# The performance of the Science Foundation Programme (SFP) graduates in their 1st year of the degree programmes at UNAM from 2005 to 2016

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***Abstract***
*This study investigated the performance of the SFP graduates in their 1st year of the degree programmes at UNAM from 2005 to 2016. The study used a quantitative research design. The population of the study consisted of the 1298 former students who had gone through the UNAM SFP from 2005 to 2016 at the Oshakati campus. The data were conveniently collected through document analysis from a sample of 128 former SFP students who went through the SFP at UNAM Oshakati Campus from 2005 to 2016. The researchers also analysed the University of Namibia Integrated Tertiary System (ITS) database to extract student data to find out how many former SFP students had registered for degree courses; and also to find out the performance of these students in their courses of study at UNAM. Data mining techniques were used to analyse the data from the respondents. Descriptive statistics, i.e., frequency tables were used to analyse the data on the performance of the SFP graduates in the 1st year degree programmes at UNAM.*

*The findings of the study showed that since the establishment of the SFP in 2005 at the Oshakati campus the SFP has been growing and attracting more students within Namibia. Further, more than half of the former SFP students had enrolled into UNAM degree or diploma programmes from 2006 to 2016. The findings also indicated that the SFP was meeting its mandate and achieving its goal and objectives of preparing students for the first year of their studies at tertiary institutions. The study recommends that further research be carried out to compare the performance of SFP students at UNAM and the direct entry Grade 12 students into university degree programmes, further a longitudinal study should be carried out to shed light on the performance of SFP graduates throughout their studies: from first year to their final year of studies.*

**Keywords**: *Science Foundation Programme, science related courses, tertiary institutions, performance of the SFP graduates, degree programmes, UNAM*

## Introduction and background

As in most African countries, formal education in Namibia prior to independence was limited and segregated. It was based upon ethnic, racial and tribal lines (Ministry of Education and Culture, 1993). Education provision in Namibia during the apartheid era was unfair, discriminatory and fragmented. At independence in March 1990, a new Ministry of Education**,** Culture, Youth and Sport was established, which developed a new teaching and learning paradigm meant to dismantle the previous regime's policy of segregation and inequality of access; it had to reflect the new government's priorities of equity, access, quality, and democracy in education (Angula, 1990). The University of Namibia (UNAM) joined the government in responding to the educational needs of disadvantaged learners; especially those in rural and remote regions in the country. Accordingly, in 2005, the UNAM Senate approved the establishment of the Science Foundation Programme (SFP) at the Oshakati campus, "to redress the inequities of the past; resolving the constraints to the expansion of the University caused by the weak academic preparation of students and widening access and at the same time maintaining the standards and quality of its academic programmes" (Naukushu, 2005, p. 23). The SFP is a one-year full time face-to-face programme. Students enrol for five compulsory examinable subjects: English, Mathematics, Biology, Chemistry, and Physics (Chirimbana, 2014). The SFP is offered to Grade 12 certificate holders who show potential to pursue a degree in science-related fields but do not meet the UNAM entry requirements of 25 minimum points in five

subjects. The main aim of the SFP is to prepare students from marginalized communities for the first year of studies at tertiary institutions. The admission criteria of the SFP are a minimum of 22 points in the best five National Senior Secondary Certificate (NSSC) subjects or an equivalent Grade 12 qualification: English (minimum E), Mathematics (minimum E), Biology (minimum D), and Physical Science (minimum D). On successful completion of the above five subjects', students can then enrol in mathematics and science-related fields at UNAM. The minimum pass for a SFP student to be admitted to a degree programme is a 60% (C) average score (University of Namibia, 2005).

**Problem statement**

Since the introduction of the SFP at UNAM Oshakati campus in 2005, no study has been carried out to evaluate this programme and to find out how the former SFP students performed in their first year of studies at UNAM. There is therefore a need to assess the effectiveness of the SFP in preparing students for their first year of study in science degrees at UNAM. It is against this background that this study was carried out to investigate the performance of the SFP graduates in their 1st year of the degree programmes at UNAM from 2005 to 2016.

