Identifying what works in education

The challenge of conducting research trials in school

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Randomised control trials are considered the gold standard when it comes to testing the effectiveness of medical interventions. This method of conducting research is increasingly used in the classroom, too. In the school context, it is particularly challenging to find out what really works.

In a school-based randomised control trial (or RCT), half of the participants are randomly assigned to an experimental group (such as a maths skills training programme) and the other half are assigned to a control group (receiving no training). This allows us to test the effectiveness of the training, since we can look at improvements in maths in the experimental group compared to the control group. We are therefore identifying gains that go beyond normal increases in performance through the school year.

RCTs are increasingly used in education research, to discover what the most effective practices are in the classroom. In medical research, the RCT is the standard method to find evidence for a process which might be useful as a medical treatment. In educational research, RCTs are still the exception, rather than the rule. One reason for this is that in a classroom setting, there are many factors to consider. The first challenge is in choosing an appropriate control group. In our maths example, should the control group be doing no maths at all, or is it a fairer test if they are in a normal maths lesson but not taking part in the experimental training programme?

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The teacher and the school might also determine the effectiveness of training. A fantastic teacher in a well-funded school is probably more likely to garner success from a skills training programme than a struggling teacher in a chaotic school. It is really hard to take account of these kinds of factors when deciding if training is successful. And what exactly do we mean by success? If we are only interested in seeing how maths grades change over time, we might miss out on important information relating to motivation in maths, or enjoyment of maths.

Do these challenges mean we should stop RCTs in education altogether?

Some researchers argue that RCTs are not practical or informative in education. I disagree: they are
certainly challenging, and require a lot of thought relating to their design, but that does not mean they should be abandoned. Rather, it means that we should think carefully about the best way of overcoming these challenges.

Communication between teachers and researchers is vital in ensuring that an RCT is well designed and practical. For example, a training programme that is too prescriptive is likely to be unpopular with teachers, who understandably tend to prefer being given an extra tool that they can use in their classroom, rather than a wholesale change in approach. Teachers should be given the opportunity to suggest changes to the study based on the practicalities of school.

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As well as leading to better research design, close engagement between teachers and researchers may also encourage more schools to take part. This is a particular problem in RCTs since schools are sometimes less inclined to take part if they are in the control group. If there is a programme that we think might be good for students, naturally this is the group that everyone wants to be in. But the control group is an essential component in assessing training effectiveness, both in showing us how good the training really is, but also in making sure there are no negative effects of training.

A good way round this problem is to use a “waiting control group”, whereby the control group later participates in the training too, thus mitigating this downside to RCTs while ensuring that the research is effective.

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RCTs remain a key way of finding out what really works in education, and their use should be encouraged. Scientific research in the lab can lead to ideas for education, but unless we test them in the classroom against a control group, we will never know how effective they really are. Though RCTs require careful planning and good communication, the effort is well worth it as the results show us how to enhance learning in the typical classroom setting. In the educational neuroscientist’s toolkit, the RCT is vital!

A mini-series on evidence in the classroom

- Bringing scientific evidence to the classroom
- Neuromyths in education
- Identifying what works in education (current blog post)
- Brain training for children
- Fostering a growth mindset
Electrical brain stimulation to enhance learning

Further articles in this series will look at the evidence behind the popular concept of mindsets in education, and so-called brain training educational programmes.

The illustration accompanying this blog post was created by Nora Maria Raschle for the new blog she and her colleague Réka Borbás, both developmental neuroscientists, launched in September 2017 with the goal of disseminating knowledge in a way that is both fun and easily understandable for everyone. Their blog, called “We Are All Born Scientists,” is definitely worth a visit!

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