.⁵ The portal now includes hundreds of reading materials that staff can access during #AlwaysLearning sessions, as well as in their own time, should they so wish.

I later developed the #AlwaysLearning newsletter, which was published termly in order to provide staff with 'research bites' and practical ideas of how this research could be put into practice. This evolved into a 'reading briefing' that would take place on alternate Thursday mornings, allowing staff to collaborate with peers in order to discuss and debate a range of reading materials and consider practical ways to transfer evidence into practice. Now, we are not only engaging with research but also engaging in research by adopting the PICO format,⁶ originally designed for evidence-based medicine, as a fundamental part of our whole school CPD programme.

Over the last two years, the school leadership team have worked tirelessly to ensure that teacher development really is 'the main thing'.⁷ In our last inspection, Ofsted found that 'teachers are provided with a well thought out programme of ongoing training

A massively reduced workload, rising staff morale and consistently improving results are clear evidence that avoiding silver bullets and using research evidence is having a positive impact on teaching and learning in our school.

which has the teachers' standards at its core ... where pupils and staff can flourish'. We have been awarded the Silver CPD Quality Award by the TDT, who noted that 'effective professional development includes significant engagement with external expertise and research to support and challenge practice. There have been many initiatives to support engagement with external providers, including the #AlwaysLearning page, appointment of the school research lead, and the research element within coaching plans.' Most recently, CHS featured in the Parliamentary Review 2017/18, which highlighted the fact that 'professional development at Culcheth High School takes an evidence-based approach'. This level of feedback is a true testament to the positive impact that a research lead can have on moving towards a culture where everything that you do is supported by evidence.

In 2017, I was awarded the Accomplished Lesson Study Practitioner Award accredited by Sheffield Hallam University in conjunction with the TDT. This programme offered me an insight into how the lesson study process can aid teacher engagement with research. I was tasked with designing and implementing a 'lesson study' programme that fitted in with the context of our school and our professional development needs. This provides colleagues with dedicated time to engage with research, collaborate with peers and aim to put evidence into practice and evaluate what works. Feedback has been positive and colleagues particularly enjoy the opportunity to collaborate with their peers and explore.

Where are we going?

Colleagues have recently completed an evaluation survey into their own research engagement inspired by the evaluation tools recommended by the Chartered College of Teaching. 93% of colleagues reported that

they are aware of how and where to access appropriate research materials. 85% of colleagues reported that they have an 'evidence mind-set' and are conscious of the need to engage with evidence to improve practice, whilst 83% reported that their increasing engagement with evidence and research is improving their practice. A large proportion of colleagues said that they wanted to be given more time – more time to engage in collaborative research with peers, more time to put evidence into practice and more time to evaluate their own practice, using research to drive their practice forward.

The governing body and SLT, in consultation with the school community, have shown huge commitment to driving our evidence-informed school improvement agenda forward by changing the structure of the school timetable: students leave school an hour early one day a fortnight and this time is purely dedicated to #AlwaysLearning and collaborative engagement with research and evidence. This is a clear reflection that embedding evidence-informed professional development is absolutely 'the main thing'; and a massively reduced workload, rising staff morale and consistently improving results are clear evidence that avoiding silver bullets and using research evidence is having a positive impact on teaching and learning in our school.

As Simon Smith (@smithsmm) wrote in his recent blog, 'quality research should inform our practice but we need to be wary of assuming there is a silver bullet'. He argues that 'when teachers are more knowledgeable about what works, that can only be good for schools'. However, as a school it is crucial that we always remain 'healthily sceptical'. It is only through scepticism can we evoke change.

REFERENCES

1. The Parliamentary Review (2018) *The Parliamentary Review 2017/18 – secondary education: north west*. Available at: www.gov.uk/government/uploads/attachment_data/file/711111/1Tmftz
2. Rosenshine, B. (2008) 'Principles of instruction: research-based strategies that all teachers should know', *American Educator* 36 (1) pp. 12–39.
3. Bennett, T. (2016) *The school research lead*. Reading: Education Development Trust.
4. Coe, R., Aloisi, C., Higgins, S. and Major, L. E. (2014) *What makes great teaching?* London: The Sutton Trust.

