A Heroic Failure? Learning from False Starts in a Maths GCSE Intervention

Dr Julian Crockford

Widening Participation Research and Evaluation Unit

The University of Sheffield

@JulianCrockford
@WPREU_Sheffield

Julian.Crockford@Sheffield.ac.uk

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Introduction

- Political and regulatory context
- A cunning plan!
- Threshold concepts
- Implementation
- The best laid plans. Or - when the wheels fall off…
- Lessons learned
- Group discussion – Experience of implementation issues working with schools

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*“Strategy is, at some level, the ability to predict what's going to happen, but it's also about understanding the **context** in which it is being formulated. And then you have to be open-minded to the fact that you're not going to get it right at the very beginning.”*

Martin Dempsey

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Political Context

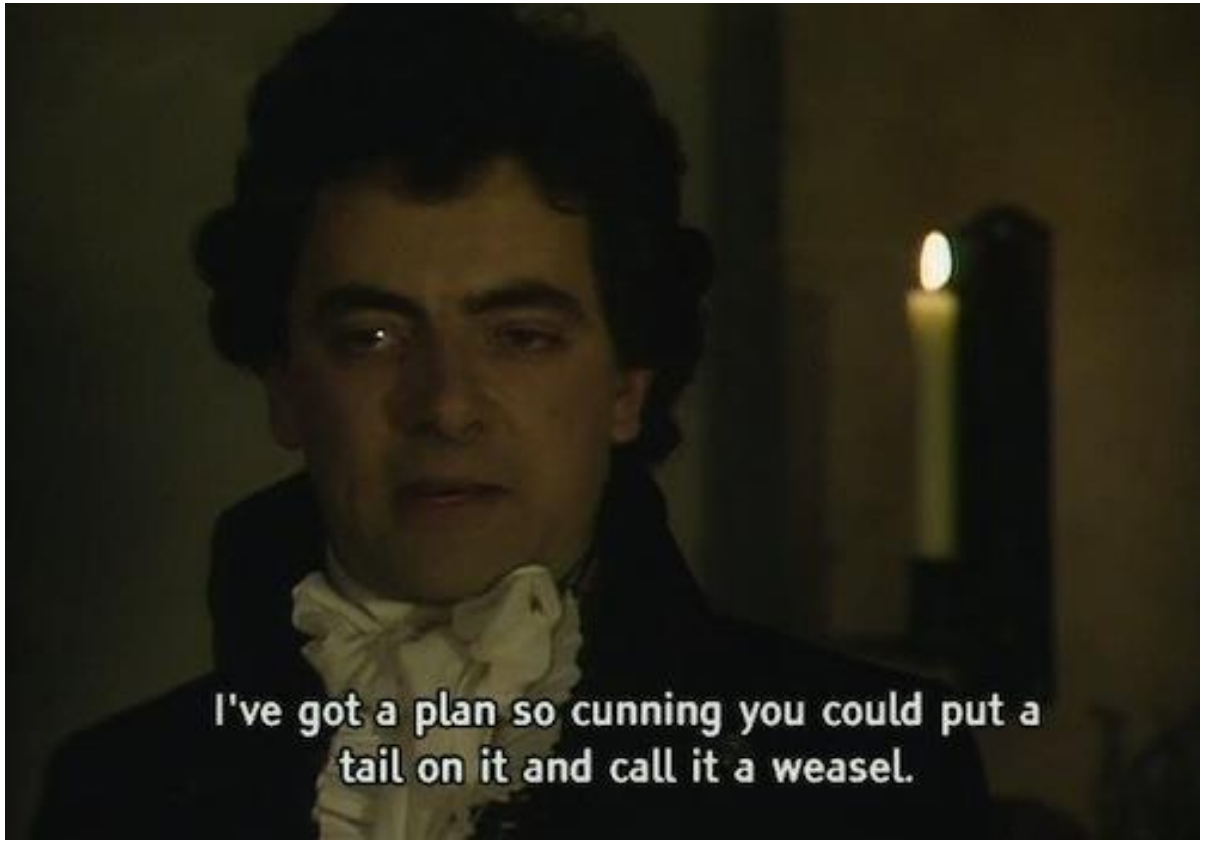
"That is why I am announcing an ambitious package of education reforms to ensure that every child has the chance to go to a good school. As well as allowing new selective schools we will bring forward a new requirement that means **universities who want to charge higher fees will be required to establish a new school or sponsor an existing underperforming school**."

