



# Leaving rates and reasons for leaving in an Engineering faculty in South Africa: A case study

**Author:**Jonathan Pocock<sup>1</sup>**Affiliation:**

<sup>1</sup>School of Chemical Engineering, Faculty of Engineering, University of KwaZulu-Natal, Durban, South Africa

**Correspondence to:**

Jonathan Pocock

**Email:**

Pocockj@ukzn.ac.za

**Postal address:**

School of Chemical Engineering, University of KwaZulu-Natal, King George V Avenue, Durban 4041, South Africa

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This paper describes a case study undertaken at the Faculty of Engineering of the University of KwaZulu-Natal to determine the leaving rates from the faculty both by a cohort analysis (over the existence of the university from 2005 to 2010) and by a 1-year population balance over the whole faculty in 2009. Students who had left the faculty who could have continued were identified from the population balance and interviewed to determine the common reasons for leaving. The cohort analysis showed that from 2005 through to 2008, the leaving rate from first-year cohorts was reduced year on year (from over 22% to below 14%). This reduction coincided with stabilisation of the faculty after a merger process and increased academic support. In 2009, however, an increase in the proportion of first-year students who left (to over 17%) was identified, which may be linked to the entry of students who had taken the new National Senior Certificate in South African high schools. The population balance over the year 2009 showed an academic exclusion rate of approximately 6% of the total undergraduate student body, and, more significantly, an academic leaving rate of about 14% of the total student body. The exclusion rate remained fairly static across three semesters whilst voluntary leavers increased over the same period. An analysis and interviews with a sample of the students who left showed that financial reasons played a significant role in these rates, with 49% of non-academically excluded students having financial difficulties, and that a significant proportion of students continue their studies at universities of technology. Although this is a case study within one institution, it is hoped that the findings can inform the current debate surrounding increasing throughput in Science and Engineering within the country.

## Introduction

The problem of student retention and completion continues to trouble academics and administrators in higher education systems worldwide. In financial terms, with a world enrollment of tertiary students of over 150 million in 2007,<sup>1</sup> drop-out rates of any significant size represent a substantial loss to the institutions in either state subsidies or private fees. In sub-Saharan Africa, the financial loss is further compounded by the loss of potential skilled workers within developing economies, thus slowing economic growth.

At the University of KwaZulu-Natal (UKZN), student loss has become an issue which can be split into three causes. The first is academic exclusion of students from a department or faculty as a result of slow academic progress. The second is 'walking away' – in other words, those students who leave the university before completing their degrees regardless of progression. The third is financial leavers (or financial exclusion) where students leave because of an inability to continue to fund their studies. These phenomena are often linked; for example, a student who is unable to pay residence fees may have to travel for many hours to and from university and does not necessarily have the time to study. However, the extent of each cause is not easy to discern from the literature or retention rates alone. The aim of this study was to categorise the reasons for leaving the Faculty of Engineering of the UKZN, and, in particular, to quantify the scale of 'walking away' and financial reasons for leaving.

## Reporting leaving rates

A number of terms for leaving university without qualification are used in the literature. One common terminology used in the literature to describe students who leave a specific university without completing a qualification in their chosen initial degree subject is 'drop-out'. Other common terms used are 'attrition rate' (for example, Cutler and Pulko<sup>2</sup>), 'leaving without graduating' used by Scott et al.<sup>3</sup> to describe students who leave either an institution or higher education in general, and 'stop-out'<sup>4</sup> to define those that return after a period of time. The actual term used does little to distinguish the reasons for leaving,<sup>5</sup> which can be variously linked to both the individual involved and the institution involved.<sup>5,6</sup>



Each of the terms used can have problematic implications. For example, attrition in an engineering situation implies the chipping of particles from a larger piece of a material, usually as either a deliberate action of a grinding mill or through incidental and unwanted collisions between materials.<sup>7</sup> This term is therefore not particularly appropriate when referring to a higher education system.

