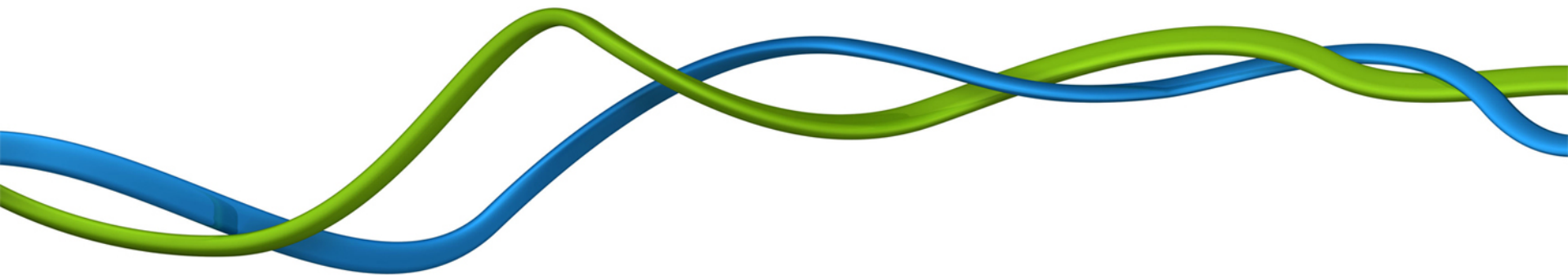




# Challenges for Engineering Education research

Dr Rhys Morgan  
Director, Engineering and Education  
Royal Academy of Engineering





