

Choosing engineering: what may work and why?



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Setting the scene

A long-standing concern for the engineering community in the UK is the skills shortage and therefore there is a need to nurture and encourage student interest in engineering. The engineering sector relies on the education system and informal learning opportunities to generate sufficient interest for young people to pursue engineering training or study. However, as it stands, not enough young people are choosing to pursue engineering educational pathways. Ensuring greater science, technological, and mathematical literacy amongst all students would greatly benefit the engineering profession as well as society as a whole.

Reasons for embarking on the literature review

1. There is already a large amount of literature related to engineering education and outreach for 14 to 18 year olds and the underlying concerns around gender, ethnicity and socioeconomic status.
2. There has been to date a limited understanding and sharing of the evidence beyond the different research communities that dealt with the topic, and therefore there are limitations in its implications for educational policy and practice.
3. The literature review would inform not only our current and future work but also help and support engineering education practitioners and everyone interested in finding answers to the long-standing issue of attracting young people into engineering.

The systematic review process

We developed a set of key search words and terms (based on an initial scoping of the field – see Figure 1) which we then used to search for papers and articles in Scopus, Web of Science and JSTOR. This gave us 4,000 unique references which were next screened by at least two members of the team for relevance. The selected 1031 (after duplicates and unavailable work had been removed) were then reviewed. Figure 2 gives a description of the relevance of the identified literature (based on the contents of the titles). The key findings are shown below.

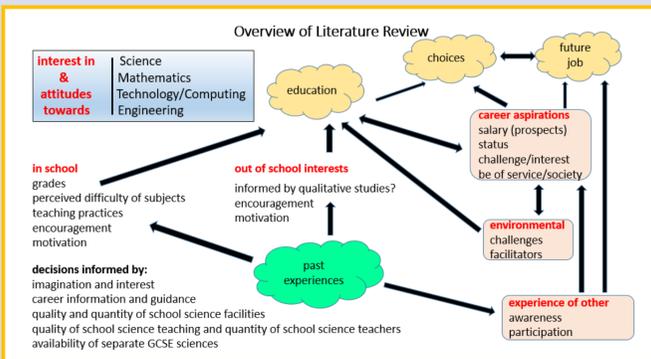


Figure 1: Overview of our review of various frameworks and readings

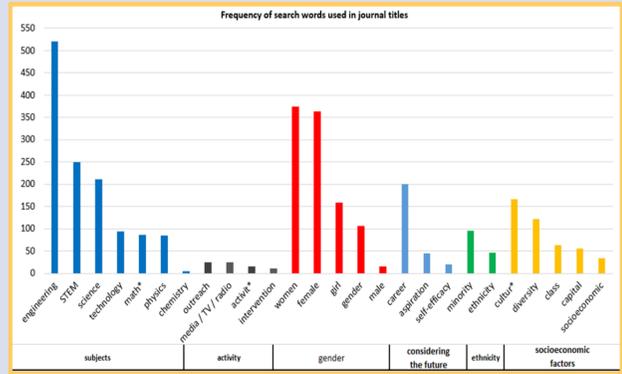


Figure 2: Relevance of the identified journal papers



What may work?

How will this be achieved?

Raising awareness of engineering :

- Outreach
- Engineering-related / inspired activities
- Interventions

STEM groups including STEM Ambassadors, university initiatives, the engineering institutions and others with an interest in engineering.

People who can offer help and support:

- Role models
- Parents/carers
- Teachers
- Careers advisors

Increased visibility of underrepresented groups
CPD for teachers (and careers advisors)
Support from the various STEM groups and engineering institutions.

Promoting engineers and engineering in the media:

- Avoid negative stereotypical portrayal
- Increase awareness of current engineering applications - potential for large-scale change
- Social responsibility
- The relevance to one's own interests and/or concerns

When there was a shortage of engineers in the US, they introduced the television programme "The A-Team" which promoted engineers as problem solvers.

In order to fill in the gaps identified and as a direct consequence of the areas highlighted in this review of the literature, we conducted a survey of 14 to 18 year olds in England, with a comprehensive questionnaire regarding their attitudes to engineering and the ways in which they had come about the information. This generated over 3000 responses and we are now seeking further funding to enable us to analyse these data and disseminate the findings.