Is a year long access course into university helping previously disadvantaged black students in biology?

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ABSTRACT
There has been increased demand to widen access to university study. The Science Foundation Programme (SFP) at the University of KwaZulu Natal (UKZN) (formerly Natal), Pietermaritzburg, is a year long access course specifically for previously disadvantaged black students. Students in the SFP take five courses and performance in these is reflected in final marks. This determines whether they proceed into the faculty. However, little is known about whether or not this guarantees their success. One of the subjects SFP students take is biology. In the present study the performance of these students in their SFP biology course was assessed across years (1995-2000), as well as in the first year bioscience course. Assessment marks were also analysed to determine if they showed trends in the mastery of the skills and knowledge tested. The use of different forms of assessment as monitoring instruments appears to improve the reliability and validity of the final mark awarded to a student. It seems that passing their biology SFP does not necessarily mean that these students will perform well in their first year Biology course. This is a consequence of a myriad of academic and non academic factors. However, in terms of ongoing curriculum development, the types of teaching and assessment used to award a final grade need to be examined. Development of language and higher order thinking skills need to be examined at both SFP biology and bioscience levels.

INTRODUCTION
One concern at universities is whether one should widen access to university study, and how this could affect student retention and degree success (Rust 2002; pers. obs.). There has been much speculation and little investigation of the relationship between entry qualifications and degree success, especially if it is felt that expansion and diversification is lowering standards (Hoskins et al. 1997; pers. obs). There is also pressure on universities to be more representative of the broader society.

In South Africa there is concern at both the national and institutional levels that there are generally few black students majoring in the Sciences. At the University of KwaZulu-Natal (UKZN) (formerly Natal), Pietermaritzburg, there is a particular concern about the lack of black students majoring in life sciences. One of the
mechanisms developed to address this issue is the establishment of the Science Foundation Programme (SFP) at the university. This is a year-long programme that precedes entry into the Science faculty. It is designed to equip academically able, but under prepared black students with the skills, resources and self-confidence to embark on a science degree. Constructivists principles guided the development of the SFP (Vygotsky, in Bereiter 1985; Slavin 1997), as well as a focus on skills-based learning (Driver and Scott 1987) in order to encourage deep learning, and develop lifelong learners (Ramsden 1992). Assessment in such a course becomes integrated into the learning process (pers. obs.). It has been found that this approach in biology has been very successful with first-year biology students (Miller and Cheetham 1990; Miller and Groccia 1997).

Pass rate is an indicator of performance of students for a particular course at university level. However, there is little analysis at tertiary institutions of student ability and the quality of a course in terms of teaching and assessment. Research has shown that assessment criteria and weighting varies between disciplines in an institution, and between institutions (Bridges et al. 2002; Hornby 2003; Simonite 2003). A student’s final course mark determines the student’s progression to higher courses. This is of particular importance in foundation courses for disadvantaged students who would otherwise be unable to enter Faculty. There is also increased pressure from most university managements to obtain information that affects the viability and continuation of courses, especially with regard to staff and course enrolment (Meade 1997).

When assessing the performance of students in a foundation course, it is important that students’ final performance is of a standard that allows them to succeed at first-year level courses, and that the course succeeds in its purpose of preparing students, as well as developing them sufficiently. However, there are a variety of factors external to such a course that affect students’ learning, development and performance (Downs unpublished data).

SFP student numbers have increased from the initial 35 in 1991 to 140 in 2000 and 280 in 2001 and onwards. In the first eight years of SFP students gained access by completing selection tests. In the past two years, matriculation performance in terms of points and ability to pay for the course controlled access. Students were able to apply for financial loans if their financial situation was very poor. This change in the selection and the influence of financial affordability bring into question whether comparative analysis is possible. However, as all SFP students had lower than set university entrance requirements and were from educationally disadvantaged backgrounds, comparative analysis of SFP students’ performance was conducted. SFP students’ continued access to faculty is not guaranteed unless they achieve the minimum required grades designated in each SFP subject.