Theresa May – 9 September 2016

Translated into Regulatory Context

"We expect all institutions to set out in their 2018-19 access agreements how they will **work with schools and colleges to raise attainment for those from disadvantaged and underrepresented groups**. This includes a strong expectation that we will see greater numbers of higher education providers sponsoring schools (either as main sponsor or co-sponsor) or with advanced plans to do so, with a view to improving attainment of disadvantaged and under-represented groups to enable them to apply to higher education if they wish to."

OFFA (2017) - Strategic guidance: developing your 2018-19 access agreement



So We Came Up With A Cunning Plan!

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Challenges

Attainment is a highly complex area:

> "This is a complex topic which spans the remit of government departments and public services. As such, one of the underlying themes of the report is that cross governmental action will be needed to address the social problems causing attainment deficits – they are not purely an educational issue."
>
> DfE (2018) *Understanding KS4 attainment and progress: evidence from LSYPE2 - Research report*

SO

We should narrow the focus

i) To key qualifications Maths and ~~English~~ GCSE

ii) To key curriculum issues in Maths GCSE

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But also….

- Other issues with HE attainment raising:
  - Teachers work with their students over a long period in a concentrated way
  - HE outreach tends to dip in for a short period
- *So what kind of claim to causal change can an outreach approach make?*

- And
  - Schools are often poorly resourced / under pressure
  - Teachers often have to balance needs of individual students against a whole large class
- *Would HEIs claiming impact be disrespectful to over-stretched and over-worked teachers?*

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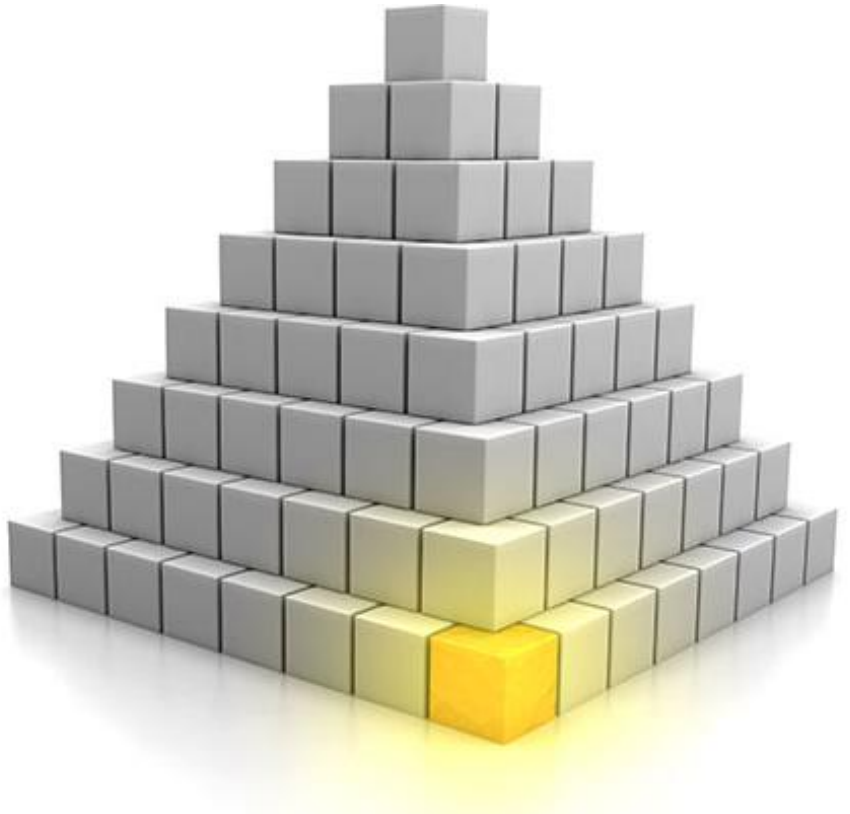
Threshold Concepts

- Meyer and Land (2003) – Threshold concepts in economics
  - Difficult conceptual blocks
  - Transformation of understanding when blocks are overcome