**Theoretical framework**

This study is underpinned by the programme evaluation theory (Bickman, 2012). The evaluation theory can be used to provide a conceptual framework for monitoring, for evaluation, or for an integrated monitoring and evaluation framework. It is very useful to bring together existing evidence about a programme, and to clarify where there is agreement and disagreement about how a programme is understood to work, and where there are gaps in the evidence. It can be used for a single evaluation, for planning cluster evaluations of different projects funded under a single programme, or to bring together evidence from multiple evaluations and research (Benjamin & Greene, 2009).

A programme evaluation generates information about programme effectiveness and how to improve programmes; programme evaluation supports evidence-informed decision-making (Funnell & Rogers, 2011). The researchers used the programme evaluation theory to assess the effectiveness of the SFP in preparing students for tertiary education. In this study the theory was used to gain information that might inform the stakeholders, responsible for the establishment of the SFP at the UNAM Oshakati campus, and whether this programme was achieving its objectives of widening access, equity and equality to higher education of the previously disadvantaged and/or marginalised groups by preparing them for the first year of their studies in science-related degree programmes at UNAM.

**Literature review**

Generally, bridging courses are used as an alternative entry to university studies, and as such are designed to identify academically talented but underprepared high school graduates who want to pursue degree studies (Grayson, 1997). According to Trigwell and Corrigan (2009), preparatory and bridging courses are those that fill a gap between knowledge, skills and attitudes of students wanting to enrol at a university and the actual requirements for a tertiary course. The SFP at the Oshakati Campus was developed to assist disadvantaged, underprepared and/or marginalised students, from remote secondary schools across the northern and central regions of Namibia, to enrol at UNAM for degree courses in science.

There has been a worldwide trend to broaden access to universities (Grayson, 1997). Like other developing countries, South Africa, and its neighbouring African states (Namibia included), suffer a serious skills shortage with a lack of suitably qualified manpower in the sciences. Identifying the potential in students from academically disadvantaged backgrounds to succeed in the sciences is a crucial factor for Southern African tertiary institutions. According to Donaldson and Lipsey (2004, p. 152) "during the last decade a variety of efforts were made to address the needs of school-leavers who were not ready to enrol for higher education. A route often chosen to address the needs of this group is by way of bridging courses". The UNAM SFP which was developed to cater for Grade 12 school-leavers is a bridging programme.

The University of Namibia faced serious challenges in responding to the needs and demands of the disadvantaged society, often those living in rural areas and far outlying

regions (Uugwanga, 2006). The establishment of the SFP at UNAM aligns with social accountability and equity imperatives of tertiary institutions, assists in addressing inequities in secondary education outcomes experienced by under-served communities and supports a widening participation agenda for tertiary education (Smith, 2018).

Many of the students who gain direct access to the university do so without the critical knowledge and skills required to comprehend the subject matter in sciences and mathematics in the first year. This is attributed to the fact that learners graduating from historically disadvantaged schools often do not attain the same level of understanding and educational achievement as the ones who attend well-resourced schools (Chirimbana, 2013).

Uugwanga (2006) observes that in South Africa, for instance, the bridging courses to higher education programmes aim at increasing graduation rates at public universities by giving promising students in mathematics, science, and agricultural fields an opportunity to learn, excel and contribute positively to economic growth. According to Pandor (2004), research has shown that students who access university programmes through foundation programmes stand a better chance to complete their studies in time compared to those who access universities with a Grade 12 qualification. This is because during the year that students do a SFP course they are equipped with enough expertise and experience necessary for them to do better in their selected degree programmes; this is not always done at Grade 12 level (Pandor, 2004).

