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# Prediction of Student Performance in Engineering Programs

## A case study using entrance information

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**T**his paper describes studies of entrant students in both Ireland and Portugal, and how student data available at the time of entry can be used to predict the success of students in their first year of studies. Similarities and differences between the countries are drawn and attention is drawn to the structural differences which make such cross-country comparison difficult.

Enrolment trends in many European countries show static or declining numbers of people entering engineering dropped programmes.

In order to consider increasing the number of engineering students it is essential to examine the measures that may be excluding potential entrants. This paper presents some of the results of the ATTRACT project, which has examined the formal barriers standing in the way of entry to engineering. Issues relating to prior student achievement both in engineering-relevant subjects and other areas are examined to assess whether or not alternative procedures could be used to admit more, but still highly-qualified, students.

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Comparisons are made between Ireland and Portugal, countries that share certain similarities in terms of the need to increase engineering graduates, but also significant differences in relation to context. Inevitable complexities arise when comparing complex systems across national boundaries. What may appear to be an identical barrier in two countries is nonetheless operating within an entirely different framework in each. As a result, understanding the implications of existing barriers beyond their particular context, or attempting to infer how a practice from one country may translate to another, can be challenging.

The sample in IST (Portugal) study includes 1253 students admitted in that institution in 2004/05 by the national contest for access to higher education. The dimensional axes of analysis were: academic background, socioeconomic status and family capital, motivations / expectations, and contextual factors.

The sample in TCD (Ireland) is 1,835 engineering students over ten years (2000-2009 inclusive). The factors analysed were academic achievement in high school, gender, and residential status.

Despite significant differences in the structure of the education system in the two countries, there are clear parallels in a number of areas for which similar entrant data was available:

- Overall academic achievement is predictive of student progress in both cases, albeit specific subjects are more valuable than the overall aggregate grade in the Irish context. This may simply be an artefact of the relatively free subject choice in the Irish system compared to the more 'tracked' system in Portugal.
- Access to high preference choice of course is significant, albeit less so than academic grades, in both countries
- Physics confers an advantage on students in both countries with regard to progression

There are areas where there is insufficient data overlap between the two countries to effect a direct comparison – these include the socio-economic and family status, the student travel time and the student expectations and motivations.

Of the remaining areas where there is data available, there are interesting divergences regarding living at home and gender. Interestingly both of these variables are significant in the Irish/Trinity College context when the entire student cohort (including Arts, Medicine, Business, Law etc) is considered, but not specifically for engineers. ■