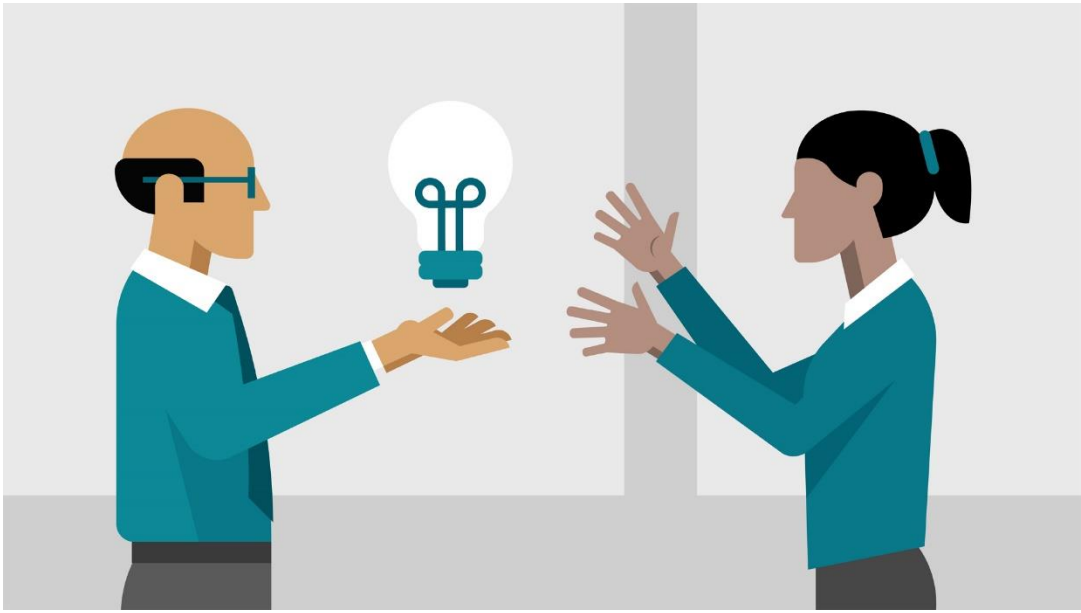
“Threshold concepts have been described as portals, opening up a new and previously inaccessible view of a topic, a view without which students would be unable to fully progress intellectually.”

Breen and O’Shea (2016)



So we thought - what if we:

- Train HE outreach mentors
  - To work with individual students
  - To address **specific threshold concepts** in the GCSE Maths curriculum
  - And thereby provide additional capacity to teachers
  - And deliver what teachers tell us their students need – by way of supporting them to cross conceptual thresholds - but which teachers don't have the available time or resources to deliver



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Alignment with NERUPI Framework

Level 2 (education stage Y10-11)

INTELLECTUAL CAPITAL	KNOWLEDGE CURRICULUM	UNDERSTAND	**Develop students' understanding by contextualising subject knowledge and supporting attainment raising**	**Broaden understanding of subject knowledge and its wider applications**
				Develop understanding and competence of GCSE curriculum
				Discover how GCSE subject knowledge can be applied in other contexts and settings
				Engage in challenging educational projects which extend understanding and contextualise learning
				Link GCSE subject knowledge to university subject areas
				Explore how GCSE knowledge can be applied and developed at degree level
				Understand how GCSE curriculum relates to university subject areas
				Extend their capacity for critical thinking, perspective taking and creative engagement with their subject area
				Access and experience appropriate attainment-raising interventions

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Evaluation Opportunities

1. Evaluate acquisition of specific curriculum knowledge using a test (*supporting robust measures*)
2. Use before and after tests to assess increase in knowledge acquisition (*change across time*)
3. Give same tests to a counter-factual non-participant group (*impact of the intervention*)
4. Strong empirical outcomes (*OfS evidence type 2*) and a causal inference (*OfS evidence type 3*)

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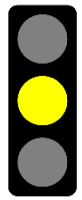
Implementation Plan

1. Recruit participant schools
2. Adopt an online mentoring platform
3. Form teacher advisory group to identify relevant threshold concepts that we could target
4. Develop targeted evaluation test for these curriculum concepts
5. Recruit mentors (studying for Maths related degree subject)
6. Recruit participants
7. Get agreement for accessing a counter-factual group
8. Deliver pre-test
9. *Roll out mentoring programme*
10. Deliver post-test
11. Bob's your uncle

And then the wheels started to fall off…..

