Do Grade 12 Life Sciences' Results Predict Competence with regard to Knowledge and Skills Required in First Year Biology Education?

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Abstract

Higher Education Institutions (HEIs) view the National Senior Certificate results as important indicators for entry into such institutions. In the light of the improved Grade 12 results the purpose of the research was to compare first year students' Grade 12 performance with their results obtained in a first biology module at a tertiary institution. We used a number of strategies to determine if there was a significant difference in performance. One strategy was to compare student competences with competences stipulated in the Department of Education National Curriculum Statement for Life Sciences. We also explored students' experiences of learning biology. Grade 12 results as well as results obtained in the first biology module provided data to make comparisons. The results show that the significant difference between Grade 12 results and the performance in the first biology module may be explained by the fact that students demonstrate knowledge and skills that are below those stipulated in the policy documents. Furthermore students' experience of learning at a tertiary institution are significantly different to their schooling experience. This has implications for HEIs and requires interventions by such institutions to ensure a smooth transition from school to tertiary education.

Keywords: Biology education; Grade 12 results; First year experience; Institution expectations; Student expectations.

Introduction and Background

With the demise of apartheid, a common education system was introduced for all learners and the infamous Bantu education system which had wreaked havoc amongst those who were subjected to this system was eradicated. The introduction of an outcomes-based education system was one way of transforming education. As the effect of a transformed education system would only be visible after a number of years, there was a need to demonstrate significant change in the short term. The South African matriculation (Grade 12) examination results was one way of demonstrating this change.

The consistent improvement of the matriculation results, including the Life Sciences' results, has been under scrutiny for a number of years (Nel & Kistner 2009). As far back as 2001, Jansen (2001) was extremely critical of the matriculation results because he believed the results were politicised. This has led to debates in many circles with a number of stakeholders questioning the validity of the results (Ramphele 2009). The Department of Education contends that the numerous intervention programmes initiated by the department are working and this has resulted in the improved pass rates for Grade 12 learners. However, research has shown that interventions appear to have little effect on the education system (Taylor, Muller & Vinjevold 2003; Taylor 2010).

The 2010 Grade 12 results once again showed an improvement over previous years despite the problems that the learners had encountered, which prompted an intense debate that resulted in a report by Umalusi in which they attempted to explain how the matric standardisation decisions were made (Umalusi 2011). With regard to Life Sciences the explanation was that the raw mean score of the 2010 result was in line with the raw mean score of 2009 as the difference was very slight. The 2010 cohort performed slightly better than the 2009 cohort (Umalusi 2011) and according to Umalusi, the Life Sciences' marks were not adjusted. The improved matriculation pass rate assumes improvement in the lower grades as well, although this is not evident from the poor performance of South African learners in the Third International Mathematics and Science Study (TIMSS) (Reddy 2006). Even South African studies show that learners are performing below the requirements of the curriculum (Sikhwari & Pillay 2012).

It is against this background that, HEIs, enrol first year students. The

university at which this research was conducted has no access/foundation programmes, thus student preparation for tertiary study was not available. Students who enrolled for their first year of study were expected to register for their chosen major subjects in that year. Anecdotal evidence during registration over the period 2009 to 2011 seemed to suggest that first year students who registered for the first module in Biological Science Education had better Grade 12 results than in previous years. What was significant was the fact that the three cohorts, from 2009-2011, were the products of Curriculum 2005. This prompted the question whether these students, who had been exposed to an outcomes-based education system, were more competent than those who had experienced the traditional education system that was in place before the introduction of C2005.

The discrepancy between school performance and university performance is a well-known phenomenon and has generated much research (Baron & Norman 1992; Nel & Kistner 2009; Govender & Moodley 2012). We were therefore not expecting students to perform at the same level as they did in Grade 12. However we were interested to find out if the learners who were exposed to C2005 throughout their school careers, had improved knowledge and skills compared to previous cohorts.

The purpose of the study is threefold: firstly we wanted to compare the Grade 12 results for Life Sciences of three cohorts (2009-2011) with their results for the first biology module to determine their levels of competence in the subject; secondly we wanted to determine what competences first year students bring to biology courses and thirdly to explore their experiences of teaching and learning at a tertiary level. This study was conceptualised when the 2011 cohort registered and their high marks in Life Sciences were noted. The critical questions that guided the research are:

- How do first year Biological Science Education students' Grade 12 marks for Life Sciences compare with their performance in a first year biology module?