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# Engineering skills crisis

**By 2022...**

**1.82 million** engineers and technicians at all levels

**1.06 million** engineers at level 4+

**7 out of 10** replacement demand

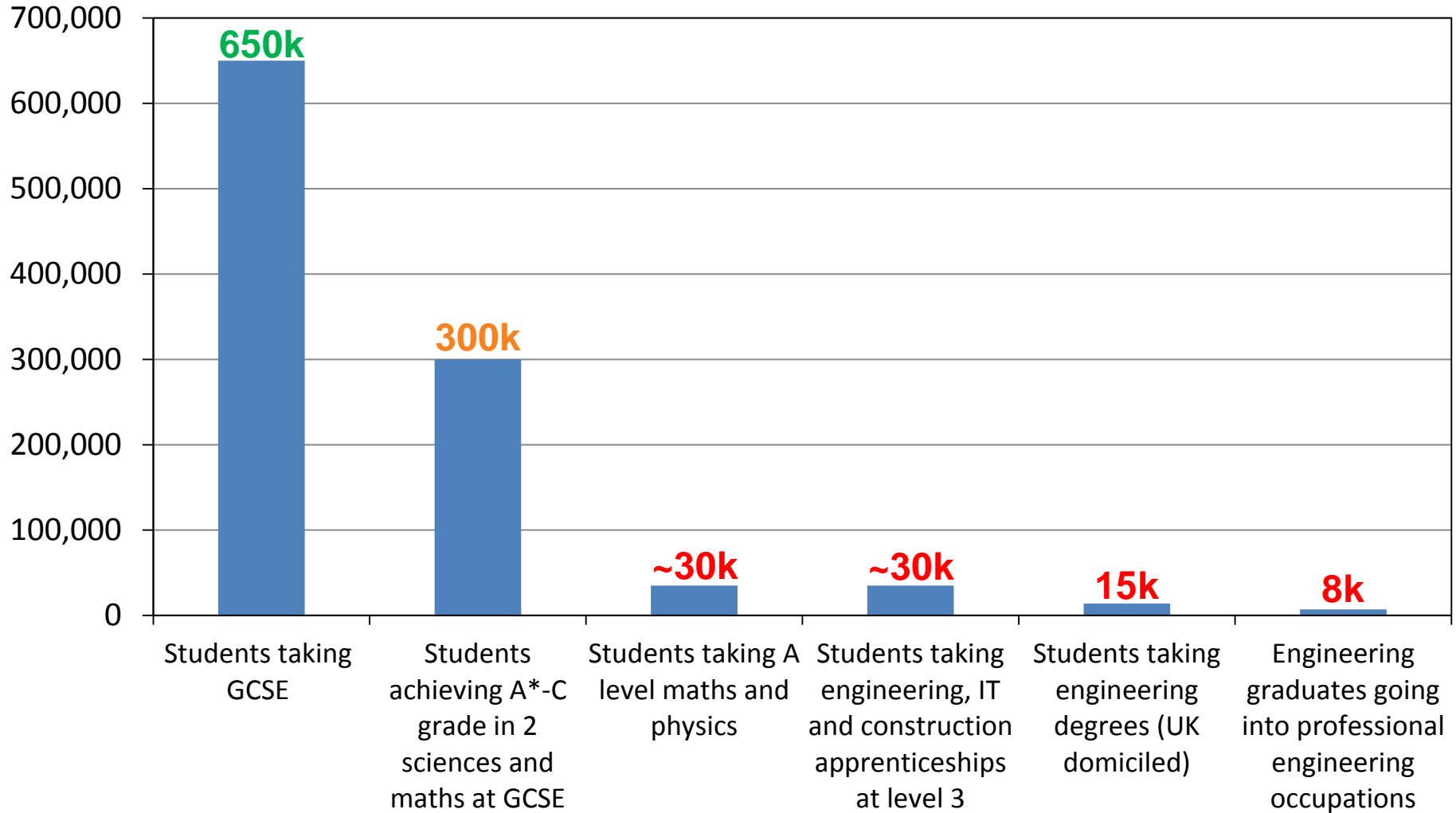
**360,000** expansion

*Data from EngineeringUK 2015 annual digest*



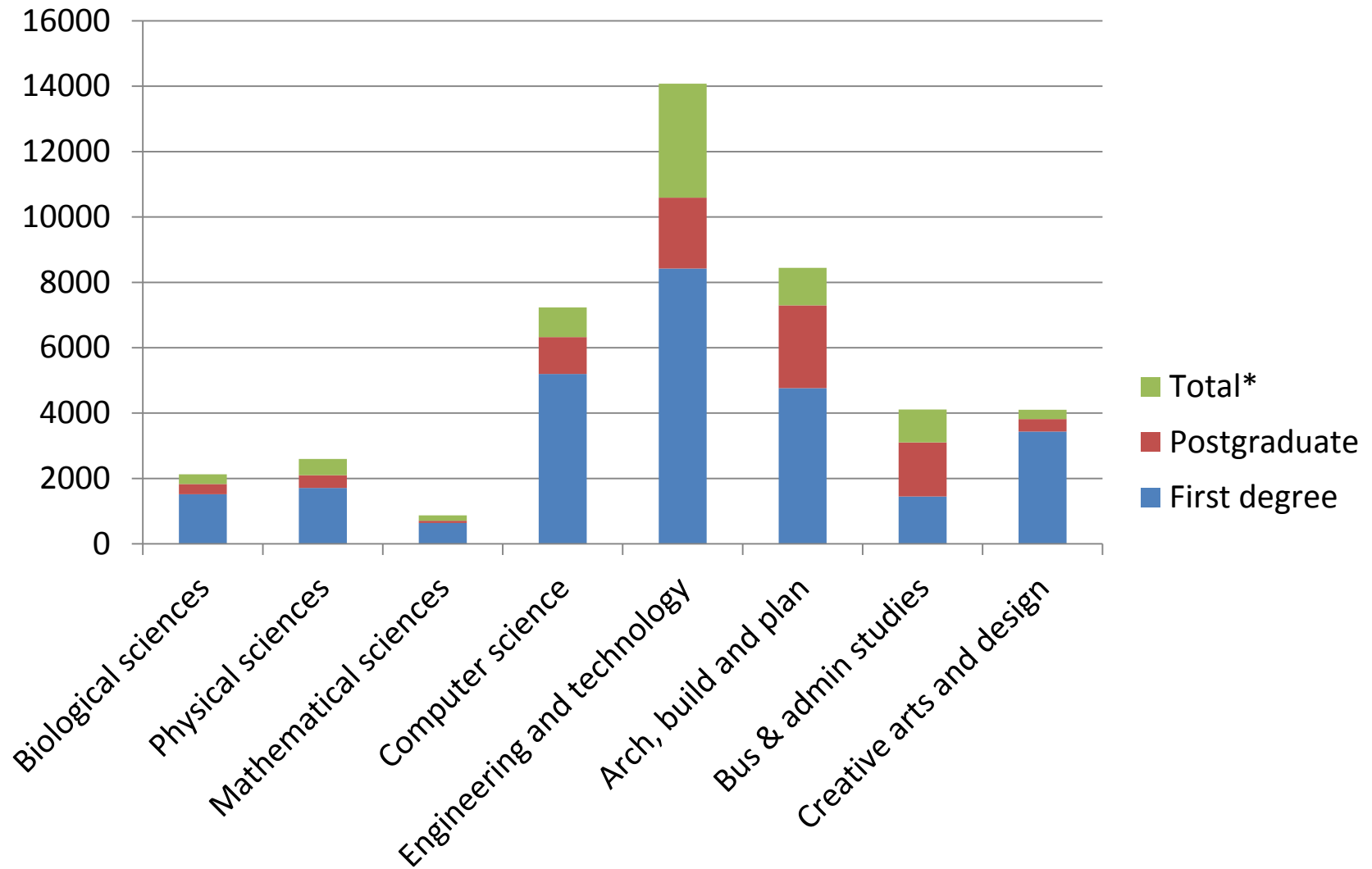
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# Engineering skills supply