The term drop-out has negative connotations because of its use in common parlance. The Oxford Advanced Learners' Dictionary provides two definitions of drop-out: the first is related to leaving school or college without completing a degree and the second is 'being a person who rejects the ideas and ways of behaving that are accepted by the rest of society'<sup>8</sup>.

'Leaving without graduating' may be a more forgiving term, but still does not divulge any reasons for doing so. The use of stop-out does not give an indication of when that individual will return, and returning students are taken into account in a cohort analysis based upon the number of students.

For these reasons, the term 'leaving' is the preferred term for this paper, and refers specifically to leaving the faculty itself, with descriptors added to distinguish reasons for leaving an institution.

## Reported leaving rates

There is a plethora of literature available that reports leaving rates from universities and other higher education institutions worldwide using a variety of the terms listed above. A key starting point was the longitudinal study reported by Tinto<sup>6</sup> that was carried out in the USA in the late 1970s. At that time, for students entering a 4-year college programme, approximately 44% would have departed their first institution after 2 years, with 28% leaving the higher education system entirely. In his analysis, Tinto<sup>6</sup> states that:

The net effect is that the total rate of four-year institutional completion of entering cohorts can be expected to be approximately 44%. Conversely, the typical four year college can expect a total rate of institutional departure to be roughly 56% of the entering cohort.

It should be noted that Tinto was analysing what happened to cohorts entering both 2-year and 4-year higher education sectors, which means that, although the 4-year institutions exhibited these rates of completion, many of those leaving did transfer to 2-year courses and did leave higher education with some form of qualification.

Although Tinto's<sup>6</sup> figure for leaving of 44% was from the 1970s, a review of current literature suggests that little has changed in terms of the number of students retained. Table 1 gives an indication of more current leaving rates reported for the USA, Canada, Europe, the UK and Australasia. In cases where data specific to Engineering faculties have been given, these are reported rather than overall rates. As can be seen, overall non-completion rates of 50% – 65% are still reported for 4-year degrees and Engineering degrees, with first-year leaving rates of 15% – 35% reported in a range of subjects including Engineering. In South Africa, lower rates of 27% – 40% for Engineering degrees are reported, as shown in Table 2.

Data available from the literature for South Africa are mainly pre-institutional merger data published prior to changes in the secondary education system (that is, the introduction of the National Senior Certificate in preference to the previous higher-grade and standard-grade curricula).

In comparison with the rest of the world, the reported departure rates from South African universities are similar, whilst Engineering tends to have lower rates of loss than many other subjects. This difference is most likely because of the requirements of registration for an Engineering degree, which tend to be in the higher end of the high school qualifications, meaning that students who are accepted into these degrees are more likely to achieve academically.<sup>3</sup>

## Reasons for student departure from higher education institutions

Tinto<sup>5</sup> suggested a conceptual framework which would determine whether an individual left higher-level study or remained in the system. The model is longitudinal and relies upon interactions between the individual and the

**TABLE 1:** Leaving rates reported for countries outside South Africa.

Country	Subject or faculty	Definition of leaving rate	Leaving rate (%)	Citation
USA	Multiple universities; university-wide	Completion of degree versus non-completion	50	4
		Completion of degree versus non-completion in 6 years	60	9
	Multiple public universities; 4-year BS students	Left after 1 year of study	32	10
Italy	Multiple universities; engineering specific	Listed as left faculties, no further definition given	65	11
UK	Multiple traditional universities;	Left after first year of study	Mean 15.5	2
	Electrical and Electronic Engineering	Left after second year of study	Mean 6.7	2
Australia	Multiple faculties and universities	Larger programmes (>40 enrollment); first-year leaving rate	Mean 28.2	12
New Zealand	Single university; after foundation year	Left without passing any courses	Range 20–30 (2001–2003)	13
Canada	Multiple universities; university-wide	Left after 1 year of study	Mean 24 (range 12–44)	14
Spain	Multiple universities; engineering specific	Left after/during first year of study	23.6 (higher technical schools); 35.2 (university)	15

Note: Please see the full reference list of the article, Pocock J. Leaving rates and reasons for leaving in an Engineering faculty in South Africa: A case study. *S Afr J Sci.* 2012;108(3/4), Art. #634, 8 pages. <http://dx.doi.org/10.4102/sajs.v108i3/4.634>, for more information.