- How do the knowledge and skills of first year Biological Science Education students compare with the knowledge and skills stipulated in the National Curriculum Statement (Life Sciences)?

- How do students experience the learning of Biology during their first year of study?

Literature Review

The research described here raises the question of the relationship between school exit examinations and acceptance of students at HEIs. Of the many questions surrounding exit examinations such as the South African senior certificate examination, one enduring question is whether these results actually matter. This question is especially important in the context of higher education as HEIs expect a certain level of competence on which they build. The senior certificate examination is a high stakes examination in South Africa. High marks are prerequisites for entry into many courses and often marks are the only criterion for entrance into such courses. While schools and communities place a high premium on good performance in these examinations, HEIs are more concerned with the competences learners acquire during their years of schooling (Pike & Saupe 2002).

Nel and Kistner (2009) proposed a benchmarking test for HEIs to give a more realistic assessment of student competence as the National Senior Certificate (NSC) tends to inflate the lower grades, allowing learners into the system who may not be able to cope with the increasing demands of tertiary education. Furthermore, with the increasing diversity of students entering universities worldwide, it has become necessary to develop predictors of academic performance in the first year (Mackenzie & Schweitzer 2001). Rankin, Schöer, Sebastiao and van Walbeek (2012) suggest that students' performance in both the NSC and the National Benchmark Tests [1](NBT) should be used to determine student success in the first year of tertiary study.

Baron and Norman (1992) found that scholastic performance was a better predictor of achievement than aptitude tests. As aptitude tests are supposedly indicators of potential, this is an interesting finding. In South Africa HEIs often place more emphasis on potential than on scholastic

[1] The National Benchmark Tests (NBTs) were commissioned by Higher Education South Africa (HESA) with the task of assessing academic readiness of first year university students as a supplement to secondary school reports on learning achieved in content specific courses.

achievement when admitting students into courses with limited access, as this is deemed a better predictor of success (Enslin, Button, Chakane, de Groot & Dison 2006). Aptitude tests such as the Differential Aptitude Test (DAT) commonly measures potential for verbal, numerical and abstract reasoning. Dynamic assessment as a method of measuring potential is also gaining momentum (Murphy & Maree 2006). To admit students into HEIs based purely on their scholastic performance is often regarded as a discriminating practice, considering our history of inequalities between different race groups where the education of these groups was, and currently still is, differently resourced and their teachers differently qualified (Keevy 2006).

The work of Evans and Fancy (1998) shows a strong relationship between prior academic achievement at secondary school and first year performance although this relationship varies, depending on the discipline. While the work of Cyrenne and Chan (2012) shows that high school results are indeed a predictor of university performance, other factors also play a significant role in predicting performance – they give examples such as socio-economic background, the financial position of the student at university, as well as the resources of the school from which the student comes.

Although Umalusi regularly reports on Grade 12 results and endeavours to make comparisons between cohorts from different years, very little research has been conducted to determine whether students who have been exposed to an outcomes-based education system such as C2005 perform better at university. Govender and Moodley (2012) found that the first cohort of physics students at their institution who had been exposed to C2005 throughout their school career, performed worse than those of previous years, while Engelbrecht and Harding (2008) found that first year students who had matriculated before 2008, but were exposed to OBE in the earlier years performed at the same level as earlier cohorts.

The transition from Grade 12 to tertiary education is difficult for most students, irrespective of whether they are products of an outcomes–based education system or not (Keke 2008). Most universities expect students to be capable of developing inquiry and problem solving skills. Students are encouraged to think critically and independently, rather than rely on external authoritative knowledge (Yang, Webster & Prosser 2011). This may be difficult for students who have not been exposed to this approach at school. A further factor that was found to influence students' performance at university

was that of workloads (Kember, Jamieson, Pomfret & Wong 1995). Students report that the amount of work covered at university is considerably more than that covered at school over the same period of time. This raises the question as to the ways in which students are inducted into particular disciplines at university.