5. Sweller, J. (1988) 'Cognitive load during problem solving: effects on learning', *Cognitive Science* 12 (2) pp. 257–285.
6. Jones, G. (2015) 'The school research lead and asking better questions – part one', *Evidence Based Educational Leadership* [blog]. Available at: www.gov.uk/government/uploads/attachment_data/file/711111/1Tmftz
7. Covey, S. (2004) *The 8th habit: from effectiveness to greatness*. New York, NY: Free Press.

OPINION

KNOWLEDGE IS THE ROAD TO JOY



Will Orr-Ewing

The work of E D Hirsch and many others has been cited as pivotal in the recent interest – particularly in the UK and the US – of ‘knowledge-based curriculums’. That’s great, says Will Orr-Ewing – as long as we don’t forget joy.

important features and benefits. It is understandable that, in the fierce heat of contemporary squabbles, heads and educationalists prefer to talk up the more empirical benefits of a knowledge approach; but, by doing so, they leave the implementation of a knowledge-based approach open to those who would happily squander its joy for its effectiveness. In order to illustrate the way that a knowledge approach is currently advocated, it is necessary to summarise the arguments of its defenders very briefly. There are three main strands, all interrelated and often evoked as one.

1. Knowledge = access. Children need a secure knowledge base to access, firstly, texts of increasing complexity (cf. E D Hirsch, Daniel Willingham, Doug Lemov et al.) and, secondly, higher-order skills such as creativity, interdisciplinary thinking, critical thinking etc. (cf. Dylan William, Daisy Christodoulou, David Didau, Joe Kirby et al.). Here is a representative quote from Carl Hendrick: ‘The extent to which we can

A knowledge-based approach is on the march in UK schools. For any traditionalist who was working in the early 2000s – when a knowledge-based approach would have been dismissed as boring, reactionary and (thanks to Google) redundant – this must feel like an unexpected victory. It is a mark of how far we have come from the days of the 2007 National Curriculum and the RSA Open Minds Curriculum that the majority of the UK’s most prominent schools and educationalists now publicly favour a knowledge-based (or knowledge-rich) approach and the education minister can proudly call himself a ‘Hirschian’.

With the battle won (in theory if not quite yet in practice) and the victors sweeping the battlefield, finishing off dead and wounded progressives, many educationalists are now moving on from philosophy to implementation. Before they do, it is worth pausing to stake a philosophical claim that might determine the forms this implementation might take. This claim, neglected in debates over the last decade but treasured by older thinkers, is that knowledge – whatever its other educational benefits – brings joy. That knowledge gained is not just a means to other ends but is its own reward, and that this is one of its most

Educationalists prefer to talk up the more empirical benefits of a knowledge approach; but, by doing so, they squander its joy for its effectiveness.



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think critically about something is directly related to how much we “know” about that specific domain and “knowing” means changes in long-term memory.’ This contention is sometimes summarised as ‘the Matthew effect’ based on the passage from Matthew’s Gospel: ‘For all those who have, more will be given, and they will have an abundance; but from those who have nothing, even what they have will be taken away.’

2. Knowledge = success. Because higher-order skills, including exam skills, cannot be accessed without knowledge, the best way to prepare for long-term exam success is via a knowledge-rich curriculum. The work of schools such as Michaela and those in the Inspiration Trust exemplify this approach. Christine Counsell, Director of Education for the latter, says: ‘I feel quite passionate about the broad curriculum in key stage 3 serving attainment in GCSE.’

3. Knowledge = power. Building on the two positions above, if schools do not teach knowledge, only those children from more privileged backgrounds whose parents pass on their own knowledge (even if obliviously) will be able to read well, access higher-order skills and achieve exam success. This is the social justice case for a knowledge approach advanced by all of the above, as well as the likes of the West London Free School. See also Michael Young’s concept of ‘powerful knowledge’.

These arguments, prosecuted on Twitter, blogs and at conferences, have generally and rightly won out – remarkably so, given the headwinds of a progressive teaching establishment. And yet, despite the fact that such arguments are often labelled ‘traditional’, they

feel rather too bound within late modernity’s norms and values. As you have read in the above, knowledge is almost exclusively presented as a means rather than an end. The search for empirical benefits, able to justify approaches in only instrumentalist terms, has missed the marrow at the heart of knowledge and so risks erecting an educational project as thin and dreary as the orthodoxy it correctly seeks to replace.