Thus, in this study SFP student performance in the programme was investigated in one of the SFP courses biology, with a specific focus on how students performed in their assessments across a range of tasks in order to see if any trends were observable. The first purpose of this study was to determine how SFP student
biology performance was reflected by their final SFP Biology mark, and various assessments, compared across years (1999–2000). Second, these performance trends were assessed in order to determine if the Biology SFP course resulted in a final mark that reflected students’ potential to cope with tertiary studies. Third, the performance and success of past SFP students was assessed in the first year formal Bioscience course. In particular, an investigation of whether SFP biology assessment marks reflect the development of practical and cognitive skills was conducted. The use of different forms of assessment as monitoring instruments, especially the patterns of grades awarded over a number of years, was explored. Effects of increased numbers of SFP students and the range of abilities of these students were also investigated. It was important to establish whether the trends found in the SFP marks were the same for the SFP students in first-year bioscience, or showed different indications. I hoped that trends found would assist in the development of curriculum and/or assessment aspects of first year life science courses, particularly bioscience.

**METHODS**

**Grades and methods of assessment used in SFP biology**

The SFP course ‘Foundation Biology’ (Biol 010) is housed in the School of Botany and Zoology, UKZN, Pietermaritzburg. The first semester mark contributes 15 per cent to the final grade and is composed the following: first semester course work (33%) (practicals (60%), theory assignments and tests (40%), the June theory examination (33%) and the June practical examination (33%). The second semester course work contributes 25% to the final grade and includes: practicals (60%), theory assignments and tests (40%). The November examinations contribute 60% to the final grade and are a combination of a theory paper (60%) and a practical paper (40%). The content and format of practicals remained the same for the period of review. The practical examination questions were similar with only the specimens changing. Although the format of the theory examinations was the same across years, there was some variation in questions asked. The stated weighting was imposed by University criteria. Assessment format was similar from 1995–2000. All comparisons were drawn by applying percentage values rather than absolute values.

**Analysis and Assessment of Results**

Students’ performance in the various assessment components of SFP biology from 1995–2000 were collated, and analysed. Student performance on individual questions and total scores were analysed using Repeated Measures Analysis of Variance (ANOVA, Statsoft, Tulsa) for validity and significance calculations. SFP biology data from 1995–2000 were compared. Students’ performance in course work, theory and practical examinations was compared using Repeated Measures
ANOVA and regressions. Frequency histograms were also produced for various performance indicators. All statistical analyses were conducted using the Statistica software programme (Statsoft, Tulsa). In addition, data on the final performance and grades of SFP students in the first year bioscience 110 course at UKZN were analysed between 1995 and 2000.

RESULTS

Analysis of SFP Performance

There was an increase in the number of SFP biology students since 1995 (Table 1). A small percentage of these students failed SFP biology and this varied between years (Table 1, Figure 1a). Number of students achieving grades higher than 75 per cent increased over the years (Figure 1b).

Comparison of SFP final biology marks (November) between 1995 and 2000 showed a significant difference (ANOVA; F(5,655) = 4.14; p = 0.001), although final marks ranged from 58.5 to 62.8 per cent (Figure 2). A post-hoc Scheffe test showed a significant difference between the specific years 1995 and 1999 (p <0.05). Comparison between years 1995 to 2000 of the June and November final biology marks showed a significant difference (RMANOVA; F(5, 653) = 63.86; p = 0.00). Generally students performed better in June (midyear) than in November (final) (Figure 2). June final marks ranged from 58.60 (1998) to 67.8 (1995), while November final marks ranged from 58.47 (1997) to 62.8 (1995).

![Figure 1: Comparison of the ends of the distribution of final SFP biology marks from 1995 to 2000 where a. failures (final mark < 50%)](image-url)
Figure 1: Comparison of the ends of the distribution of final SFP biology marks from 1995 to 2000 where b. distribution of marks and number of students > 75%

Figure 2: Comparison of SFP June and November final marks between 1995 and 2000
Table 1: Summary of SFP biology assessment results from 1995 to 2000 (mean ± SE)

