

Mathematics diagnostic test for first year undergraduate engineers: issues of transition and identity

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This paper presents data gathered from biographical interviews with engineering students during their first six months at university who may therefore be described as being in transition from student in sixth form college or college of further education to student engineer in university. These interviews were conducted as part of a larger research project funded by the TLRP and ESRC into the place of mathematics during this same transition.

By choosing to study engineering, students are selecting courses which are mathematically demanding and subsequently this selection may influence their overall success or failure on the course. Therefore, as recommended by the Engineering Council (2000), diagnostic testing takes place at the beginning of the majority of engineering courses to discover students' mathematical ability. As a result of this process, students are placed in groups for their mathematics studies that are suited to their personal needs i.e. groups that reflect their present knowledge rather than their mathematical ability. There have been various studies into diagnostic testing which highlight the shortcomings of pre-university mathematics and its detrimental effect on the standards of new engineering students (Engineering Council, 2000; Learning and Teaching Support Network, 2003; Haßler, Atkinson, Barry & Quinney, 2004). This paper, however, is different in that it explores the subject through the students' own voices.

Student engineers were interviewed in four of the universities involved in this project who have very different stories to tell about the transition they were experiencing in their journey to become engineers. These interviews reveal their experiences of and their engagement with mathematics and how these shape their disposition towards mathematics in particular and their respective engineering courses in general. Apart from revealing their own dispositions towards the mathematics in their respective engineering courses, their narratives also expose the transitional mathematics practices which take place at the four universities and, in particular, how these practices help or hinder the mathematically 'less well-prepared' student.

The initial data for our investigation were gathered via a survey of fifteen hundred students either just before or just after they started higher education. From these we identified twenty-six engineering students who were willing to be interviewed. These interviews were then analysed as biographical narratives which, according to Sfard and Prusak (2005), provide insight into the students' identification with the mathematics that plays such an important role in their engineering courses. Particular attention was paid to statements of self-identity because these show most clearly how the individual student is disposed towards mathematics.

Analysis of the biographical narratives reveals that some of the students do not respond well to all these transitional practices. In particular, the diagnostic testing

results in some students finding themselves marginalised from mathematics because they have been labelled as a 'less-well prepared' or even as a 'struggling' student. It may be that these students find this early setback to their aspirations of being successful students and, ultimately, successful engineers difficult to overcome.

These findings may therefore be significant because this positioning of students as 'struggling' in mathematics within their first few days at university might lead to a disposition away from mathematics in certain individuals. Future stages of the project will provide data that will allow us a better understanding of the implications of diagnostic testing on engineering students. Further analysis of these data will be discussed.

References

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