Perhaps we need older perspectives – from an Aristotle or a C S Lewis or anyone who might be said to defend a liberal education in the old sense of that phrase – to remind us of just how much we are selling knowledge short. This older view of what knowledge can do is perhaps best encapsulated in the writing of Charlotte Mason, who saw herself both as the inheritor of this ‘liberal education’ tradition and as being charged with spreading its fruits to children of every background in late Victorian and Edwardian England. Here is what a knowledge-based approach meant to her:

‘We launch children upon too arid and confined a life. Personal delight and joy in living is a chief object of education ... It is for their own sakes that children should get knowledge. The power to take a generous view of men and their motives, to see where the greatness of a given character lies, to have one’s judgment of a present event illustrated and corrected by historic and literary parallels ... these are admirable assets within the power of every one according to the measure of his mind; and these are not the only gains which knowledge affords. The person who can live upon his own intellectual resources and never know a dull hour (though anxious and sad hours will come) is

Mason talked of a child’s ‘knowledge-hunger’, an appetite of the mind akin to the appetite of the body for food. Knowledge was inherently ‘delightful’, helping children to see a world that pulsed with meaning. It required no further justification.

indeed enviable in these days of intellectual inanition, when we depend upon spectacular entertainments pour passer le temps.’

In her writing and in her schools, knowledge was never presented as a means to something else.

She talked of a child’s ‘knowledge-hunger’, an appetite of the mind akin to the appetite of the body for food. Knowledge was inherently ‘delightful’, ‘enlivening’, ‘vitalising’, helping children to see a world that pulsed with meaning. It required no further justification. Beyond the philosophical differences, she also contrasts with today’s defenders of knowledge in the implementation of her vision. There are many interesting ways in which the approaches diverge (and, naturally, converge) but the three summaries below will stand as illustrations:

1. Role of the teacher. It seems fair to say that those that promote knowledge today also tend to favour a heightened role for the teacher than the ‘guide on the side’ proposed by progressives. Many knowledge-rich schools make much of their teachers’ subject knowledge for instance. Mason would not have had a problem with this per se but she worried that a charismatic teacher could get in the way between a child and knowledge. There is an interesting piece by one of her followers on her views on Vygotsky’s ‘scaffolding’, which shows her dislike of the way teachers would often unwittingly come between children and ‘the mountain’ (or what she elsewhere called ‘the feast’) of knowledge through excessive talking. Teachers of course have their role to play in elucidating meaning but their role was one of ‘masterly inactivity’, something which is unlikely to find any favour in contemporary knowledge advocates, who tend to favour direct instruction and other ‘sage on the stage’ roles for the teacher, sometimes going as far as prescribing scripts for teachers.

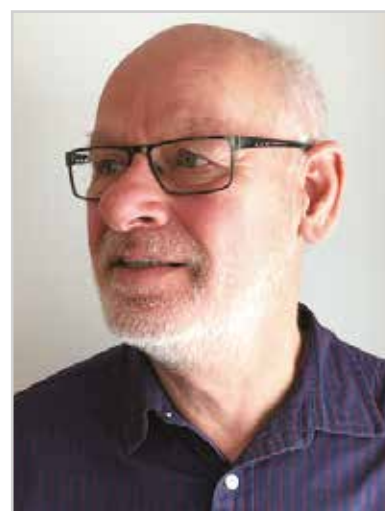
2. Books vs textbooks. Because Mason feared that teachers often got in the way between children and knowledge, her lessons were rooted in reading. She condemned the way that educationalists ‘wrote down’ to children in ‘dry as dust’ textbooks, diluting the delightful aspects of knowledge, and would have disapproved of the generally pro-textbook stance of knowledge’s defenders today, not to mention the printable worksheets, précis and simplified versions that are still so common across all classrooms today.

She placed her trust not in all books but in certain well-chosen books, especially those with lively narratives and the right expressions, which expertly conveyed meaning from the mind of the author to the mind of the child. The teacher’s role is to elucidate the meaning in the books but not to be the main purveyor of the knowledge itself.