**Methodology**

This study adopted a quantitative research design to investigate the performance of the SFP graduates in their 1st year of the degree programmes at UNAM from 2005 to 2016. The population of this study consisted of 1298 former UNAM SFP students from 2005 to 2016 at the Oshakati campus. Document analysis was used to collect information from the former SFP students who went through the SFP at UNAM Oshakati Campus from 2005 to 2016. Document analysis enabled the researchers to interpret, give voice and meaning around an assessment topic (Platt, 2001). Payne and Payne (2004) note that document analysis is a technique used to categorise, investigate, interpret, and identify the attributes of a certain variable.

The researchers analysed the University Integrated Tertiary System (ITS) database to extract students' data in order to find out how many former SFP students had registered for degree courses; and also to find out the performance of these students in their courses of study at UNAM. Data mining techniques were used to "... discover patterns and trends" (Nong, 2003, p. 23) in the collected information from the University ITS database using Oracle 9i software. The students' marks for all subjects were extracted in order to find out the performance of the SFP graduates in their 1st year, of their study at UNAM. Payne and Payne (2004) assert that a key advantage in conducting documentary analysis is that it eliminates the effect that a researcher might have on a person or situation where the research is being conducted.

Data from data mining techniques were analysed using descriptive statistics. Frequency tables were used to analyse the data on the performance of the SFP graduates in the 1st year degree programmes at UNAM to determine the total number of former SFP students who were currently enrolled in degree programmes at UNAM. This information enabled the researchers to determine the performance of the SFP graduates in their 1st year of the degree programmes at UNAM from 2005 to 2016. Ethical clearance was granted by the UNAM Research Ethics Committee (UREC). Accordingly, the researchers were given access to the students' data from the UNAM system.

**Results**

Table 1 shows the intake of students into the SFP from 2005 to 2016 (University of Namibia, 2016).

**Table 1: Student intake into the SFP from 2005 up to 2016**

| Year | Number of students in the SFP |
|---|---|
| 2005 | 50 |
| 2006 | 60 |

| | |
|---|---|
| 2007 | 66 |
| 2008 | 72 |
| 2009 | 100 |
| 2010 | 120 |
| 2011 | 147 |
| 2012 | 130 |
| 2013 | 137 |
| 2014 | 141 |
| 2015 | 140 |
| 2016 | 135 |
| **Total** | **1298** |

The researchers analysed the students' data from the University Integrated Tertiary System (ITS) database to find out how many former SFP students had registered so far, for which degree courses, under which Faculty or school, and the performance of these students in their courses of study at UNAM. Table 2 presents the performance of the SFP graduates in their first year of degree programmes at UNAM from 2005 to 2016. Also shown are the number of former SFP students by their field of study, the number that passed their first year, and the number that were not admitted to write the final examination in their first year of studies at UNAM.

**Table 2: Performance of the SFP graduates in their 1st year of a degree programme study at UNAM from 2005 to 2016 (n=979)**