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<td>Practical</td>
<td>66.7 ± 0.82</td>
<td>66.22 ± 0.67</td>
<td>71.92 ± 1.24</td>
<td>65.93 ± 0.79</td>
<td>65.38 ± 0.65</td>
<td>71.22 ± 0.89</td>
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<td>Short loan</td>
<td>73.4 ± 0.146</td>
<td>78.71 ± 0.88</td>
<td>64.38 ± 1.29</td>
<td>52.78 ± 1.22</td>
<td>63.01 ± 1.15</td>
<td>73.79 ± 1.04</td>
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<td>Report</td>
<td>71.8 ± 1.02</td>
<td>61.46 ± 1.00</td>
<td>62.22 ± 1.03</td>
<td>58.78 ± 1.24</td>
<td>65.04 ± 0.98</td>
<td>72.92 ± 0.77</td>
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<td>Test</td>
<td>70.9 ± 1.35</td>
<td>52.41 ± 1.14</td>
<td>59.22 ± 0.92</td>
<td>57.44 ± 1.06</td>
<td>64.05 ± 1.04</td>
<td>65.25 ± 1.21</td>
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<td>Total theory</td>
<td>71.6 ± 0.89</td>
<td>62.97 ± 0.81</td>
<td>63.95 ± 1.00</td>
<td>55.49 ± 0.87</td>
<td>62.88 ± 0.84</td>
<td>67.20 ± 0.86</td>
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<td>June course work</td>
<td>68.7 ± 0.72</td>
<td>64.92 ± 0.57</td>
<td>68.73 ± 0.95</td>
<td>61.75 ± 0.69</td>
<td>64.38 ± 0.66</td>
<td>69.61 ± 0.77</td>
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<td>June theory examination</td>
<td>66.6 ± 1.29</td>
<td>58.81 ± 1.10</td>
<td>59.39 ± 0.82</td>
<td>52.13 ± 1.00</td>
<td>69.61 ± 0.87</td>
<td>65.27 ± 1.32</td>
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<td>June practical examination</td>
<td>68.1 ± 1.50</td>
<td>62.88 ± 0.83</td>
<td>66.27 ± 1.06</td>
<td>61.49 ± 0.86</td>
<td>61.61 ± 0.99</td>
<td>60.39 ± 1.29</td>
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<td>June final mark</td>
<td>67.8 ± 0.98</td>
<td>62.23 ± 0.68</td>
<td>64.80 ± 0.73</td>
<td>58.60 ± 0.72</td>
<td>65.22 ± 0.71</td>
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<td><strong>Second semester</strong></td>
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<tr>
<td>Practical</td>
<td>66.9 ± 1.12</td>
<td>67.39 ± 0.72</td>
<td>63.53 ± 0.63</td>
<td>67.08 ± 0.79</td>
<td>65.40 ± 0.83</td>
<td>72.21 ± 0.72</td>
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<tr>
<td>Test</td>
<td>63.6 ± 1.70</td>
<td>54.47 ± 1.05</td>
<td>53.70 ± 1.16</td>
<td>48.49 ± 0.86</td>
<td>53.58 ± 1.16</td>
<td>59.85 ± 1.28</td>
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<tr>
<td>Total theory</td>
<td>63.6 ± 1.70</td>
<td>55.52 ± 1.06</td>
<td>55.37 ± 1.15</td>
<td>60.01 ± 0.97</td>
<td>67.26 ± 0.89</td>
<td>62.92 ± 0.81</td>
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<tr>
<td>November course work</td>
<td>65.6 ± 1.16</td>
<td>62.64 ± 0.72</td>
<td>60.20 ± 0.68</td>
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<td>November short question</td>
<td>48.87 ± 1.36</td>
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<td>47.43 ± 1.22</td>
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<td>November multiple choice questions</td>
<td>72.05 ± 0.99</td>
<td>80.51 ± 1.07</td>
<td>69.37 ± 1.05</td>
<td>69.07 ± 0.92</td>
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<td>November essay</td>
<td>51.32 ± 1.54</td>
<td>45.08 ± 1.61</td>
<td>51.62 ± 1.38</td>
<td>63.49 ± 1.24</td>
<td>49.67 ± 1.85</td>
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<tr>
<td>November theory examination</td>
<td>66.5 ± 1.84</td>
<td>58.36 ± 1.02</td>
<td>57.75 ± 1.23</td>
<td>60.69 ± 1.10</td>
<td>58.21 ± 0.92</td>
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<td>November practical examination</td>
<td>50.3 ± 1.55</td>
<td>52.61 ± 0.85</td>
<td>53.45 ± 0.80</td>
<td>57.84 ± 0.87</td>
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<td>Final mark</td>
<td>62.8 ± 1.09</td>
<td>58.99 ± 0.66</td>
<td>58.47 ± 0.78</td>
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Comparison of first-semester practical, tutorial and test results from 1995 to 2000 showed that students performed better in practicals, which reflects the emphasis at this period of the course (Figure 3a). Similarly, in the second semester SFP students generally performed better in practicals (Figure 3b). There was a significant difference between years 1995-2000 and second semester practical, test and theory marks (RMANOVA; $F_{(10,1306)} = 27.26; p = 0.00$). This showed that the

![Figure 3a](image)

**Figure 3a:** Comparison of SFP biology practical, test and total theory results from 1995 and 2000 in a. first semester and b. second semester
marks differed between years, as well as for the components that made up the marks. Comparison of June course works and November SFP course works between years 1995 and 2000 showed a significant difference (RMANOVA; F(5,652) = 38.00; p = 0.00). Generally, June course works were higher than November course works (Figure 4).

