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General Engineering - Student Motivations towards Flexibility and Breadth in the Engineering Curriculum

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Across Europe concerns remain of a shortfall of graduates to meet industry needs and maintain competitive advantage ([1]-[2]). The problem is in part due to student attractiveness to the discipline, but also the variability in progression from a degree course to an engineering career due to motivational changes in educational need ([3], [4]). Several UK universities (as in many other European countries) currently provide a General Engineering (GE) entry to students. The advantages of such entry are typically reported as: (i) the provision of a broader foundation in engineering fundamentals (e.g. engineering maths and science) as well as skills-related components (e.g. design, communication and problem analysis); (ii) allowing students a more informed choice in degree specialisation selection, e.g. the option for students to defer specialisation until course tasters are sampled, or greater awareness of personal preferences in engineering work / application are realised; (iii) the preparation of students for a more versatile career, i.e. graduates who are able to apply their training to other engineering contexts.

In this paper, the attractiveness of GE to student recruitment is explored through a national (UK) survey on pre-university (16-18 age group) students. Specifically, attention was given to student motivations towards flexibility in engineering specialisation, combined degree options (e.g. engineering and management) and exposure to other non-technical courses such as politics, business studies and languages. The study therefore addresses the following questions:

1. Is GE entry attractive to students who intend to study engineering?

2. Can GE entry help attract students into engineering who are considering studying a non-engineering mathematics/science based degree? How does this compare to a combined degree option?

3. What are the broader educational elements of university education that are particularly attractive to students?

The survey was restricted to students who were undertaking qualifications that enabled entry into engineering degree programmes, e.g. A-levels in both mathematics and physics; a response rate of 1538 from this group was achieved. Attention was given to student motivations towards flexibility in discipline specialisation, combined degree options (e.g. engineering and management) and exposure to other non-technical courses such as politics, business studies and languages.

Of those respondents who indicated a desire to enrol on an engineering degree (N=775; 50.4%), 30.7% were undecided on their choice of specialisation and 81.6% indicated a favourable response to a GE type programme. Of those respondents who were not considering an engineering career (N=763), 35.7% indicated a favourable response to a GE programme, i.e. given such a programme, 32.7% would "possibly reconsider" applying to engineering, and 3% would "definitely reconsider". Also for this cohort, 32.9% indicated a favourable response to a combined degree, i.e. 29.4% would "possibly consider" applying to such a programme and 3.5% would "definitely consider". As part of broader university education, "important aspects of other engineering disciplines" was ranked highest by students who were considering an engineering degree, followed by education in leadership, teamwork, environmental and sustainability studies and business skills. Students not considering an engineering degree ranked education in leadership as highest, followed by teamwork, self-awareness / personal development, business skills and international studies. The data indicates the potential attractiveness of GE to student recruitment. Student desires for wider engagement in professional skills development are also apparent, specifically in areas of leadership, teamwork, business skills and self-awareness / personal development. ■

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