Performance of the former SFP students on their first year at Unam

| Faculty School Name | 2006 | | | | 2007 | | | | 2008 | | | | 2009 | | | | 2010 | | | | 2011 | | | | 2012 | | | | 2013 | | | | 2014 | | | | 2015 | | | | 2016 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N | E | P | F | N |
| A & NR | 1 | | 1 | | 3 | 3 | | | 2 | 1 | 1 | | 13 | 13 | | | 11 | 9 | 1 | 1 | 10 | 9 | 1 | | 10 | 8 | 2 | | 11 | 9 | 2 | | 10 | 9 | 1 | | 8 | 7 | 1 | | 10 | 8 | 1 | 1 |
| E & MS | 1 | 1 | | | | | | | | | | | 1 | 1 | | | 1 | | 1 | | 3 | 3 | | | 3 | 2 | 1 | | 1 | 1 | | | 1 | 1 | | | 10 | 5 | 3 | 2 | 3 | 2 | 1 | |
| EDU | 10 | 7 | 2 | 1 | 13 | 10 | 2 | 1 | 13 | 12 | 1 | | 9 | 6 | 2 | 1 | 10 | 8 | 2 | | 32 | 30 | 2 | | 50 | 47 | 2 | 1 | 43 | 40 | 2 | 1 | 50 | 45 | 3 | 2 | 55 | 52 | 3 | | 58 | 53 | 3 | 2 |
| E & IT | | | | | | | | | 6 | 5 | 1 | | 7 | 6 | 1 | | | | | | | | | | 1 | 1 | | | 7 | 4 | 2 | 1 | | | | | | | | | | | | |
| ES -U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | |
| SOM | | | | | | | | | | | | | | | | | | | | | 2 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| SOP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | 1 | 1 | | |
| SON | 10 | 8 | 2 | | 7 | 5 | 1 | 1 | 18 | 16 | 1 | 1 | 8 | 7 | 1 | | 21 | 20 | 1 | | 10 | 9 | 1 | | 16 | 16 | | | 6 | 6 | | | 17 | | | | 15 | 15 | | | 20 | 19 | 1 | |
| H & SS | | | | | 3 | 3 | | | 3 | 3 | | | 4 | 4 | | | 6 | 6 | | | 5 | 5 | | | 2 | 1 | 1 | | 4 | 3 | 1 | | 7 | 17 | 1 | | 11 | 10 | | 1 | 8 | 5 | 3 | |
| LW | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | 6 | | | 1 | | 1 | | | | | |
| SOC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 2 | 1 | |
| SCI | 21 | 19 | 2 | | 29 | 26 | 2 | | 9 | 8 | 1 | | 18 | 17 | 1 | | 26 | 23 | 2 | 1 | 30 | 25 | 3 | 2 | 40 | 35 | 5 | | 20 | 16 | 4 | 1 | 40 | 35 | 3 | 2 | 34 | 31 | 3 | | 24 | 22 | 2 | |
| Grand Total | 43 | 36 | 7 | 1 | 55 | 47 | 5 | 2 | 51 | 45 | 5 | 1 | 61 | 55 | 5 | 1 | 75 | 66 | 7 | 2 | 92 | 82 | 8 | 2 | 122 | 110 | 11 | 1 | 92 | 79 | 11 | 3 | 125 | 113 | 8 | 4 | 135 | 120 | 12 | 3 | 128 | 113 | 12 | 3 |
| Progerssion rate | 84% | | | | 85% | | | | 88% | | | | 90% | | | | 88% | | | | 89% | | | | 90% | | | | 86% | | | | 90% | | | | 89% | | | | 88% | | | |

***Table 2:** Information taken from University of Namibia (2016). UNAM database, 2005-2016

**Key Table**

| | |
|---|---|
| **P** | Pass |
| **F** | Fail |
| **N** | Not admitted to write the examination |
| **E** | Enrolled |
| **Progression rate** | Pass/enrolled x 100 |
| **A & NR** | Agriculture & Natural Resources |
| **E & MS** | Economic & Management Science |
| **EDU** | Education |

| | |
|---|---|
| **E & IT** | Engineering & Information Technology |
| **ES – U** | External Studies - UNAM |
| **SOM** | SH: School of Medicine |
| **SOP** | SH: School of Pharmacy |
| **SON** | SH: School of Nursing |
| **H & SS** | Humanities and Social Sciences |
| **LW** | Law |
| **SOC** | School of Computing |

Table 3 compares the student intake in the SFP with the enrolment rate of UNAM degree or diploma courses from 2005 to 2016. Comparative data were used to find out how many former SFP students had enrolled at UNAM.