**TABLE 2:** Student leaving rates from South African higher education institutions.

University	Faculty	Definition of leaving rate	Leaving rate (%)	Citation
General; all technikons and universities	All	Left after first year of study	25	16
		Of overall enrollment per year	16.7	16
All universities in South Africa (2000 cohort) excluding distance-learning institution (UNISA)	All	Left original institution without graduating after 5 years	38	3
All universities	Engineering	Did not graduate and did not re-register after 5 years	27	3
General; higher education institutions in South Africa	All	Completion rate	50	Ministerial speech in 2006 cited in 17
Average; higher education institutions in South Africa	All	Leaving rate in 2004	38	18
		Leaving rate in first year	30	19
University of Pretoria	All	Left by end of first year	5.8 (2005)	20
		Left by end of second year	10–15 (2000-2005)	20
		Overall leaving rate	Up to 20	20
	Engineering; 4-year and 5-year programmes	Unable to continue from first level cohort in 2010	32.15 (4-year programme)	21
			41.5 (5-year programme)	21
		Have not graduated after 7 years (2005 intake)	46 (5-year programme)	21
		43 (4-year programme)	21	
University of Cape Town	Chemical Engineering	Percentage of intake that do not ultimately graduate	43 (1988–1998 intakes)	22
			30 (2002–2005 intakes)	22
Science and Engineering countrywide	SASOL Inzalo Foundation bursars 2010 intake	Percentage of students eligible to proceed (bursars)	65	23
		Excluded from programme	14.7	23
University of the Witwatersrand	Engineering	Loss and exclusions from 1992 to 1998 cohorts	35 (by 2003) for 4-year programmes	20
			40 (by 2003) for extended 5-year programmes	20

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institution. Tinto<sup>5</sup> describes individual goal commitments (i.e. the student's commitment to completing the chosen course of study) and institutional commitment (i.e. the interplay between the individual and the institution based upon the characteristics of the institution). If students are committed to the goal of graduation but have a low level of commitment to the institution, they may leave and transfer to another institution. If students have high institutional commitment but low goal commitment, they may remain in the institution but 'just get by', that is, they may continue in their chosen field of study but are unmotivated. The extent of the commitments is determined by the interactions that occur within the academic and social environments of the institution and the expectations of the student, which are determined by the student's past experiences. External factors also affect the commitments and social and academic integration of the individual.

In examining the reasons for student departure, Tinto<sup>6</sup> also points out that, on a personal level, two attributes of importance are the intention and commitment of the student on entry to the institution. The institutional affective factors for student departure of most importance are adjustment, difficulty, incongruence and isolation. If institutional goals match those of a student's to a greater extent, the student is more likely to be retained. Scott et al.<sup>3</sup> reported that there are a wide range of factors that affect retention of students. They suggest that financial problems are commonly reported

to be a significant factor in the decision to terminate or suspend studies and also go on to suggest that high first-year departure rates and low participation rates indicate systemic problems in the institutions, including articulation failure.

A more recent survey undertaken by the Gates foundation<sup>9</sup> in the USA explored the 'myths and realities' of why institutions experience high departure rates. The findings of the survey suggest that many students do not finish degrees because of financial pressures and the stress of having to work and study at the same time; that students who did not specifically choose their institution have a higher probability of non-completion; and that although many students realise that leaving with a diploma rather than a degree will assist them in the future, they may not fully recognise the impact that departure may have on their future.

In a study by Weko<sup>24</sup>, in which he looked into measures of completion of degrees in the UK and the USA, it was found that although completion rates in the UK are higher than those in the USA (because of the more selective entrance practices in the UK acting as a barrier), in the USA, the credit-based system of university study and the flexibility it offers allows students who do not graduate to still 'have something to show' for their studies. In South Africa, university study (particularly in Engineering courses where part-time undergraduate study at BSc(Eng) level is not generally possible) tends to be viewed as 'all or nothing'. In other words, South Africa follows the UK system to a greater extent



and completion is seen as everything, whilst the completion of some modules should be recognised to a greater extent. Once again, the differences in countries around the world will always play a part in the decision to stay at an institution or to leave.