The work of Parker, Summerfeldt, Hogan and Majeski (2003) adds another dimension in that their research examined the relationship between emotional intelligence (as measured through self-report questionnaires or tests) and academic achievement. Their study showed that emotional intelligence is a modest predictor of academic success; nevertheless it was a better predictor than high school achievement. This is in contrast to earlier studies that showed little association between academic success and emotional intelligence. This research points towards the importance of factors other than academic factors which may influence student achievement. Linked to this is the students' confidence in their own abilities, termed self-efficacy by Chemers, Litze and Garcia (2001). Their research has shown that self-efficacy has a major effect on academic performance. While most research shows that commitment is one of the strongest drivers of academic success, commitment and perseverance may be determined by both personal and environmental factors. Aptitudes and capabilities contribute to academic confidence/efficacy and this helps to determine goal commitment (Chemers *et al.* 2001). Lizzio, Wilson and Simons (2002) found that students' perception of their learning environment was a stronger predictor of achievement than school achievement. This has implications for HEIs as it questions the kinds of learning environment HEIs create that facilitate learning. Keke (2008) found that unrelated factors had a major impact on students' well-being and also influenced their academic performance. One such factor is parental role. Winter and Yaffe (2000) report that the role of parents provides a small, but significant contribution to their children's adjustment at university. This could be an important factor in a context where children are first generation students whose parents have little understanding of their university experiences. Another factor that has an effect on student performance was found to be a sense of belonging (Shook & Clay 2000).

In conclusion, the literature reveals a number of factors that impact on students' performance at university and while research points to school performance as an important indicator, a number of other non-academic factors may also have a significant effect on performance.

Methods

The method of data collection applied in this study is mainly quantitative because the data were obtained by analysing marks obtained by students in the first biology module for which they had registered, as well as their Grade 12 marks. The framework that guided the analysis of students' performance in activities was the Life Sciences Curriculum Statement (Department of Education 2008), which gives clear guidelines as to what outcomes learners should have achieved at the end of Grade 12, which served as the benchmark to be discussed later.

The first step that preceded data analysis was an analysis of the National Curriculum Statement (NCS) (Department of Education 2008) for Life Sciences. This was done in order to determine the range of skills students are expected to master by the end of Grade 12. These skills were used as a benchmark to measure the levels of skills students brought to the course. The NCS clearly states which skills are expected of learners at each level of performance, for example if all students attained a mark of 60% and above in the Grade 12 examination, as is the case in this study, the document clearly states what the competence level of such learners should be.

The second step involved the analysis of the Grade 12 marks for Life Sciences for those students who enrolled for their first year of study in the module Biological Science for Educators 210 in 2009 (30 students), 2010 (41 students) and 2011(68 students), respectively. The marks obtained by the three cohorts for the above named module were also analysed. Furthermore, the results for two tests and the university Biology examination of the 2011 cohort were also analysed.

A third step in analysis involved one activity where students' responses were analysed to determine their perceptions of learning in their first year of study of Biology at the HEI.

The National Curriculum Statement, NCS: Life Sciences

Three sections of the NCS document were used to determine the skills students were expected to have acquired at the end of Grade 12. The first was the introductory section; the second was the three learning outcomes and the third was the competence descriptions.

One of the pertinent statements in the introductory section is that the NCS: Life Sciences Grades 10 – 12 (General) aims to develop a high level of

knowledge and skills in learners' (Department of Education 2008: 1). It further presents this goal as extremely important because it strives to empower those sections of the population who were previously prevented from achieving high knowledge and skills.

The three learning outcomes of the subject Life Sciences are based on three competences i.e. scientific inquiry and problem-solving skills; construction and application of life sciences knowledge and an understanding of the interrelationship of Life Sciences, Technology, Environment and Society. For the purpose of this research we only focused on the first two competences because the third competence is covered in other modules of the B.Ed Biology Education curriculum.

Learning Outcome 1 states that: '*The learner is able to confidently explore and investigate phenomena relevant to Life Sciences by using inquiry, problem solving, critical thinking and other skills'.* The document elaborates on the statement by explaining that the above competences involve experimental and data handling skills, defining experimental skills as the ability to follow instructions, make observations, measure trends and record information. Data handling skills are described as skills involving identifying, selecting, organising, presenting, translating, and manipulating data, as well as making inferences, deductions and conclusions from the data gathered.

Learning Outcome 2 states that: '*The learner is able to access, interpret, construct and use Life Sciences concepts to explain phenomena relevant to Life Sciences'.* This means learners should be able to use their inquiry and thinking skills to interpret, apply and extend the understanding of concepts, principles, laws and theories. As all the members of the first year cohort in 2011 achieved a mark of 60% or above in the Grade 12 Examination, the outcomes they were expected to have achieved are described in table 1.

Table 1: Achievement descriptors for different levels (From NCS, DoE, 2008).