1. Recruit 3 participating schools
2. Adopt an online mentoring platform
3. Recruit teacher advisory group
   - Only 2 teachers attended
   - Had to work through Year Heads instead



4. Develop targeted evaluation test
   - Schools couldn't agree which areas of the curriculum to focus on (different curriculum schedules)
   - But we were only resourced to write one set of tests
   - All schools had to work to the same threshold concept – not necessarily relevant to their students

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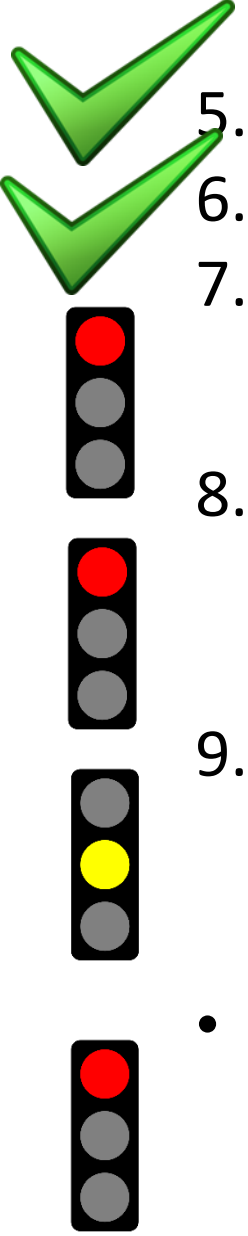

5. Recruit mentors (Maths degree)
6. Recruit participants
7. Get agreement for testing counter-factual group
   - Difficult to get school agreement / student groups to volunteer
   - Difficult to schedule pre-test for non-participation group
8. Deliver pre-test
   - Didn't get full engagement from all participants
   - Participants couldn't see the need for / didn't want to take an 'extra' test
9. Roll out mentoring programme
   - Poor student engagement / few sign ups
   - Missed appointments
   - Limited access to IT / IT problems
10. Deliver post-test
    - See above
    - Evaluation tests - pulled

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Participant /Teacher / Mentor Feedback

- The online mentoring platform was highly regarded

BUT

- Need for parents to sign up their offspring reduced take up
- Timing of sessions was an issue – participants did not want to stay after school to access the platform
- Restricted curriculum focus = limited interest for participants and teachers
- Other study priorities took over
- Participants forgot to book or show up (online) for the mentoring sessions

What we've learned

- The basic principles of the project might still be sound
- Implementation and evaluation processes ultimately grounded by practical issues
- School resources are stretched and school teams weren't able to scaffold and manage their participants
- Participant self-management didn't work (apart from 1 very keen pupil!)
- Participants weren't always in a position to judge the threshold concepts they struggle with without a teacher's advice
- We weren't able to deliver flexible provision targeted at specific threshold concepts because of scale and project resourcing
- Both schools and participants need more scaffolding and support (more resource at the project level)

Conclusions

- There are many challenges of working with school partners
  - Schools are under-resourced, under pressure, juggling multiple agendas and priorities
  - Different schools tackle different parts of the curriculum at different times
- To gain maximum benefit from the mentoring activity we needed to better scaffold the experience for participants
  - To ensure that participants understood the process / how it was supposed to work
- These projects require much more input and resourcing than we were able to give to a pilot
  - We needed detailed engagement from teachers from the start
  - We needed to project manage to a greater degree to ensure all stakeholders remained engaged

Discussion Activity

- *Schools are primary stakeholders if we want to work with young people to raise attainment*
- *They are also under many other pressures and resource pinches*
- So – please share and discuss the challenges of working with school partners (or, vice versa - the challenges schools face working with HE outreach providers) AND (*hopefully*) how you have solved or tackled these issues.
- We will have 10 minutes of whole room feedback / discussion

References

- Breen, S. and O'Shea, A. 2016. Threshold Concepts and Undergraduate Mathematics Teaching. *PRIMUS*, 26:9, pp. 837-847
- Meyer, J.H.F. and R. Land. 2003. Threshold concepts and troublesome knowledge 1 - linkages to ways of thinking and practising. In C. Rust (Ed.), *Improving Student Learning - Ten Years On* (pp. 412–424). Oxford, UK: OCSLD

@JulianCrockford

@WPREU_Sheffield

www.shef.ac.uk/apse/wp/wpreu

Julian.Crockford@Sheffield.ac.uk