3. Knowledge demonstrated vs teaching to the test. Today’s defenders of knowledge seem to see the UK’s examination system as being a worthy demonstration of their pupils’ knowledge, boasting of high attainment in GCSE or, in the case of private schools, of places won at top senior schools or universities. Mason, on the other hand, worried that any teaching to the test, any academic marks or prizes, winnowed the innate desire within children for knowledge for its own sake. She favoured a method called narration, whereby children told back (either written or out loud) what they had heard or read. Now that schools can boast of their pupils’ knowledge via social media, YouTube etc., where are the demonstrations of that joyful knowledge that Mason would surely have used if she was still alive today? (Her equivalent was to publish a list of substantive nouns and proper nouns written in a typical exam in her schools – e.g. Africa, Alsace-Lorraine, Antigonous, Abdomen, Antennae, Aphis, Antwerp, Alder, etc.) The closest that comes to it are Michaela’s moving videos of their children chanting great poetry, but where are the others?

By aligning a knowledge approach with textbooks, charismatic teaching and excellent examination prep, amongst many other implementations, there is a danger that today’s defenders of knowledge are dampening exactly that aspect of knowledge that makes it so genuinely ‘rich’, ‘powerful’ and delightful. It is time to reclaim joy as the rightful aim of a knowledge-based approach (could it even be hoped that a knowledge approach implemented on Mason’s grounds could go some way to pushing back at the awful incidence of childhood unhappiness we see about us?) and time to experiment with other methods that protect and uphold this worthy goal for a great and liberal education.

GRAHAM NUTHALL: EDUCATIONAL RESEARCH AT ITS BEST.



Jan Tishauser

Professor Emeritus Graham Nuthall, an educational researcher from New Zealand, is credited with one of the longest series of studies of teaching and learning in the classroom that has ever been carried out. A pioneer in his field, his research focused on the classroom, and what impact certain factors – for example, teaching – had on the outcomes of learners. Perhaps his most famous work is *The Hidden Lives of Learners*, which is increasingly being seen as a seminal text for understanding learning.

Jan Tishauser, programme manager for researchED Netherlands, explores his contribution to the education debate, and why his work is extraordinarily relevant today.

The outcomes of the research that Graham Nuthall conducted into the classroom experience of learners are little known, notwithstanding the far-reaching implications for our classroom practice. He demonstrated the need for formative assessment and discovered which factors influence learning most. He also pinpointed metacognition's role on learning outcomes.

Nuthall started recording classroom conversations as a student. He kept on doing this during his whole career from 1960 until 2000. In some ways his research was an

expedition into unknown territory. His first question was: what actually happens during a lesson? His final research question was: what is the role of ability in learning?

Taking off

It all started in 1960, when Nuthall (at that time a young student) obtained permission from a number of experienced teachers to record their lessons with a number of students. At this time, he had not yet developed a sound design for his research. He was simply driven by curiosity, wondering what actually happens in a lesson. He worked under the assumption that one needs to observe experienced teachers to spot good teaching.

On the surface, his initial results show a seemingly spontaneous interaction between teachers and students; but beneath this surface, his analysis showed set patterns of communication and predictable structures and rules for social interaction. Nuthall replicated his research in the US and Japan; these rituals were identical everywhere. But the purpose of these rituals was not clear at that time. He concluded that 'like language, teaching has its own underlying grammatical rules'.

Learning that experience makes no difference

In the period between 1968 and 1974, Nuthall and his PhD students started to work with an experimental design. Together with a group of teachers, they scripted a series of lessons about the black-backed gull. They wanted to know whether a teacher's experience or training influenced the learning of students. They analysed differences between three groups of teachers: experienced teachers, inexperienced teacher trainees and teacher trainees who were trained to analyse their lessons using micro-teaching and recording. The results were rather unexpected: experience and training made no difference; instead it was only the type of feedback the teachers gave and their style of questioning students that mattered.

Dead end

Nuthall and his PhD students thought they were on to something and continued to work with scripted lessons. They worked with experienced teachers, made recordings, did pre and post tests, trying to find the factors that had a positive effect on learning outcomes.