By the end of Grade 12 the learner with outstanding achievement (80-100%) can:	**By the end of Grade 12 the learner with meritorious achievement (60-79%) can:**
■ suggest specific changes to	■ analyse, reflect on, and evaluate

improve the experimental design as well as provide conclusions showing awareness of uncertainty in the data; ■ analyse problems and make solutions to problems brought by biotechnology; ■ evaluate the relevance of biotechnological applications to Life Sciences; ■ critically evaluate the application of scientific and indigenous knowledge in South Africa and elsewhere; ■ develop justifiable and responsible positions on the influences of different beliefs, attitudes and values in various communities; ■ evaluate and give ecommendations on the impact of scientific and technological processes and products on different communities.	findings of the investigation as well as identify and allow for irregular observations when displaying data; ■ debate and show how concepts, principles, laws, theories and models influence one's behaviour; ■ analyse the application of scientific and indigenous knowledge in the South African context as well as debate the influence of different beliefs, attitudes and values among different communities; ■ analyse and report on the impact of scientific and technological processes and products on different communities.

The expectation was that all students should therefore have the competences described in Table 1 to varying degrees.

Ethical clearance was obtained from the university where the research was conducted. The university assisted in making examination results available and students gave their consent for their tests and class work scores to be used. A limitation of the study is the fact that data on class activities and tests were only collected for the 2011 first year cohort. Consequently, only final marks for the 2009 and 2010 cohorts were available.

Results and Discussion

The results from the various data sources are discussed below.

Analysis of Grade 12 results

Table 2 shows the Grade 12 results for Life Sciences of students registered

for the Biological Science for Educators 210 (EDBS210) course from 2008 – 2010.

Table 2: Matriculation results of students registered for EDBS210 from 2008 – 2010

	YEAR MATRICULATED		
	2008	**2009**	**2010**
Number of students	30	41	68
80-100%	4 (13.3%)	3 (7.3%)	7 (10.3%)
70-79%	7 (23.3%)	15 (36.6%)	29 (42.6%)
60-69%	14 (46.7%)	20 (48.8%)	31 (45.6%)
50-59%	5 (16.7%)	3 (7.3%)	1 (1.5%)
Percentage of students achieving >70%	36,6%	43.9%	52.9%

The cohorts show a steady improvement of their Grade 12 results from 2008 to 2010 with percentages of students attaining >70% ranging from 36.6% to 52.9%. This means that more than 50% of the students who registered for the first module in Biology in 2011 obtained a mark of 70% or higher.

Table 3 shows the final results for the three cohorts registered for Biological Science for Educators 210 from 2009 to 2011.

Table 3: Final results for students registered for module EDBS210 over three years

	FIRST YEAR REGISTERED FOR EDBS210		
	2009	**2010**	**2011**
Number of students	30	41	68
>74% First	0 (0%)	1 (2.4%)	0 (0%)
69-74% Upper second	2 (6.6%)	2 (4.8%)	0 (0%)
60-68% Lower second	3 (10%)	5 (12.2%)	6 (8.8%)
50-59% Third	11 (36.7%)	26 (63.4%)	28 (41.2%)
40-49% Fail (qualifies for a supplementary examination)	11 (36.7%)	5 (12.2%)	26 (38.2%)

<49% Fail (Including students who did not qualify for a DP)	3 (10%)	2 (4.8%)	8 (11.7%)

The performance categories are slightly different from those of the Grade 12 results, but if the categories from 69-100% are analysed, the percentages are as follows: In 2009 only 6.6% of students scored above 69% in the module; in 2010 only 7.2% scored above 69% and in 2011 no student scored above 69% in the final examination. The 2011 cohort that matriculated in 2010 with 52.9% obtaining a pass above 70% preformed the worst in the biology module.

While lower scores for the biology module are not unexpected, the difference is significant. This does raise questions about the alignment between what is expected of Grade 12 learners and what is expected of first year university students in a module such as Biology.

Results of Selected Activities of the 2011 Cohort

A number of activities were selected that covered certain competences mentioned in Learning Outcomes 1 and 2 of the NCS: Life Sciences (Department of Education 2008).

Practical Activity

The first practical activity, completed by 68 students, consisted of a number of smaller tasks aimed at discovering what the level of basic process skills were. One of the activities required students to observe the object before them and to record what they observed. This activity served to gauge very basic skills and we were especially interested to see whether students, when operating in the context of learning Biology are focused on biological phenomena and whether they are able to observe keenly. This particular activity was set up in the garden outside the biology laboratory. This was an extremely simple activity and could be regarded as unsuitable at tertiary level, but we felt justified in including this as a starting point for first year students. All 68 students registered for the module participated in the activity.

