The Department of Science and Innovation's National Youth Service Programme: Workplace experience for unemployed science graduates

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Acronyms

DSI	Department of Science and Innovation
DST	Department of Science and Technology
HSRC	Human Sciences Research Council
NYDA	National Youth Development Agency
NYS	National Youth Service
SAASTA	South African Agency for Science and Technology Advancement
SES	Science Engagement Strategy
STEM	Science, Technology, Engineering and Mathematics
YiSS	Youth into Science Strategy

Executive summary

The Department of Science and Innovation's National Youth Service is a state funded programme responding to the phenomenon of unemployed science graduates. The key objective of the programme is to provide work experience for unemployed science graduates, facilitating their careers in STEM areas. The programme is built on three dimensions: service, individual development through learning and meaningful exit opportunities .This technical report provides the findings from surveys conducted with the 2016, 2017 and 2018 cohorts from data collected in 2019.

The data showed that those accessing the NYS programme in 2018 were largely African and female. The programme has successfully targeted groups considered 'vulnerable' in terms of these demographic characteristics with regards to the labour market. While the academic performance reported in grade 12 was not outstanding, the study showed that respondents do access and succeed in tertiary education programmes. The qualification profile of NYS participants was such that: 4.4% completed a TVET qualification, 30% a diploma, 43.4% a Bachelor degree and 21.2% a postgraduate degree. Participants studied at South African universities, universities of technology, TVET colleges and Private tertiary institutions. Participants graduated with qualifications in areas of chemistry, engineering, health sciences and environmental sciences. The educational profile of these graduates (and the reported shortages of skill in the country) highlights the unemployed STEM graduate phenomenon. Furthermore, that graduates from all major South African institutions participate in the programme indicates that this issue goes beyond whether or not a graduate attends a 'poor performing institution'.

Across the cohorts, respondents accessing the NYS followed four distinct pathways into the programme: (i) respondents who were unemployed, (ii) respondents who were underemployed as they were working part-time or were working in fields not related to STEM, (iii) respondents who proceeded directly from a higher education institution into the programme, and (iv) respondents who were working. We have categorised the last two groups of pathways as "unintended" as the intention of the programme is to provide work experience for those STEM graduates who are experiencing barriers in gaining relevant work experience.

As part of the NYS objective to improve participants' employability, the programme aims to support the furthering of studies in STEM areas. After participation in the programme 46 % had found paid employment with a further 8.1% of respondents working and studying. Thus the NYS programme appears to improve employability of some respondents, with 54.1% of participants moving into employment. Earnings of the group exhibited a wide range with the majority of the respondents earning between R3001-R21 001. Furthermore, 19.4% of participants pursued further studies. Of concern is that one in four NYS completers are still unemployed.

Other findings indicate that 85.7% of respondents indicated that participation in the NYS programme improved their employability, with a further 1.8 % responding that their employability was enhanced, though not related to their subject knowledge. The respondents' ability to work in teams, interpersonal and STEM related skills were perceived to have limited improvement. In terms of the goal of assisting participants in transitioning into STEM related careers, the NYS programme may, therefore, require more of a specific focus on imparting technical skills required of a STEM work environment.

A large proportion of the respondents reported being involved in some form of volunteerism. The highest proportion is for tutoring learners or students' indication some form of give back community service. This suggests that the dimension of inculcating a culture of service is being fostered through the programme.

South Africa experiences both skills shortages and graduate unemployment in STEM areas, where the workplace requires first time employees to demonstrate work experience. Programmes like the state-funded NYS are important in bridging the divide between graduates and the workplace. The NYS promotes mechanisms which allow the most disadvantaged groups - with the least social capital - access to labour market networks to gain this experience and thereafter access the appropriate job opportunities. This state funded subsidy is a mechanism towards promoting equity within the labour market.

1. Introduction

In South Africa, despite the drive to produce more science graduates, many of these graduates face the challenge of being unable to find employment as they attempt to enter the labour market. This is often as a result of graduates lacking the workplace experience that prospective employers seek.

The NYS model incorporates three dimensions: service, individual development through learning and meaningful exit opportunities[1]. Each of these elements need to be seen as part of an integrated whole – each element builds upon and feeds into the other elements. The model is based on the idea that young people require interventions that address the personal, social and economic aspects of their lives in a holistic manner.