Finally they came up with results: the way teachers gave feedback, questioned students and activated students made a difference. This might not seem so amazing to us now, but in 1974, these were promising results. One of the problems that was brought to the surface through their intensive monitoring of the interactions in the classroom was the enormously complex reality of the classroom. To supplement their findings, they would have to do hundreds of intensive follow-up studies, which would most likely produce an endless, useless list of dos and don'ts. It could lead to a 'robotification' of the teacher, while their own research had shown them that this is impossible and undesirable:

'I realized I was following a path that satisfied the cultural rituals of the research community, but would be of little value to teachers, and probably do them harm.'

Nuthall hit a dead end. He describes this period as 'roaming in the desert'.

A focus on student learning

Then Adrienne Alton-Lee, an experienced teacher, started working on a PhD in 1978. Her research question focused on the students. What causes a student to learn the course material? In her classroom practice she was unable to predict when a given student would have learned the material and when they would not. Alton-Lee dissected the course material in great detail, down to what she called 'concepts' and 'items', using a rolodex system. For example, a simple series of lessons on climate could contain as many as 500 items.

What stands out most in Nuthall's research is that only the 'three times' rule has predictive value. Ability or intelligence or similar properties do not.



A 'concept' could be: Antarctica is the driest continent. Examples of 'items':

- There is little precipitation.
- There is more precipitation in the Sahara.
- Because of the low temperatures the snow never melts.

Every 15 seconds, all student communication and every action was registered, such as what they did, or what they said to themselves and to others. All the material a student encountered was registered and everything a student made or wrote was photographed. This led to a dissertation published in a leading magazine.

Replication crisis

Because Alton-Lee had followed a mere three students, Nuthall decided he needed replication studies. He designed three follow-up studies in order to replicate her findings. Technological advancements made it possible to gather even more information. Linking the students' learning experiences, the course material and the outcomes seemed to work. Together, they collected a mountain of information.

They identified four simultaneous processes going on:

1. The invisible thinking of the student
2. The self-talk
3. The social interaction between peers (mostly invisible to the teacher)
4. The teacher-led public discussion

The self-talk and interaction between peers is well hidden. This was illustrated by the fact that while each student had an observer, even they missed 40% of the talk that was on tape. Nuthall concluded that the opinions from peers were more important and better believed than the teacher's opinions, including those related to the course matter.

The study also concluded that:

- When you start a lesson, half of what you are about to teach is already known.
- Every student holds a different piece of the puzzle.
- Almost every student learns something different in your lesson.
- In practice, they learn more from each other than from the teacher – including misconceptions – which is obviously not always a good thing.

The often-chaotic nature of the classroom explains the function of the rituals that Nuthall found in his first study. The rituals allow the teacher to focus on the class as a whole; the teacher simply doesn't have the resources to follow individual students. Part of the ritual is the 'nodding and smiling' of the students who draw the attention of the teacher. Students also make sure to appear to focus on their work whenever the teacher is in their vicinity. 'Appear' is the key word here.

Eureka!

Ultimately, Nuthall decided to precisely map out the learning process of one student in relation to one topic. He analysed the interaction of 'John' in regards to the topic 'The migration to New York'. That's when some light was finally shed on a recurring pattern.

His analysis of John's learning experience made it possible to define learning in the following terms: it is a positive change of what we know or can do; it takes place by means of a sequence of events and learning experiences; each experience builds on the previous one and every change in the order of the learning experiences will lead to a different outcome. The learning activities of a student consist of understanding and making sense of the learning experiences. A student understands, learns and remembers a concept if they have encountered all the underlying information three times.

They built on this insight and did one replication study after another with increasing numbers of students, classes and topics. And they could predict with 85% certainty which student would correctly answer which question on a test.

If ability doesn't matter, what does?

What stands out most in Nuthall's research is that only the 'three times' rule has predictive value. Ability or intelligence or similar properties do not. Yet the 'better' students learn more. Nuthall dedicated his last research period to solving this conundrum. These students had more prior knowledge and they profited more from the lessons. The secret seems to be that they make sure to get more out of the lessons. They possess better metacognitive skills; they understand what it takes to get results.

The Hidden Lives of Learners

At the end of his life, Nuthall hastily wrote *The Hidden Lives of Learners*, drawing these conclusions for the classroom based on his research:

- Standardised tests appear to offer certainty, but are no more reliable than interviews held with students.
- Learning activities should be designed to take into account how memory works.
- The subject matter should be repeated in different ways.
- Follow the individual learning experience.
- Less is more: we should confine the curriculum to the big questions. Teachers need the time to design rich learning experiences, conduct pre-tests and get to know the social processes in the class. Learners need the time and the space to really master the content.