Students were asked to say what the labelled structure was. The structure was a fern, a plant commonly found in the environment. The results in table four show that only 15 out of 68 students mentioned that they were observing a green plant. The remainder of the students mentioned other aspects that did not relate specifically to biological aspects of the fern. For instance, they would say things such as: *the sun is shining* or *the soil is dry*. It was as if they did not see the plant at all. When they were asked to specifically observe the fern, a relatively large number could make biological observations such as leaf shape and colour. However, the majority still made observations of the fern that did not indicate at all that these students possessed a degree of biological knowledge and explicit biological terms were not stated. While students' responses point to a lack of skills, the different pedagogical approach could also have had an effect on students as many of them were unaccustomed to answering open-ended questions. While Allen and Tanner (2005) are of the view that student-centred strategies promote learning, the students in this study did not benefit from this approach at the time the research was conducted, possibly because they found it too unfamiliar.

Table 4: Students' responses to a practical task

Practical Activity-Student responses	**Number of students giving correct answers**	**Percentage answers**
Object observed:		
Green plant	15	22.0
Other		78.0
Biological aspects of the object		
Observed biologically	27	39.7
Unable to observe biologically		60.3
What they thought they were expected to do		
Link between observation and expectation	31	45.5
No link between observation and expectation		54.5

The results of this activity were disappointing because it became clear that the level of skill development as envisaged in the NCS was lacking. Most students operated far below the competence level expected of students who had scored above 60 % in Grade 12 because they were unable to analyse the situation or apply biological knowledge.

Tests and Examination

During the course of the module EDBS210 students were exposed to a variety of teaching approaches. The focus was on the acquisition of knowledge as well as similar skills to those mentioned in the NCS (DoE 2008). A range of assessment strategies, both formative and summative, were employed to assess students. The most important summative assessments were two tests and the final examination. Table 5 shows the results of these three assessments.

Table 5: Breakdown of tests and examination results for the 2011 cohort

Test/Examination	**First >74%**	**Upper Second 69-74%**	**Lower second 60-68%**	**Third 50-59%**	**Fail**	**Total**
Test 1	0	0	4	7	57	68
Percentage			5.9	10.2	83.8	100%
Test 2	0	0	5	14	49	68
Percentage			7.3	20.5	72.0	100%
Examination	0	1	8	19	34	62 *
		1.6	12.9	30.6	54.8	100%

*6 students did not gain entry into the examination

While there is a slight improvement in the second test, the results are disappointing, considering the students' Grade 12 performance. As the first test was written halfway through the semester, the students had been exposed to teaching in this module for approximately 6 weeks (The semester is of 13 weeks duration). This appears to have had little impact on their performance.

By the time the end of semester examination was written, one student managed to obtain an upper second pass and a higher number of students (8) achieved lower second passes. It is disconcerting that more than half the class failed the examination.

The First Lecture in Biology Education

This lecture took place outside the lecture venue in an open area, a grassy area/field and used grass as a resource to make the link between grass and biology. While the aim of this lecture is usually to expose students to different approaches and contexts to teaching the Life Sciences, it served the purpose for this project to determine what students' experiences were of learning biology outside the classroom. Students were asked to reflect on their experience of this lecture. A variety of responses emerged from the reflections which were grouped into seven categories. Each category reflects different students' perceptions of what was conspicuous in the lecture. The categories are presented in Table 6.

Table 6: Students' reflections on their first lecture in Biology Education

Category	**Responses**	**Percentage**
1.Environmental component of Biology acknowledged	Link with biology and the environment Interact with the environment Experience learning outside [the] classroom was good Experienced the connection between the sun and plants (grass) Outdoor, wet grass, outdoor learning	21.7
2.Contributed to knowledge development	Understanding has increased, not the same Broaden scientific knowledge	8.7
3.Contribution to positive attitude development	I felt biology Love for biology was developed	8.7