**Table 3: SFP student intake vs student enrolment in UNAM first year of study from 2006 to 2016**

| Year | Student intake into the SFP (A) | Students enrolled into UNAM degree or diploma courses (B) | Percentage Progression rate into UNAM degree or diploma courses (B/A*100) |
|---|---|---|---|
| 2006 | 50 | 43 | 86 |
| 2007 | 60 | 55 | 92 |
| 2008 | 66 | 51 | 77 |
| 2009 | 72 | 61 | 85 |
| 2010 | 100 | 75 | 75 |
| 2011 | 120 | 92 | 77 |
| 2012 | 147 | 122 | 83 |
| 2013 | 130 | 92 | 71 |
| 2014 | 137 | 125 | 91 |
| 2015 | 141 | 135 | 96 |
| 2016 | 140 | 128 | 91 |

Table 3 shows that in 2015, 96% of the SFP students enrolled in UNAM degree or diploma courses; followed by 92% in 2007. During the period 2006 to 2016 more than half of SFP students enrolled in UNAM degree or diploma courses. Comparative data in Table 4 show the total enrolments of the SFP students in their first year at UNAM against their total passes, and progression rates into the second year of their studies from 2006 to 2016.

**Table 4: Total enrolment, number passes and student progression rates from year 1 to year 2 of their studies from 2006 to 2016.**

| Years (1st year) | Enrolment rate | Number Passing | Progression rate% 1st to 2nd year of study |
|---|---|---|---|
| 2006 | 43 | 36 | 84 |
| 2007 | 55 | 47 | 85 |
| 2008 | 51 | 45 | 88 |
| 2009 | 61 | 55 | 90 |
| 2010 | 75 | 66 | 88 |
| 2011 | 92 | 82 | 89 |
| 2012 | 122 | 110 | 90 |
| 2013 | 92 | 79 | 86 |
| 2014 | 125 | 113 | 90 |
| 2015 | 135 | 120 | 89 |
| 2016 | 128 | 113 | 88 |

Table 4 shows that from 2006 to 2016 most students passed their first year at UNAM and progressed to the second year of their studies. The highest progression rate of 90% from 1st year to 2ndyear occurred in 2009, 2012 and 2014.

**Discussion of the results**

When the SFP was launched in 2005 at the Oshakati campus there were only 50 students (Naukushu, 2012; Chirimbana, 2014). The student numbers have increased since then to 135 in 2016 (see Table 1). This shows the perceived programme's relevance in the lives of the potential SFP students and as alternative entry to UNAM and other tertiary institutions in the country.

In 2015, 96% of the former SFP students enrolled in UNAM degree or diploma courses, followed by 92% in 2007 (see Table 2). As evident in Table 2, more than half of the former SFP students enrolled into UNAM degree or diploma courses from 2006 to 2016. This seems to suggest that the programme was clearly attaining its objective of offering an alternative route of entry to UNAM degree and diploma programmes.

Indeed, Table 3 suggests that the SFP was meeting its mandate and achieving its goal and objectives of preparing students for first year of their studies at UNAM. Each year more students progressed into their second year of studies. The high students' progression rates over the years from first year at UNAM into their second year of studies could be attributed to the efficient manner in which the SFP prepared them for the first year of their study at UNAM. What happens to the former SFP students' progression from the second year onwards has little to do with the SFP preparations. The SFP is meant to help students enrol in courses at UNAM and succeed in their first year of study. It is reasonable to assume that the SFP laid a strong educational foundation for these students to succeed at UNAM since the former SFP students seem to be doing well in their first year studies at UNAM.

**Conclusion and recommendations**

It can be concluded from the document analysis presented in this paper that the SFP has been growing and attracting more students within Namibia due to its perceived relevance and as an alternative route into UNAM. It can also be concluded that more than half of the former SFP students were enrolled in UNAM degree or diploma courses for the years 2006 to 2016 showing the effectiveness of the programme in preparing students for entry into UNAM. Therefore, it can be concluded that the SFP has been effective in preparing students to take up further studies in science and science-related fields since the students were passing their first year of tertiary education at UNAM. Based on the study results, the researchers recommend that, further research should be carried out to assess the performance of SFP students at UNAM and the direct entry Grade 12 students into university degree programmes. A longitudinal study should be carried out to shed light on the performance of SFP graduates throughout their tertiary education studies: from first to final year of study.

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