June SFP biology course works, theory and practical examination results differed significantly between 1995 and 2000 (RMANOVA; F(10,1302) = 33.02; p = 0.00). June course works were generally higher than June theory and practical examination results (Figure 4). Final SFP biology theory and practical examination results differed significantly between 1996 and 2000 (RMANOVA;

**Figure 4:** SFP Biology coursework, theory examinations and practical examinations in a. June (first semester) and b. November (second semester)
F(4,612) = 17.24; p = 0.00). Final SFP Biology theory and practical examination marks were lower than November course works. Comparison of November course works, theory and practical examination marks between 1995 and 2000 showed a significant difference (RMANOVA; df = 10,1306; F(10,306) = 21.26; p = 0.00) (Figure 4). A post hoc Scheffe test showed a significant difference between course works, theory and practical (p < 0.05). Comparison of final SFP biology practical examination marks between 1995 and 2000 showed that they were significantly different (ANOVA; F(4) = 15.37; p = 0.00) (Figure 4). Students generally improved in practical performance.

When the components of the SFP November theory examination were examinationined from 1996 to 2000, there was a significant difference between multiple-choice questions (MCQ), short questions and essay questions (RMANOVA; F(8,1222) = 69.46; p = 0.00) (Figure 5). SFP biology students always performed better in multiple-choice questions and generally performed poorly in essay questions. Scheffe tests showed no significant difference between years (p > 0.05) but a significant difference between the multiple-choice questions, and short questions and essay questions (p < 0.05). Overall means from 1996 to 2000 were multiple-choice questions 72.8 per cent, short questions 53.4 per cent and essay questions were 52.2 per cent.

**Performance of SFP students in first year Bioscience**

SFP students’ performance in bioscience varied (Figures 6 and 7 and Table 2). This is shown in the final marks of SFP students in Bioscience 110 (Figure 6) for the
Is a year long access course into university helping previously disadvantaged . . .

Figure 6: Previous SFP students’ final mark in Bioscience 110 for the period 1995 to 2000

a.

SFP Performance in Bioscience 110 1995-2000

b.

SFP Final marks of those in Bioscience 110 1995-2000

Figure 7: a. Final mean Bioscience 110 mark of previous SFP students between 1995 and 2000. b. Final mean SFP biology mark of the above students

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Table 2: Performance of SFP and other students in first-year first-semester Bioscience 110 from 1995 to 2000

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period 1995 to 2000. There was a significant difference in the final bioscience mark of SFP students between 1995 and 2000 (ANOVA, $F(5, 189) = 5.24; p < 0.05$, Figure 7a) with a general decline in the mean final Bioscience 110 mark. SFP students showed a decreased performance in bioscience from 1995 to 2000 (Table 1). This is contrary to the final SFP Biology mark (Figure 7b) that shows that SFP students entering Bioscience 110 had similar SFP final marks each year.

Furthermore, there was no correlation between students’ SFP final mark and their final mark in Bioscience 110 ($r^2 = 0.36$). There was a significant difference in students’ SFP final mark and their final mark in Bioscience 110 ($t$-test; $df = 146; t = 30.21; p < 0.00$) suggesting this is not a good predictor of their Bioscience performance.

**DISCUSSION**

**SFP assessment**

The final mark for SFP Biology is a summation of a coursework and final examinations. The latter contributes a greater percentage to the final mark though. Numerous tasks based on theory and practical are performed by the students during coursework and examinations. Consequently, the final mark should reflect the students’ performance and their ability to cope with the tasks. The varied forms of assessment help determine students’ competence and their achievement of the desired outcomes of the course.

The goals of the constructivism philosophy of the SFP Biology course, in terms of objectives, teaching, content, and assessment appear to have been met. The final mark awarded to an SFP Biology student appeared to be a valid indication of their performance at this level, considering that the final mark was not a once off assessment but rather a summation of a range of assessment components that each consisted of various tasks.