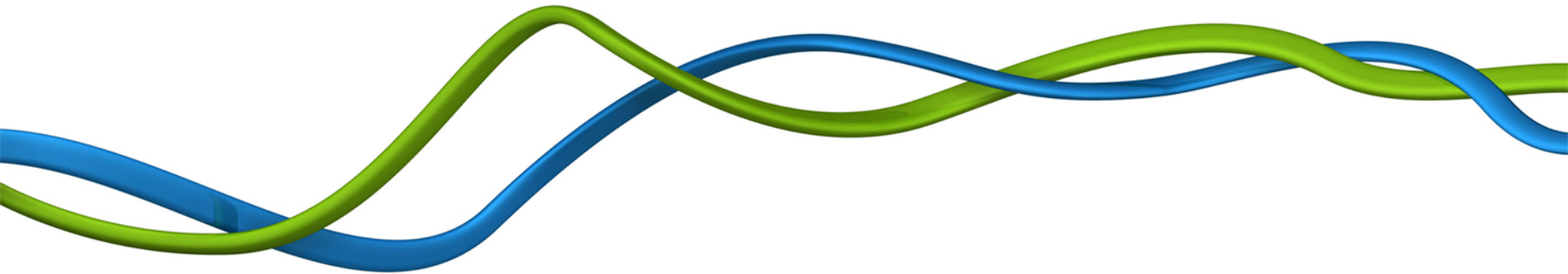
*Data from JCQ, Data Service, HESA*

# Graduates in engineering jobs



*Data from EngineeringUK 2015 annual digest*

**What does this mean for  
engineering education research?**





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# Key challenges

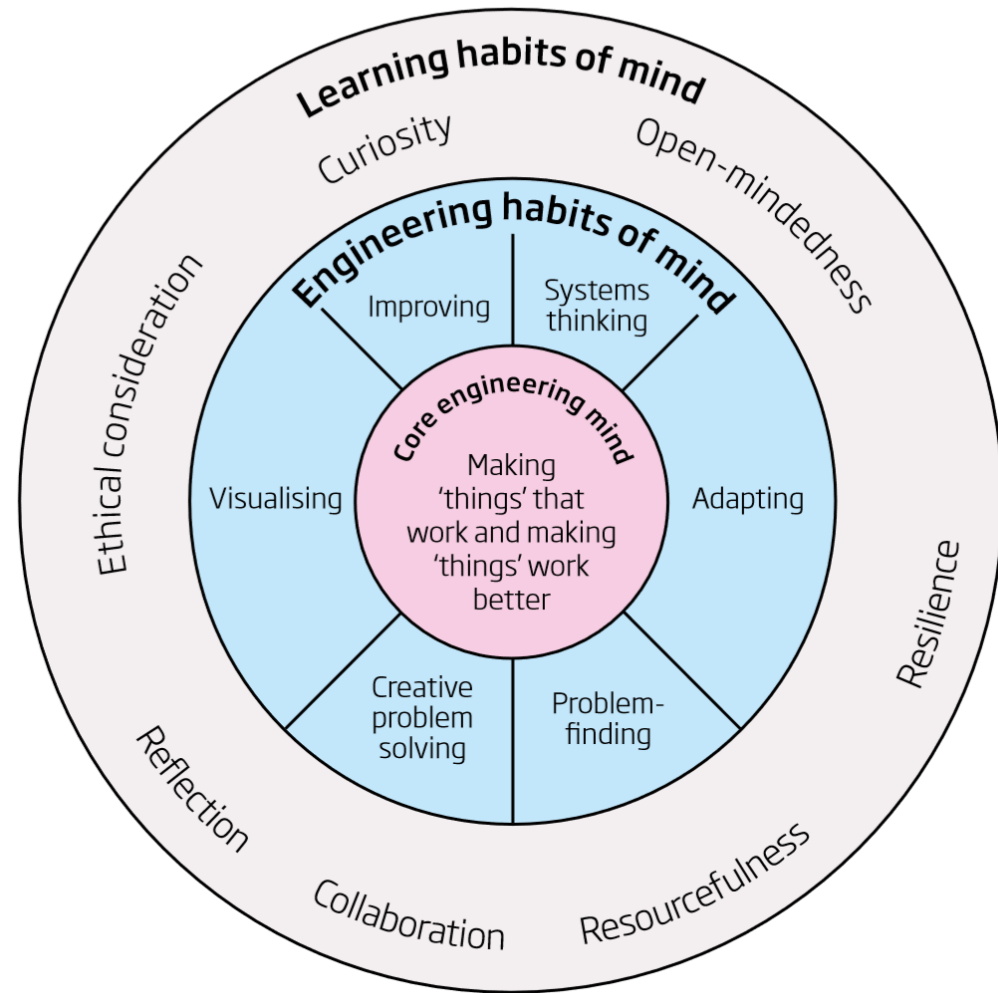
- Defining engineering
- Teaching students without physics and/or maths