In effect, when trying to understand the leaving rates from an institution, there is no generic solution to reducing the rate of departure from a specific institution. The literature does, however, provide pointers towards factors that can be investigated. By asking departees why they left and what their current status is, goal and institutional commitment can be determined to an extent, as can some of the external factors involved.

## Methodology

To better understand leaving rates within the Faculty of Engineering at the UKZN, two sets of data were studied. The first was a year-on-year cohort registration analysis which provided an indication of the overall leaving rate from the university, along with time of leaving (i.e. how many years of study were completed). The second was a population balance across the faculty registrations as a whole, which provided a 1-year snapshot of student progression and departure. This population balance provided an overall 1-year loss rate and allowed identification of students for interviews to determine their reasons for leaving.

These sets of data were then compared with reported rates to determine whether they were particularly high or low. The cohort data was also compared to a timeline of events within the history of the faculty to explore whether these events may have had an influence on leaving rates.

Finally, in order to unravel the reasons for student departure and to determine the scale of loss in the three categories (exclusion, 'walking' and leaving for financial reasons), exclusions and non-returnees were identified from the population balance. The non-returning group was then sorted into financial leavers and 'walkers'. The 'walkers' were interviewed telephonically to determine their current status, future intentions and reason for leaving.

## Cohort analysis

The cohorts from 2004 to 2009 were tracked through the in-house student database to determine continuing registrations over a 4-year period (the length of the degree programme). These departure rates are given in Table 3. Although it is acknowledged that students may not have graduated after 4 years of study, it is unlikely that after 4 years they would be excluded academically as a result of having met earlier progression requirements.

The loss rate in this analysis is based purely on re-registrations and does not discriminate between the defined categories of departure. However, the data do match periods of change

within the university and faculty and were compared to a timeline of significant events during this period.

Figure 1 shows these rates as charts along with annotations regarding historical events within the faculty and university during the years analysed. Although it is impossible to draw conclusions regarding the trends observed, the influence of two factors – the merger of two universities (the University of Natal and the University of Durban-Westville) in 2005 and the introduction of the National Senior Certificate within the South African high school system in 2008 – do coincide with increased departure rates.

Between 2006 and 2009, interventions were put in place within the faculty to increase retention; these interventions included a peer mentoring system, creation of an academic support unit for Engineering students and increased monitoring and engagement with pass rates. The reduction of student departure during the period could be linked to these interventions together with the stabilising effect of time after the merger process.

Graduation data from the 2005 cohort shows that approximately 31% of the students from the cohort graduated within 5 years. This figure does not take into account students who completed all examined modules yet still had requirements such as vacation work outstanding. A further 19% of the students were still registered in 2010. In comparison to the cohort data for Engineering subjects given by Scott et al.<sup>3</sup>, the completion rate is much lower than the 2000 national average of 54% graduating in 5 years, whilst the continued registration is similar (19% is given in the same paper). For the same cohort, the data show that the graduation rate after 5 years amongst White students is 39% compared to 25% for non-White students. Neither of these figures is particularly encouraging when compared to those provided by Scott et al.<sup>3</sup> (64% of White students compared to 32% of Black students graduated in 5 years from the 2000 nationwide cohort). (It should be noted that in Scott's study, 'Black students' refers to African students rather than all non-White students.)

The 2005 cohort began their studies on two campuses and was enrolled during the time of greatest change in the

**TABLE 3:** Cohort departure rates (%) within the Faculty of Engineering of the University of KwaZulu-Natal from 2004 to 2009.

