Course switching patterns among Engineering students at a South African university (0641)

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It is often assumed that a significant number of students do not persist in their first declared major in higher education. In fact, research has shown that switching courses is a natural process for most undergraduate students who are often at the stage of finding the right fit for their academic studies (Astoni-Figari and Speer, 2018). Other scholars have suggested that lack of career guidance in high school is the major causal factor for switching majors (Rottinghaus, Falk and Park, 2017). There is also a growing body of research which has established that students often switch because of the conflict they experience in the socio-cultural conditions of their chosen disciplines (Jackson et al., 2016). In South Africa, the issue with course switching is compounded by the increasing calls on universities to produce STEM graduates (Fisher and Scott, 2011). Moreover, there have been calls to improve the quality of education, with stakeholders calling for more accountability and transparency on higher education institutions (Dhunpath, Amin and Msibi, 2015). For instance, the recent student protests and calls for the decolonisation of education are reminders that universities have a mandate to invest in successful students (Mubangizi, 2016). In order to fulfil this mandate, universities must operate like any other business, where their losses and gains are known. It is in line with this background that this study is framed.

A scan of the literature on course switching amongst university students in South Africa revealed a number of shortcomings. While there is a growing body of international literature on the topic (Astoni-Figari and Speer, 2018, USA; Rottinghaus et al, 2017, USA; Bettinger, 2010), there was no corresponding body of literature from the South African academic community (that I came across). In fact, most of the research in this tradition has been dominated by North American scholars, revealing an apparent gap in knowledge which this paper seeks to fill. This suggests a study such as this one, is not only timely, but also necessary as it sheds more light on the problem of student attrition, retention and persistence which seem to perennially scourge South African higher education institutions.

The main purpose of this study is to examine the patterns of selecting and switching majors among students in the Engineering programmes at a South African University. The following research questions will guide this analysis:

- What are the patterns of Engineering students in selecting and switching qualifications?

- Which variables help to describe qualification switching?

The data used in this analysis came from the cohort data archived in the department of Institutional Intelligence at the University of KwaZulu-Natal (UKZN). The cohort data set captures students' biographical information (race, gender), admission point scores, academic performance in the first year as well as information financial aid and whether the student resides on university campus or not. Additional information on academic support was collected at department level. The presentation will first provide descriptive accounts of course switching, followed by logistic regression models to predict the likelihood of switching given the student background characteristics such as application choice, admission point scores, socio-economic status, prior academic achievement, and help seeking behaviour. The sample consists of 1595 first time entry students who began their academic year in 2009, 2010, 2011 and 2012, thus allowing for a seven year graduation rate for the latter cohort. An assumption is made that by examining the academic destinations of the switchers, we can better understand their motivations for switching.

To identify the switching patterns, the analysis will look at the intended major as recorded on the application form, the registered major and any subsequent majors leading to the graduation major. The conceptual model is shown in Figure 1 below.

Figure 1: Conceptual model
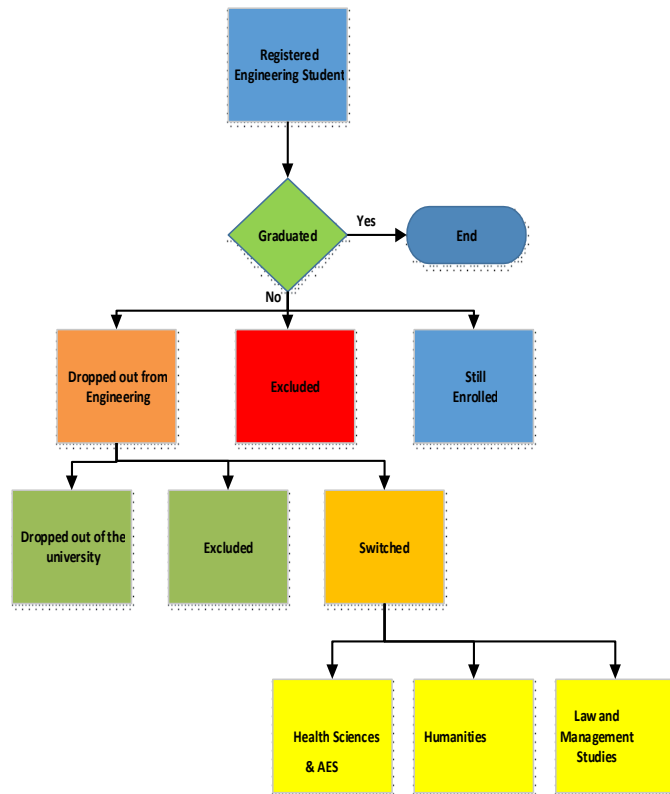
The start point of this model is a student being registered in an Engineering programme. If the student graduated from the engineering programme, he or she would be dropped from the analysis. The next step was to look at those students who had not graduated and track their patterns and trends of departing from the initial registered qualification (that is, dropped out, excluded or still enrolled). Of those who dropped out (departed) from engineering, the analysis examined the path they had taken (drop out form university, excluded or switched). The last part of the analysis was to identify the switching patterns among the switchers. Regression models were also run to identify variables which best explained the trends (Graduate, drop out and switch).

Results

Preliminary findings from both descriptive and logistic regression revealed that most of the students (57%) either obtained a degree or persisted in their first declared major. Of those who did not persist, 31% switched to other programmes, 56% dropped out, while 13% were excluded from their first declared major. The majority of switching also occurred in the second year of registration. The results from the regression analysis also reveal diverse patterns of switching among those who do not persist in their first declared major which are

stratified by admission point scores, race, first year academic performance, financial aid status and gender. In other words, students with higher admission point scores or had financial aid were less likely to switch. Females (across races) and Africans were likely to persist while males in general were more likely to switch relative to females. Academic performance in the first year of study was also positively correlated with persistence and graduation from the first declared engineering major.

Conclusions

The aim of this study was to examine the patterns and trends as to qualifications selected and those to which students switch. The study brought to the fore the effect of the socio-cultural, demographic and academic factors which influence the patterns and trends engineering students take from enrolment to graduation. Overall, the results show that most of the students who enrol in engineering either persist or switch to other STEM related degree programmes. The results also point to the importance of the first year of study, and suggest that this is the best time to advance interventions which can help students persist.

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