- Addressing the challenge of graduates leaving engineering for other sectors
- The higher vocational education pathway
- The impact of TEF on the importance of teaching in the HE landscape



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# Defining engineering

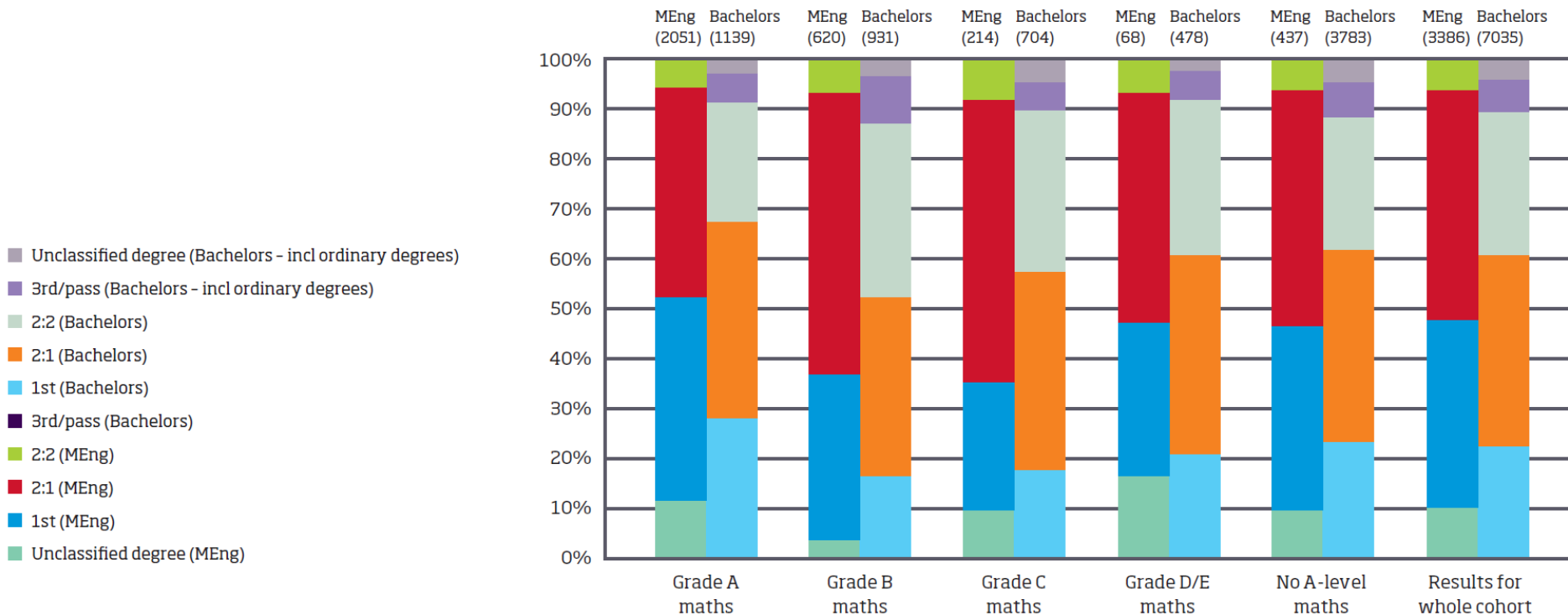
- What should engineering students know?
- What should they be capable of doing?
- How do we create breadth and depth of knowledge across disciplines