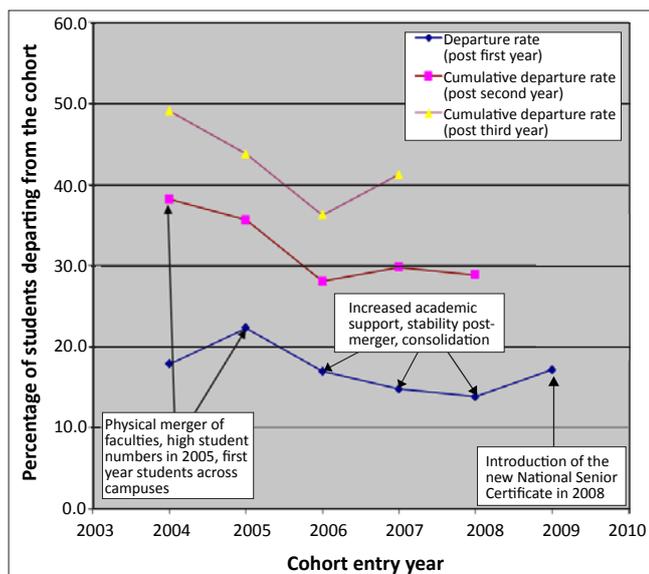
Year <sup>a</sup>	Leaving rate (after first year) <sup>b</sup>	Cumulative leaving rate (after second year) <sup>c</sup>	Cumulative leaving rate (after third year) <sup>d</sup>
2004	17.9	38.2	49.1
2005	22.3	35.6	43.8
2006	16.9	28.1	36.2
2007	14.8	29.8	41.2
2008	13.8	28.8	-
2009	17.1	-	-

<sup>a</sup>, Year of first registration of the cohort, excluding any students that transferred in from other faculties who had already completed some modules.

<sup>b</sup>, Percentage of students from the cohort who did not re-register within the faculty in the next year of study.

<sup>c</sup>, Percentage of students from the cohort who did not re-register within the faculty 2 years after their first registration.

<sup>d</sup>, Percentage of students from the cohort who did not re-register within the faculty 3 years after their first registration.



**FIGURE 1:** Cohort departure rates within the Faculty of Engineering of the University of KwaZulu-Natal from 2004 to 2009.

faculty's history, namely, the physical merging of facilities which continued throughout 2005 and which may have influenced the figures. The physical merger of the Schools of Engineering of the University of Natal and the University of Durban-Westville brought about much greater class sizes (in some cases, class sizes doubled), logistical problems such as students in residence on one campus who had lectures on another campus 6 km away), a change in environment and necessary re-orientation.

In comparison with data reported in the literature, the cumulative leaving rates post-2005 are within the range experienced both in South Africa and the rest of the world, but are high in comparison to past rates of South African Engineering faculties. Although these data are of use in quantifying the efficiency of the institution, there are students from cohorts other than those listed who are still within the faculty system. In order to gain a better understanding of the reasons for leaving, a population balance over a year within the faculty was studied by interviewing a sample group of the students who left for reasons other than academic exclusion.

### Population balance over a year

The population balance was used as a way of determining the overall leaving rate through known student entry numbers, registered student numbers and academic exclusions in 2009. By performing a population balance with the known figures, the total student loss could be determined in each semester (Figure 2).

This analysis is not dissimilar to performing a material balance in process engineering. Effectively, in this case, the semesters can be seen as a batch process. If we have known values of input and output for all other variables, we can find the losses from the system after the given time (in this case, a semester of study). As an example, taking the period from

the beginning of the first semester of 2009 to the mid-term of the second semester of 2009:

Inputs = 1679 continuing students + 593 new entries or transfers in + 47 known returning students = 2319 students

Outputs = 56 students completing + 64 known academic exclusions + 2067 students in the second semester + first semester loss = 2187 students + first semester loss

Therefore the non-exclusion first semester loss equates to 2319 less 2187, giving a total student loss for the first semester of 132 students.

Applying the same technique over the second semester provides a non-exclusion loss of 188 students. Over the year 2009, this equates to a total loss of 457 students from the faculty through a combination of voluntary departure and academic exclusion.