SFP students performed better in the practical component than the theory component. In the theory examinations SFP students showed better performance in the multiple-choice question component. They had difficulties with the theory examinations, especially with the short answer and essay questions. These trends could indicate a tendency towards more recall-oriented tasks, and greater difficulties with written tasks. This suggests poorly developed higher cognitive and/or language skills. A combination of language problems and of poor background knowledge would lead to difficulties in constructing succinct scientific arguments. Generally SFP students’ biological language knowledge is poor, and most have misconceptions about fundamental biological concepts (Sanders and Nhlapho 1993; Feltham and Downs 2001). It would appear that the skills required for more theoretical tasks need ongoing practice and development over a sustained period. This would need to be continued into the mainstream courses if students’ were to improve.
As the SFP numbers have increased it appears that there is a greater range in the ability of students with more students at the extremes. Despite this the final SFP Biology mark has not differed greatly between 1995 and 2000. Comparison between years of marks for each of the other assessment parameters (i.e. classmark, practical and theory) showed few trends except that students generally achieved higher marks in the June compared to November examinations. This probably reflects the developmental structure of the course with more emphasis on practicals in terms of contact time in the first semester. In addition, the increased workload in the second semester may have students using rote learning that in turn may produce poorer results.

Despite students’ performance in SFP Biology, it appears that the final SFP Biology mark is a poor indicator of performance in the higher level bioscience course. Despite this, most past SFP students still pass the first year course, although with lower grades. A reason for these trends may be that despite SFP students developing their biological conceptual knowledge during the SFP year (Feltham and Downs 2001), it appears that their cognitive and language skills are insufficiently developed as they performed poorly in the theory component. As in SFP, these students performed better in multiple-choice question compared to short or essay questions.

Following feedback from first-year lecturers, SFP students have poor skills in the following areas: summarising, identifying key concepts, discussion, essay writing and comprehension (pers. comm., pers obs.). This suggests that the students have opted for surface level learning and consequently the curriculum does not create meaning for them. It might follow that if students’ have poor background as well as time pressures, they may not have a choice.

As mentioned, despite the development of SFP students in the Biology component, their performance in the Bioscience first-year course showed that SFP students performed poorly in those tasks that required higher cognitive skills. This is not an isolated finding, as other studies of assessment of student achievement reveal that many students fail to develop effective thinking and problem solving skills (Bransford, et al., 1986). This raises questions about whether the SFP biology course as a whole has failed despite its educational philosophy, or whether the teaching and/or assessment have failed in their contribution to the overall aim. The assessment forms used in the SFP theory examinations mirror those of the mainstream courses. This may result in modifying students more to respond to the course requirements rather than shaping the curriculum to the students. However, the teaching strategy used in SFP Biology is more interactive and follows a discussion-based mode. Students also receive more frequent feedback on assessment tasks than in the mainstream courses (pers obs.). Although the philosophies of both the SFP and mainstream courses are said to be similar, further dialogue between all those teaching the courses is required to determine the level of implementation of this in the various courses. However, in the first year course a more formal lecture mode that does not facilitate active learning is used.
throughout. An area of further investigation at both levels, SFP and mainstream, is to determine if the theory component was more contextualised, whether this would improve students’ performance.

Furthermore, there are numerous factors, including socio-economic factors external to the course, that affect previously disadvantaged students performance at higher tertiary levels which need to be considered (Downs and Barlow-Zambodla, in prep.).

SFP student performance in first year level biology questions how much is achievable in a foundation year in preparing students to cope with higher level courses. It also highlights the need for curriculum changes in teaching, learning and assessment both at the SFP and first year Bioscience levels, an interaction between those teaching both levels of courses, and determination of to what extent students are to be prepared for the courses rather than the curriculum to the students.

**Educational Perspectives**

The SFP Biology course appears to enhance and empower students as participants in the process of learning. This is reflected in their increased confidence (Barnsley, unpubl. data) and ability to tackle most tasks at the SFP level. This empowerment is the primary function of Higher education (Harvey 1997). Furthermore, the course attempts to develop a variety of attributes in students, apart from the discipline knowledge, which are important for the transformation of students (Harvey 1997). The assessment procedures appear to encourage deep learning and facilitate the empowerment of the learner (Feltham and Downs 2001). The assessment system appears to rank highly in quality following Harvey’s (1997) criteria:

- clear curriculum aims
- transparent expectations of outcomes understood by staff and students
- assessment of a range of integrated learning outcomes
- assessment methods that are valid measures of the intended learning outcomes
- multiple assessment methods to assess multiple aims
- useful feedback to students
- assessment data that informs the process of continuous quality improvement of learning.

There is also frequent interaction between SFP biology staff and other SFP staff that further enhances the understanding of the course dynamics. This has to be harnessed for curriculum development.