# Students without maths/physics

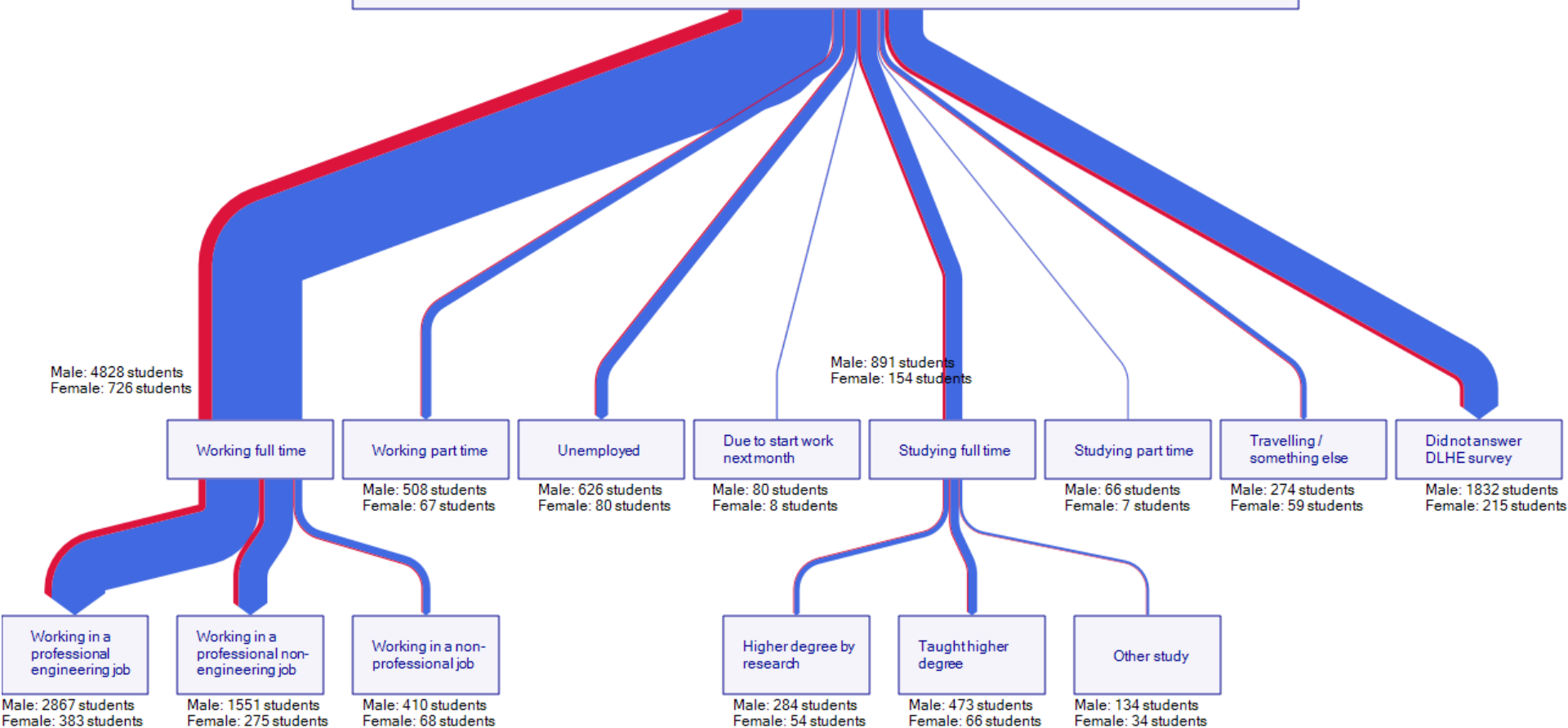
- No statistical correlation between degree classification and A level maths results (or lack of maths) for MEng or BEng