In percentage terms, over the year 2009, this gives an academic exclusion rate of 6.03% based upon the first semester enrollment, and a leaving rate of 14.08% on the same basis. These figures are high in comparison to those reported in the literature, and, when listed by semester (including the losses from the second semester of 2008), show a rising overall rate of loss over the course of the year as shown in Table 4. This rising rate coupled with the cohort analysis suggests that 2009 may have been the beginning of a period of higher than normal departures.

Academic exclusions for the semesters remained fairly static as a percentage of student registrations at 3.63%, 2.90% and 3.53%, respectively, in the consecutive semesters reported. Potential reasons for this increasing loss are both financial difficulties in the current economic climate and (as seen from the cohort analysis) higher than normal first-year departure rates possibly because of the new National Senior Certificate being the new entry criteria and students struggling to cope with their studies.

### Analysis of departure

From the population balance and the student records, a subset of students who departed was identified through the university academic monitoring process (Table 5). These students were progressing academically at a slower rate than expected, but were still able to continue their studies should they have chosen to. The selection of this group was carried out for two reasons. Firstly from a purely administrative

**TABLE 4:** Overall rate of student loss from the Faculty of Engineering of the University of KwaZulu-Natal from December 2008 to January 2010 by semester.

Semester	Number of students lost	Total number of students registered	Percentage of students lost
2008 semester 2	160	2203	7.26
2009 semester 1	196	2272	8.63
2009 semester 2	261	2067	12.63

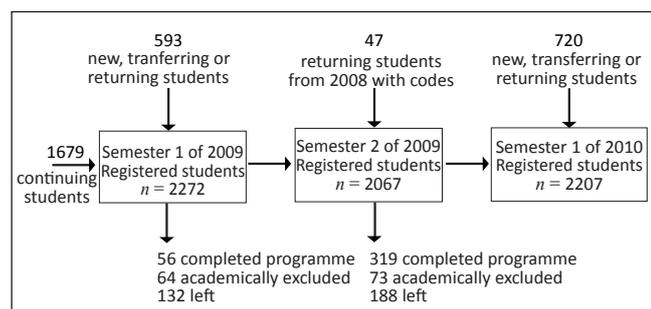


point of view, lists of students with term decisions are made available at faculty level which can more easily be checked for re-registration (as compared to checking records of over 2000 students per semester and determining who has or has not continued). Secondly, these are the students most at risk either of leaving because of their poor progression or being academically excluded at a later date as a result of their poor progression.

This subset of leavers was then checked against the student fees database to determine those who had fees outstanding at a level which would be a barrier to their re-registration. The level set in this case was R1000. These students were deemed to be 'financial losses'. The remaining 152 students in the subset were interviewed telephonically where possible.

The breakdown of year of first entry to the university for the interviewees was: 27% left within or after their first year of entry, 39% left within or after 2 years of study with the balance (34%) having spent between 3 and 9 years at university. The financial departures are more evenly spread with 25% of those with fees owing having spent up to a year in the university, 21% having spent up to 2 years in the university and the remainder evenly spread over 3 to 6 years of study. In race terms, 79% of all the financial departures in the subset were African, 18% Indian and 3% White. Of the interviewees, 16% were African, 17% White and 67% Indian. The demographic profile of 2009 first-semester registrations was 35% African, 49% Indian, 2% Coloured and 14% White.

The students interviewed were asked what their current occupation was (studying, working or unemployed), what their reasons for leaving were and whether they had any specific comments regarding their experience of studying at UKZN (positive or negative). The comments given were then grouped and are shown in Figure 3. In many cases, no reason



**FIGURE 2:** Flowchart showing student movement in the Faculty of Engineering of the University of KwaZulu-Natal from January 2009 to April 2010.

**TABLE 5:** Categorisation of a selected subset of students who left the Faculty of Engineering of the University of KwaZulu-Natal in 2008/2009.

Category	Number of students
Left for financial reasons†	78
Interviewed	98
Not contactable	54
<b>Total</b>	<b>230</b>

†, Students whose outstanding fees exceeded R1000 and were therefore considered to be unable to return to their studies for financial reasons.

was cited by the student for leaving (of the group of 98 interviewed, 46 offered comments whilst of these 18 simply said they had no overall negative opinion of their time at the university and did not give any reason for leaving). A proportion (26%) did, however, state that they found the workload too hard.