4.Experienced this approach as difficult	Challenging Lecture was difficult	8.7
5.Experience framed in terms of the nature of the lecturer	Dedicated lecturer Unpredictable lecturer Feel the lecturer's passion for the subject Lecturer was full of surprises	17.3
6.Pedagogy	Lecturer encouraged us to think critically Learner (student) centred lecture Lesson was more practical	13.0
7.Acknowledgement of 'first time' experience	Lesson was refreshing Enjoyable lecture, was captivated Interesting New experience; Fun Lecture was unique The lecture venue was a great surprise to me	21.7

There were varied student responses to the lecture, but the common thread appears to be that students experienced something different. Most of them did not appear to have had experience of working outside the classroom to learn through direct observation, collecting data and drawing conclusions. This has implications for developing skills with regard to conducting investigations. While one could argue that investigations may be conducted inside the classroom, considering the lack of resources in most schools, this does not seem likely. While the percentage is quite low (8.7%) it is worth noting that some students experienced the approach as challenging. When students are not accustomed to such open-ended approaches where more than one answer is possible, they may find it quite threatening. While research has shown that students respond well to student centred-pedagogy and active learning (Armbruster, Patel, Johnson & Weiss 2009; Preszler, 2006) the students in this study found it difficult to adjust to teaching and learning strategies that they were unfamiliar with. Another significant response for us was the relatively large number of students (17, 3%) who define their learning during the lecture with regards to the lecturer and not the content.

Conclusion

First year students' poor performance at university is not a new phenomenon. We therefore did not expect the students to produce results comparable to their Grade 12 results. What was significant for us however was the fact that the cohort with the best Grade 12 results (the 2011 cohort), performed worse in their first year than the cohorts with poorer Grade 12 results. When this cohort's competences as demonstrated in activities in which they participated, were measured against the competences listed in Table 1, the findings show that the levels of competence in biology were much lower than cited in the policy document. As all students achieved a pass above 60% in Grade 12, it was expected that they would be able to make basic observations and analyse simple situations within the context of scientific investigations. In fact, the level of skill development demonstrated by the students did not come close to the competences listed in Table 1.

As the results show discrepancies between what students can do and what is expected of them in a university course; this raises the issue of students' performance in the Senior Certificate Examination. The fact that they arrive at university with good marks, but very low levels of skills, brings the criticism of the Grade 12 results to the fore (Jansen 2010; 2011; Ramphele 2009). While a considerable body of international research shows that final year school performance is a good predictor of first-year university performance (Baron & Norman; 1992; Evans & Fancy 1998), the results for students in this study do not support this and the question remains why first year students in Biological Science Education are so poorly prepared for tertiary education.

This state of affairs has serious implications for HEIs. They have no jurisdiction over the schooling sector, and are not in a position to ensure that students entering tertiary institutions have the necessary competences. Raising entrance requirements will exclude many more students, but this will not ensure improvement in the competences required for tertiary study. Therefore, while the schooling system produces matriculants, most of whom lack the necessary competences, it is incumbent upon HEIs to prepare students for tertiary education.

Furthermore, factors other than low levels of knowledge and poor skill development may also contribute to the fact that students are poorly prepared for tertiary education and HEIs need to be cognisant of this. The fact

that students are expected to learn differently, as illustrated by the first lecture in the course as well as the practical activity described, could be a contributing factor. Students in this course are encouraged to be critical and they find this very difficult. Learning outside the confines of the classroom was also a daunting experience for many. A significant percentage of students (17.3%) when asked to comment on the first lecture, referred to the nature of the lecturer and the fact that working outside the classroom was a new experience for them (21.7%). First year students' responses in university courses may therefore be influenced by the type of lecturer they have and this should be taken into consideration during the orientation of first year students.

The findings raise an important question with regard to students' expectations. They arrive at university with high marks and it is reasonable to assume that many of them are confident that they have the necessary competences to succeed in their studies, only to be disappointed when they perform poorly. This may have a debilitating effect on students as they lose confidence and this raises the question of whether a lower matric pass would have motivated them to work harder instead of relying on their abilities as perceived by themselves. While research points to multiple non-academic factors that may also influence student performance in the first year of university study (Keke, 2008; Shook & Clay, 2000; Winter & Yaffe, 2012) the discrepancy between school performance and first year university performance may have a negative effect on student motivation.

All the above factors need to be considered by HEIs if they wish to ensure a smooth transition from school to tertiary education. Access/foundation programmes are one way of assisting students with low level competences. Such programmes are dedicated to the development of the competences required for tertiary education. Furthermore, all students need to adapt to the tertiary environment and in this regard mentoring programmes may facilitate the transition from school to university.

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