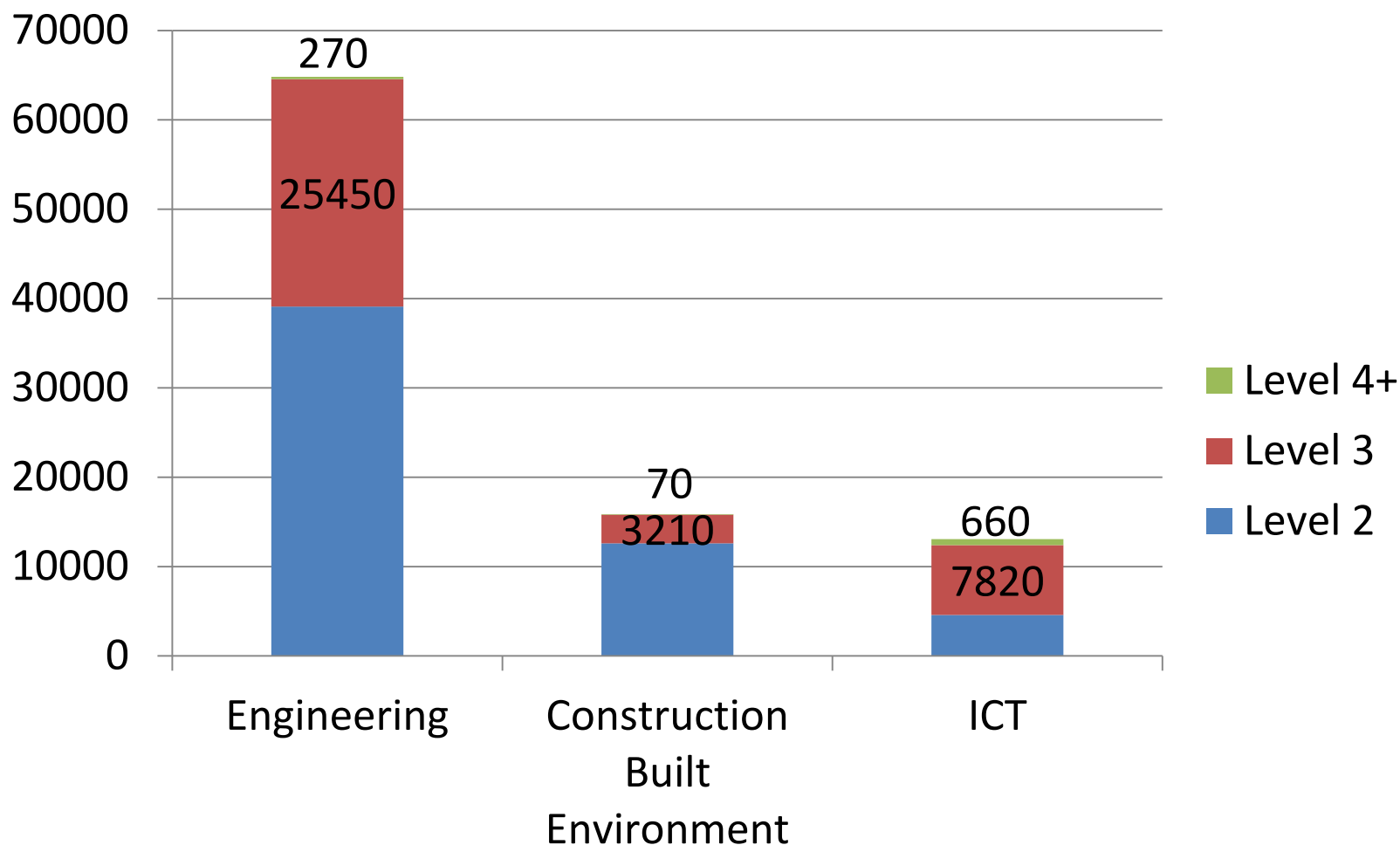
# Graduate destinations

Destinations of Leavers from Higher Education (DLHE) summary of "Most important activity" for UK domiciled, full-time engineering graduates (10, 421 students)



# Higher vocational education

- Up to 2000 Degree apprenticeships starts in 2015/16





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# Teaching excellence framework