From Figure 3 and Table 5, it is clear that finances played a major role in students leaving during 2009, with 84 students out of 176 (interviewees and financial losses) having financial difficulty (48%). Financial reasons for leaving were overtly weighted towards African students. At the same time, transition to university study (lectures rather than lessons, larger class numbers, the lack of staff-student interaction and an inability to understand the lecturer) and the level of material covered were given by 48% of the interviewees who responded as the reason for leaving.

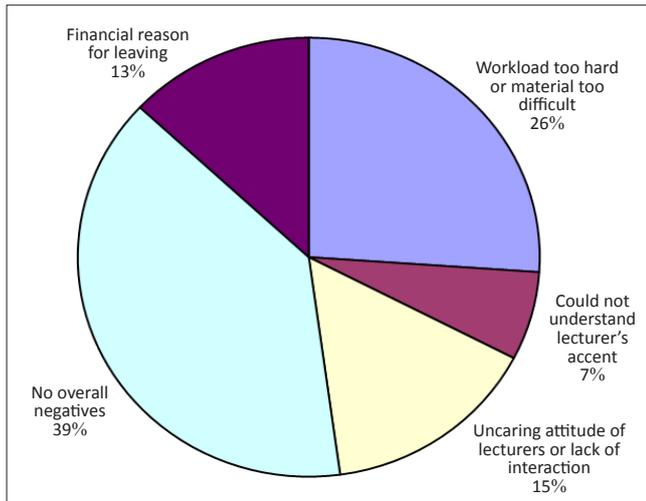
Regarding their current occupation, 61% of the interviewees were in higher education at a university of technology or another university. Of the 61%, 9% left Engineering to study another subject, but the majority continued their original degree choice at another institution. This finding suggests that the students wished to try another route into their originally chosen profession. The other occupations are shown in Figure 4, and included being unemployed (24%), working (11%) and pursuing a vocational qualification (4%).

## Discussion

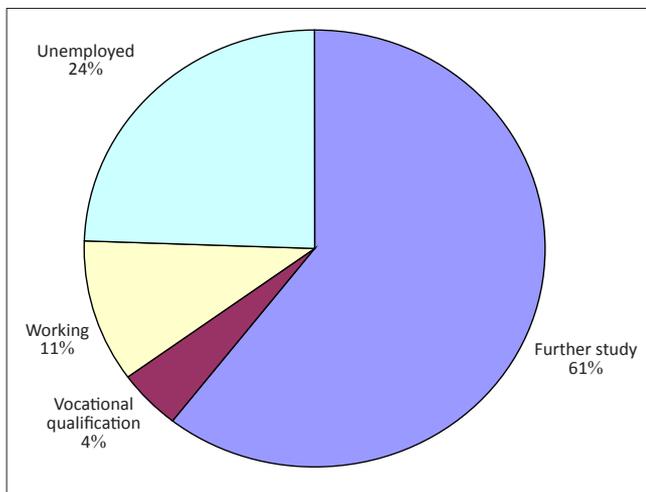
From the data, it is clear that departure rates both within the faculty and within the country are at a level which is ultimately unsustainable in the long term. The financial cost to the faculty (in fees alone, disregarding government subsidies at graduation) of over 300 students per year leaving, despite being able to continue, is almost R7 million (based upon fees of approximately R23 300 per student per year<sup>25</sup>). Although the faculty has put in place an academic support programme over the past 2 years, the programme can only assist students with academic matters, not those that are financial.

In comparison to another study undertaken at UKZN by Bokana<sup>26</sup>, which involved interviewing focus groups of academics and current students and administrators, the reasons given for leaving by those who had left the university were similar to the perceptions of the focus groups, which once again suggested that financial reasons (including the cost of travel, loss of bursaries and family commitments) and academic underpreparedness (a combination of a lack of academic preparation from schools, a lack of appropriate study skills, communication difficulties etc.) are major problems for the local higher education institutions.