Nuthall's diligent research efforts gave us lasting insights into the fundamentals of learning and teaching. We should take his research into account both in our current teaching practice and in our curriculum design. For me, the two fundamentals are that learning takes time and that it is not necessarily related to ability. The latter is really a finding that should encourage us all to set high goals for ourselves and our students.

THE LIGHT IS WINNING

WHY RESEARCH IS (SLOWLY) TRANSFORMING TEACHING. TOM BENNETT'S THOUGHTS ON researchED'S SUCCESSES AND CHALLENGES SO FAR



At the recent **researchED** in Haninge, Sweden, **researchED** magazine's editor Tom Bennett closed the conference with a speech that tried to understand where we had got to in evidence-informed education, and what the landscape now looked like. This is a transcript of that speech.

'folk teaching', where we reproduce the mistakes of our predecessors as easily as we do their successes.

So what? Because merely folk teaching leaves us at the mercy of snake oil, fads, fashions, ideology, bias. We can think of an ocean of cargo cult voodoo that often dominated educational discourse in the past: Shift Happens; TED talks; the Great Interactive Whiteboard Con; most links you see shared on Facebook. We recall the training days hosted by inexperienced experts; the books by charismatic gurus; the often quoted rentagobs that fill TV, radio and print and seem to know so much about classrooms despite never having worked in one. Know-nothings elevated by other know-nothings.

In this landscape, discussions about teaching become a battle of prejudices – Pokémon debates where we simply hurl one unprovable claim against another until someone blinks.

A new hope?

My naive ambition in 2013 when I began **researchED** was simple: we should lean on evidence where it exists; we should try to become more research-literate as a profession; and crucially we should ask for evidence at every turn. That was as far as I had gotten, strategy-wise. But surprisingly, amazingly, **researchED** took off, despite its lack of blueprint or funding. It was a movement that wanted to happen, and we started to respond to demand by hosting events across the UK and, quickly, around the world. Since then we have been to 14 countries, 5 continents, and seen 17,000 unique visitors to our events. **researchED** has 30,000 followers on Twitter (not counting the local accounts), and we have been graced with 1000 speakers (none of whom are paid). We pay no salaries (least of all to myself) and entirely self-fund each event. It is a humbling testimony to what can be achieved for next to nothing if love and altruism and mutual benefit are all you want to achieve. And it reminds me of the best in people – always.

The sleep of reason produces monsters – at least it does in education, where we see teaching full of myths, snake oil and poorly evidenced practices and strategies. Why have we succumbed so much to learning styles and worse, and why have we found ourselves basing our vital practice on gut feelings, hunches and intuition? I think it's because misconceptions creep into the spaces where:

- we don't know much about the topic,
- we like the answers junk science provides, or
- we're too busy to find out the facts.

How did we get here? Let's reframe that question. Where did you acquire your ideas about teaching, learning, pedagogy etc? Chances are your answer revolves around the following: teacher training; memories of your own school experience; your mentor; your early class experiences.

Up to a point, that's fine. Teaching is to a great extent a craft. But craft without structured evidence to interrogate its biases and misconceptions can lead to what I call

BIBLIOGRAPHY

Nuthall, G. and Alton-Lee, A. (1993) 'Predicting learning from student experience of teaching: a theory of student knowledge construction in classrooms', *American Educational Research Journal* 30 (4) pp. 799–840.

Nuthall, G. (1999) 'The way students learn: acquiring knowledge from an integrated science and social studies unit', *Elementary School Journal* 99 (4) pp. 303–341.

Nuthall, G. (2004) 'Relating classroom teaching to student learning: a critical analysis of why research has failed to bridge the theory-practice gap', *Harvard Educational Review* 74 (3) pp. 273–306.

Nuthall, G. (2007) *The hidden lives of learners*. Wellington: NZCER Press.

Nuthall, G. (2012a) 'Understanding what students learn' in Kaur, B. (ed.) *Understanding teaching and learning*. Rotterdam: Sense, pp. 1–40.