- Judgements made by panel: academic experts in learning and teaching, student reps, and employer/profession reps
- Judgements made against an assessment framework, based on evidence submitted
- Panels will consider how excellent teaching is demonstrated
- Student fees to increasingly differentiate according to the TEF level awarded



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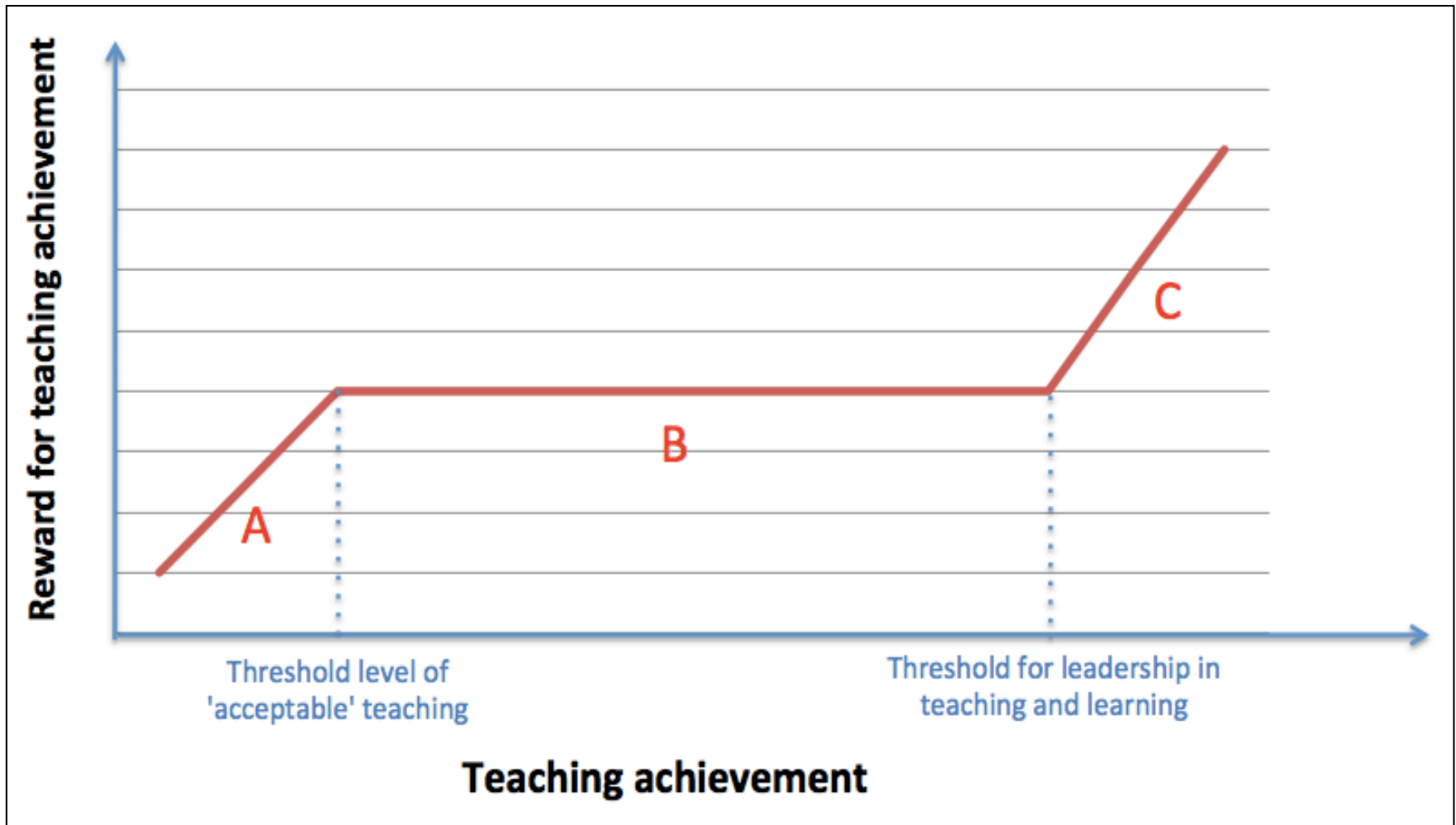
## Teaching quality - TEF

- Reward and encourage teaching practices that:
  - provide an appropriate level of contact and stimulation
  - encourage student effort
  - are effective in developing their knowledge, skills and career readiness
- There is a strategic and effective approach to understanding the ways in which students are intellectually challenged and engaged in the curriculum and their learning
- The courses, curriculum design, teaching and assessment are effective in developing all students' knowledge and skills.