Financial reasons for leaving are not exclusive to South African institutions, and were also given in a survey in the USA.<sup>8</sup> In addition, had students been able to find employment to alleviate their financial constraints, time stresses would also have caused difficulties.



**FIGURE 3:** Reasons given for leaving the Faculty of Engineering of the University of KwaZulu-Natal in 2008/2009 by a subset of students interviewed.



**FIGURE 4:** The current occupation of students who left the Faculty of Engineering of the University of KwaZulu-Natal at the time of the interview.

In relation to the theorisation of departure, the fact that a majority of the students who left UKZN continued their studies at a university of technology suggests that their goal commitments<sup>5</sup> were still in place but that their institutional commitments were not high. This finding is a problem for the university and faculty, and when dealing with the reasons stated for leaving the combination of factors suggested by Tinto<sup>6</sup> also hold. The stated 'difficulty of the workload or material' speaks to the adjustment and difficulty affective factors, whilst the stated 'uncaring attitude or lack of interaction' and even the 'difficulty in understanding non-first-language English-speaking lecturers suggests a low degree of integration into the institution as a result of feelings of isolation. With class sizes of over 500 (admittedly split into smaller lecture groups), the feeling of being 'just another termite in the mound' can be a major factor for students in determining whether to continue at the same institution.

## Conclusions and recommendations

This study was initiated to provide concrete figures regarding the numbers of students from the Faculty of Engineering at

UKZN who left for any reason without completing their initial degree choice. This aim has been achieved and it has been shown that although the departure rates are within local and international norms, they are seemingly on the increase at present.

By investigating the reasons for leaving within a subset of vulnerable students who had left, the study provided two major reasons for student loss which can be classed as financial (48% of the subset) or academic (48% of respondents within the interviews). These factors also reflect perceptions of student departures in the local environment.

In order to reduce the departure of students, a number of recommendations can be made from the study; some of these recommendations can be internally implemented, whilst others will require further assistance from both government and industry.

The faculty has instigated an academic support programme to reduce student attrition through additional study skills assistance and peer instruction. This programme has to date been reasonably successful in the provision of assistance to first-year through to third-year students, with higher pass rates achieved in subjects assisted through Supplemental Instruction, and through academic counselling of 'at risk' students (internal data shows a 15% higher retention rate for students who participated in the interventions although the numbers are not statistically significant). This support, however, needs to be further integrated into the mainstream. Students reported a lack of engagement with lecturers, difficulties in understanding the lecturers and finding the material covered to be at too high a level. Through improvements in teaching methods, further engagement with students (showing that lecturing staff care about the future of students) and further tailoring of the curricula to bridge the gap between school and university studies, a significant reduction in the rate of student losses potentially could be achieved.

Financial support for university study is usually either government or industrially based sponsorship, and this is clearly an area where improvements can be made. Improving financial support is not only achieved by increasing the amount of money available, but also by ensuring that finances are available over the entire period of a university degree programme. It is of interest that there has recently been a ministerial review of the financial aid scheme for poor and needy students<sup>27</sup> and it is hoped that changes to this scheme will help to reduce the number of students leaving South African institutions for financial reasons. Industrial bursary providers should also engage more with the students who will become their future workers, assist students with budgeting and provide continued support for them. Anecdotal evidence from the faculty during counselling sessions suggests that students are too often worried about losing a bursary and try to overextend themselves (by registering for as many credits as they can rather than concentrating on core courses), which leads to poor performance.



In comparison with the systems used in the rest of the world, the South African higher education system should be more flexible. As Weko<sup>24</sup> has suggested for the UK education system:

The continuing understanding of a course of study as a unitary experience, rather than the accumulation of relatively discrete skills and competencies contained in modules and measured in credits, militates against mobility and non-completion, imposing penalties for both that do not exist in the United States.

This viewpoint is as apt for the South African situation as it is for the UK, with high expectations of students on intake and inflexible Engineering degree programmes. The only mobility possible is between one full-time institution and another (whether it be a university or a university of technology) and no recognition is given to completion of modules unless they finally add up to a BTech, B Eng or National Diploma.

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