Nuthall, G. (2012b) 'The acquisition of conceptual knowledge in the classroom: a case study' in Kaur, B. (ed.) *Understanding teaching and learning*. Rotterdam: Sense, pp. 97–134.

Wright, C. J. and Nuthall, G. (1970) 'Relationships between teacher behaviours and pupil achievement in three experimental elementary science lessons', *American Educational Research Journal* 7 (4) pp. 477–491.

The dangers of research

But it is important to always retain a sense of caution alongside the enthusiasm. The sleep of reason produces monsters, even with good intentions. There have been some reasonable responses and criticisms of this new age of evidence enquiry:

- **I'm busy.** Good point. Teachers rarely have the time to read research, practise it, translate it. Which is why I rarely recommend teachers become researchers. Often, in-class research is of little use anyway. Research takes time and training. I want teachers to be bad researchers about as much as I want researchers to pretend they are teachers. So we need to become more evidence-facing collectively, in partnership with other institutions.
- **You don't need to know anything at all about research to be a good teacher.** Also true. But we now live in an ecosystem where we need to be able to respond to people who claim evidence is on their side.
- **Research can prove anything you want to.** No it can't. Not all research is equal; there is worse evidence and better evidence, and discerning which is which is at the heart of the task we face.
- **Teaching is practical, research is abstract/ Teaching isn't a science.** No, indeed, not entirely. But it isn't wholly an art form either. It is amenable to structured investigation. It works in the material as well as the mental world. There are many aspects of it which can – and must – be analysed.

Less reasonable responses include: you must be funded by HYDRA; this is a neoliberal conspiracy; evidence is just another way to deprofessionalise teachers/make them robots. At these I can only roll my eyes so hard they threaten to detach from their nervous tethers. Customers of tin-foil milliners will believe what they choose despite

What happens to evidence in the wild is crucial. One thing this has taught me is that high-quality research is, by itself, not enough. If it doesn't reach the classroom in a useful state then it may as well not have happened.

an absence of any evidence because they want to. No one makes a button from this, and no one funds it with any control. No one gets a say about speakers or content, we are guided by the desire to seek the truth and fuelled by altruism. Strangely, I see popular snake oil salespeople paid for by Unilever and governments who escape this criticism, often because what they say pleases the conspiracists. Fancy that.

Evidence in the wild

Bad research – the 'not even wrong' categories like learning styles – isn't the only problem. What happens to evidence in the wild is crucial. One thing this has taught me is that high-quality research is, by itself, not enough. If it doesn't reach the classroom in a useful state then it may as well not have happened. And often good research gets lost in translation. I call this the Magic Mirror. Sometimes research goes through the mirror and schools turn it into something else. Research translation is as important as research generation. Poor old assessment for learning drops into the Black Box and gets mangled into levelled homework and termly tests, weird mutant versions of what it was meant to be. And some research is simply misunderstood: project-based learning, homework, collaborative learning all have utility in the right contexts. But how many teachers know the nuance of their evidence bases? Homework, for example, has variable utility depending on circumstances. Grasping the when and the how of 'what works' is essential, otherwise we oversimplify.

A brave new world that hath such teachers in it

I think **researchED** is a symptom of a new age of evidence interest. Perhaps also a catalyst – one of many that now exist, from the Deans for Impact¹ to the Learning Scientists² to the Five from Five³ programme and many more. This is indicative of an appetite that was always there. We now host more conferences, visit more countries every year. We have more first-timers, both attendees and speakers. Like the can of worms opened, the worms cannot now go back in the can. This car has no reverse gear. Successful innovations, once perceived, cannot be unseen.

Policy makers

I once asked ex-UK premier Tony Blair what research he relied on when making education decisions. He replied that there 'wasn't any useful evidence at the time'. This attitude still dominates the biggest lever-pullers. We still see at a policy level multiple factors driving decisions away from evidence bases:

- Budgets
- Policy/ministerial churn
- Lack of insider representation
- Reliance on personal experiences

But the more the profession talks the language of evidence, the more they will have to listen to it. And I have always believed that we should reward policy-makers when they participate in evidence-driven discussions. That's why I'm proud we try to engage rather than barrack our political representatives. And why every year we invite ministers of every party to our party.