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# Measuring teaching excellence

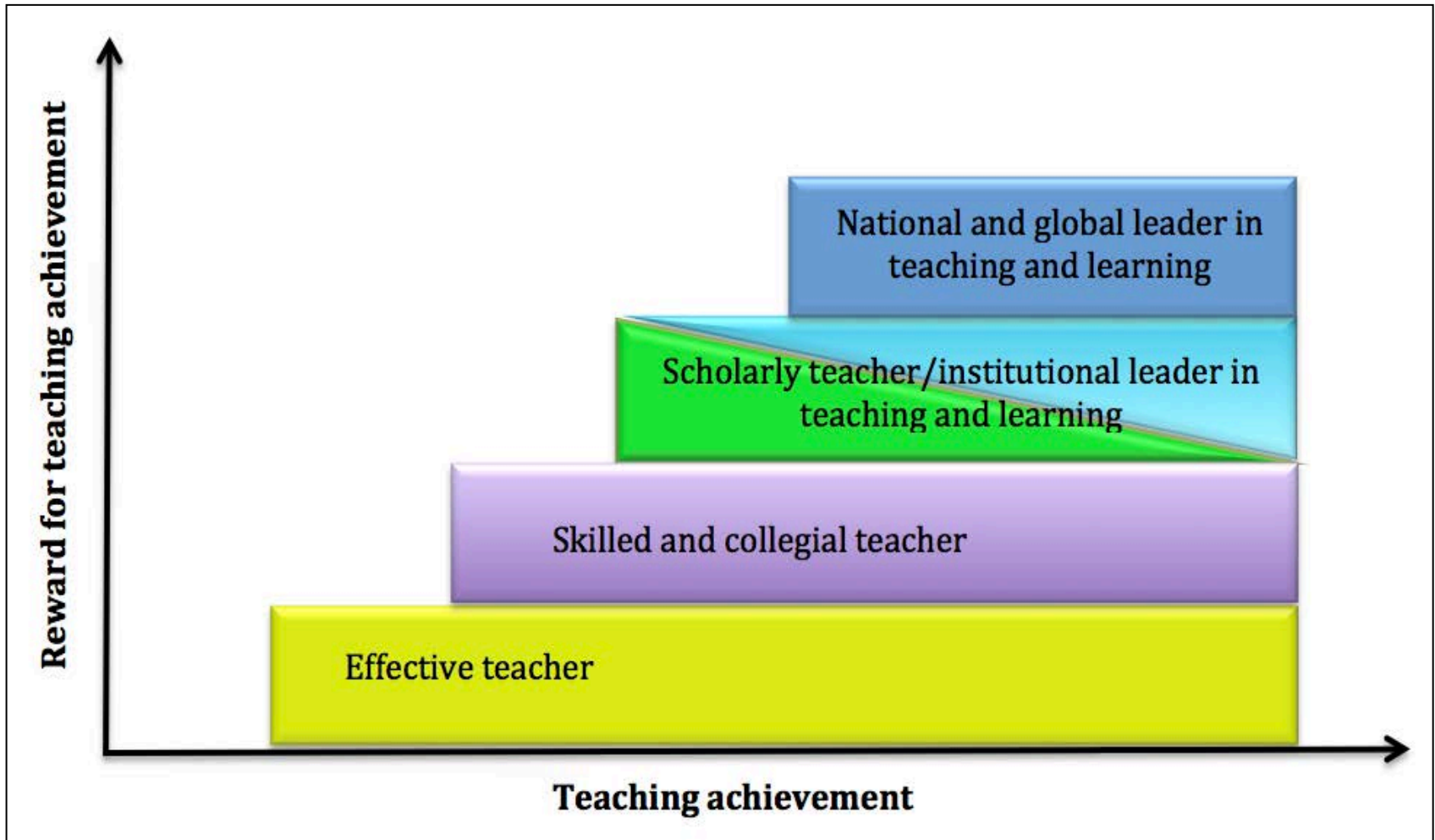


*Image from forthcoming report on template for measuring teaching excellence, RAEng*



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# Measuring teaching excellence



*Image from forthcoming report on template for measuring teaching excellence, RAEng*

**Thank you.**

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