Assessment criteria are very important but there are often large differences in the degrees to which criteria are made explicit (Freeman and Lewis 1998). Feedback to students is also important (Freeman and Lewis 1998). Both the SFP and mainstream courses need to discuss, examinationine and clearly define the
criterion used in assessment tasks. With respect to methods of assessment, they may vary from objective questions, short-answer methods or written long-answer methods (Freeman and Lewis 1998). The multitask nature of writing, the coordination of knowledge, and the processing during composition require interactions between working memory and knowledge stored in long term memory (McCutchen 2000). Written long-answer methods cause problems in assessment, as each demands considerable competence of students, irrespective of the subject being assessed (Freeman and Lewis 1998).

Unless learners have mastered all these skills, long answer methods will fail to reveal what they have and have not learnt from a subject (Freeman and Lewis 1998). Nor can the demands these methods make on students’ general writing skills be ignored- unless these are the skills that one wants to assess (Freeman and Lewis 1998). Essay questions vary considerably in nature and in the demands they make on students as some are very open whereas others are structured. Different types of essays are suitable for assessing different aspects of students learning and different course outcomes (Freeman and Lewis 1998). Long answer methods fail to provide valid assessments when learners do not possess the skills intrinsic to the methods. Therefore, discussion is needed between the teachers of SFP biology and the first year Bioscience course to address this problem.

The development of higher cognitive skills that enable students to be independent learners as well as creative problem solving users of their knowledge has always been a very important goal for educators (Chipman and Segal 1985). There is evidence, however, that explicit instruction in these skills is rare and students’ mastery of them is frequently inadequate (Chipman and Segal 1985). Regarding thinking skills, there is a fundamental assumption that there are a set of skills, or processes that are common to thinking in general (Adams 1989).

Students that are high in general ability tend to succeed with instructions that offered little assistance, whereas those of less ability profited from various forms of assistance (Tobias 1989). Students with constructive motivation (preferences for learning independently, not anxious or defensive) tend to benefit from less structured instruction. Anxious, more defensive students benefit from instruction that is more clearly structured (Tobias 1989).

Tertiary-level thinking skills to overcome transfer problems require metacognitive skills, real-life examinationples and emphasis on writing skills (Block 1985). Organisation and awareness are fostered by encouraging students to articulate thoughts, discuss ideas, and apply information (Raaheim 1991). Theories of access should provide a framework for helping students to think and solve problems (Bransford et al. 1986). In terms of the SFP biology and higher level courses, this needs to be analysed in order to determine the degree that this is required by the various assessment forms and tasks used. Instruction that emphasises memory for fact will seem effective if students are tested on this information (Bransford et al. 1986).
However, despite a courses’ intention to get students out of this mode, their performance in assessment can be expected to be low. Although multiple methods of assessment are employed in the courses discussed in this study, the practical and theory examinations contribute a large proportion to the final mark. Different weighting of assessment components are possibly required, particularly to reduce tension. In university assessments generally all the rules for psychological testing are violated (Raaheim 1991). Both the reliability of examination results and their validity as expressions of knowledge or insight into subject matter are highly questionable at times (Raaheim 1991). It questions whether the students would have performed better with a different type of test. It also requires analysis and assessment of the curriculum of the first-year courses in life sciences following the foundation year. In particular, there needs to be discussion of the consistency of philosophy both within and between courses. ‘Too often, assessment reflects confusion, mismatching purposes to paradigms or techniques. Confusion in assessment policy typically produces systems that unintentionally limit the benefits of the given approach and that fail to accomplish fully the original assessment purposes. If we understand differences in assessment approaches, we are in a better position to develop coherent assessment systems and to coordinate assessment with teaching and learning’ (Mabry 1999, 23). Hopefully the performance of students will reflect their ability if the above issues are addressed.

In summary, the SFP students across the years have shown greater ability in practical rather than theoretical tasks. Within the theoretical component of the course, they had greater difficulties with tasks that required constructing succinct scientific arguments. Students performed better in MCQ rather than short questions or essays. It would appear that the skills required for more theoretical tasks need ongoing practice and development over a sustained period. This would need to be continued into the mainstream courses if students were to improve. Furthermore, the issue of whether students are encountering a range of negative experiences that affects their persistence in the sciences needs investigation at both the SFP and bioscience levels. It is hoped that this study will encourage investigation of students’ performance in other Academic Development courses at tertiary level. It is felt that by widening access, students are still having an opportunity to pursue tertiary education despite some of them performing poorly at the higher level.

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