Schools

Leadership is still the biggest lever in driving evidence adoption. One evidence-literate school leader cascades far more than one teacher. Some schools are now embracing the 'research lead' role, and devoting staff resources to this area. There is a moral and a practical duty for leadership to attend to evidence, because an era of dwindling resources demands better, more efficient decisions – less waste, more impact, from training to workload to tech. Let us abandon the days we tried to buy our way out of our problems, as if a chequebook were a magic lamp. And I sometimes wonder if raising budgets isn't by itself insufficient, because the most important thing is to be judicious in spending the money we have.

Teachers

In the absence of a coherent, evidence-informed system it is necessary for teachers to drive their own research articulacy. It is necessary. Teachers should not be pseudo-researchers, but they should become literate; share, disseminate and interpret high-quality research, and help us to develop a herd immunity, where enough of us are learned enough to recognise the zombie learning and junk pedagogy when it rises – as it always does – from the grave.

Embrace ambiguity

We have one more duty to observe. Teachers must become active participants in the research ecosystem rather than massive recipients. But teaching is driven by practice, and the data is subtler than we suspect. We frequently seek definite answers where none exist. Research often unpacks ambiguity, and we need to embrace nuance, uncertainty and probability rather than dress high-quality research up as eternal and immutable fact. We should avoid universals and certainty – and

always remember that context is king. Otherwise we perpetuate dogma and become that which we seek to surpass.

The gatekeepers

One thing I didn't expect – but should have – is that the existing system objects to its own reinvention. Whenever power shifts, former custodians of power seek to preserve privilege; and this new age of evidence adoption has frequently been dismissed by some academics, some education faculties, commercial interests, some teaching bodies. But the habit of command dies slowly. Education has relied on arguments from authority for decades. Evidence challenges their dominance like mystics challenge the Church. I have faith that evidence and truth will win, but it will not be because it was easy. Arguments must be made; evidence bases must be made transparent.

Evidence doesn't obliterate professionalism – it liberates it

We enter a new age of evidence. Once seen it cannot be unseen, and science cannot be uninvented, although ideas can change. Fears that evidence makes us slaves to research are no more rational than the fear that understanding how to cook makes you a worse chef. It empowers. If you object to where evidence takes us, then find better evidence. Otherwise, ask yourself if your opinion is dogma, or if something more animates your objections.

Caveat emptor. In a complex field we need interpreters and brokers of research, but we must also take care not to create a new priesthood – the neo-shamans of evidence, who act as irrefutable guardians of divine truth. The OECD, for example, in some ways has become the new international inspectorate, blessing or banishing entire countries on the basis of their data. Is this healthy? I don't

think so. Beware also the New Generation of Consultants selling 'Snake Oil 2.0' who have updated their absurdities by simply stapling the phrase 'evidence-based' onto their bags of magic beans. And don't think I'm ignoring the danger of **researchED** succumbing to this, like mortal ring bearers corrupted by Sauron. This is why we curate events to include challenge and debate, like the grit in the oyster that helps to make the pearl.

The future

We begin to see new models of professional groupings emerge – digital collaborations, conference communities that no longer require permission to exist. Self-propelled, self-sustaining, self-regulating, they exist only as long as people want to go. These fluid, accessible, dynamic, virtual colleges are needed until they are no longer needed because the profession will have reinvented itself. We're not there yet. Which is why we commit to cheap, accessible events that are democratic, inclusive and most of all, directed at discovering what works – and when, and why, and how.

My ambition is that we begin to drive this voluntary professional development, and then that cascades back into schools and starts conversations which set off sparks in classrooms – ones that catch fire and burn down dogma. And also that initial teacher training increasingly

makes evidence its foundation (where it does not do so already), platforming the best of what we know rather than perpetuating the best of what we prefer. For new teachers to be given skills to discern good evidence from bad. And for that to eventually bleed into leadership; and from there, into the structures that govern us.

I'm reminded of the story about the eternal battle between darkness and light in the sky. A pessimist could look up and think that darkness was nearly everywhere. But the optimist doesn't see that. The optimist knows that once, there was only darkness.

If you ask me, the light's winning.

This transcript was first published on Tom's blog, *The Behaviour Guru*.

REFERENCES



1. www.deansforimpact.org/resources/the-science-of-learning/
2. www.learningscientists.org
3. www.fivefromfive.org.au