National government policy[2] in South Africa mandates the development of a National Youth Service (NYS) within each government department in order to provide long-term and effective ways of reconstructing South African society by developing the abilities of young people through service and learning (RSA, 2003). These capacity building opportunities for youth in the country are facilitated through the National Youth Development Agency (NYDA). The Department of Science and Technology (now called the Department of Science and Innovation (DSI)) developed its version of the NYS programme in 2007 and incorporated it firstly within the Youth into Science Strategy (YiSS) and later the Science Engagement Strategy (SES). Amid the concerns about the numbers of unemployed science graduates in the country, the DST embarked on the programme to provide workplace experiences to unemployed and underemployed Science, Technology, Engineering and Mathematics (STEM) graduates. The NYS programme, therefore, has a critical role to play in the country through building STEM capacity, both at the individual and the institutional level.

The NYS programme provides work placement for unemployed science graduates at science centres, schools and other public and private science promotion organisations across South Africa. By doing so, the DST aimed to retain these graduates within STEM related occupations, as well as provide resources to the institutions that host these graduates. In doing so, the NYS programme should contribute to achieving the goals set out in the National Development Plan to contribute to enhancing the STEM human capital of the country (NPC, 2012). As part of the programme, participants gain work experience related to science awareness, provide a service to the community and have the opportunity to attend additional training related to their work[3]. A stipend is paid to participants to cover costs incurred by their participation.

1.1 Purpose of this report

Since 2012, the HSRC has conducted an annual tracking study of the NYS programme participants. This technical report provides the findings of the tracking of the 2016, 2017 and 2018 cohorts. This data collection was done in 2019. Guiding this report are five key research questions:

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[1] The National Youth Service Implementation Plan (2003)

[2] Green Paper on National Youth Service (1998) and The National Youth Service Implementation Plan (2003).

[3] NYS participants hosted by science centres may have the opportunity to attend training provided through the DST's Science Centre Capacity Building Project (Hannan *et al.*, 2018).

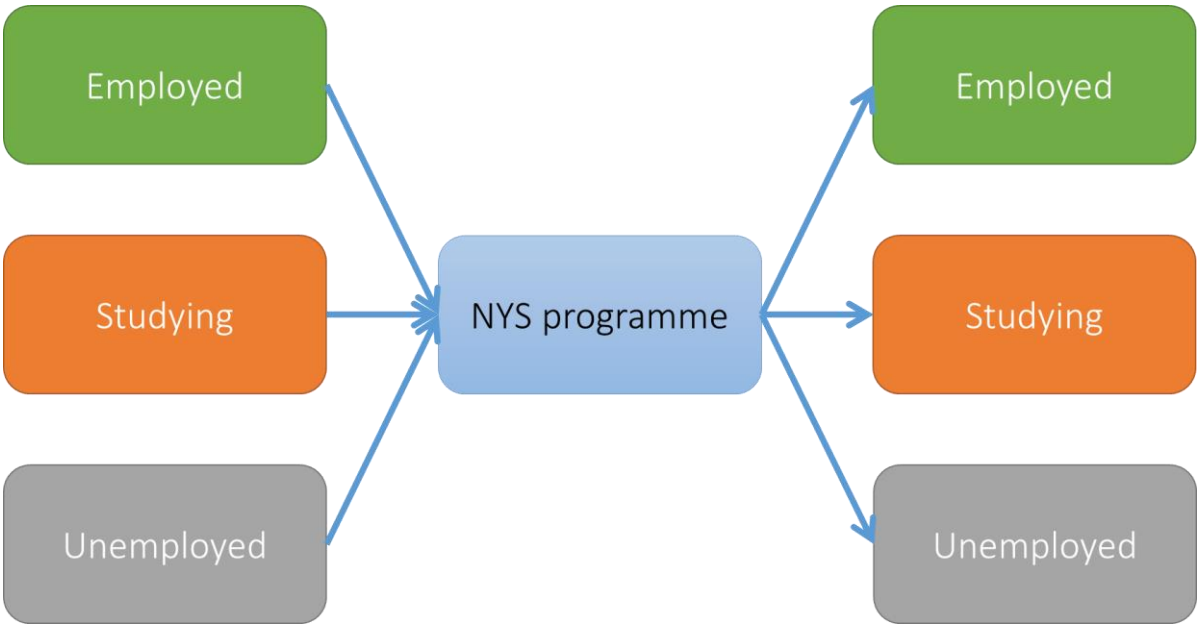
(i) Who participated in the NYS in 2018?
(ii) What were the educational-related pathways of the 2018 NYS participants into the work experience programme?
(iii) What were the experiences of 2018 cohort in the NYS programme?
(iv) What are the pathways out of the work experience programme for the 2016, 2017 and 2018 respondents?
(v) What were the volunteer activities that the 2018 respondents undertook?

As this is a technical report, we set out the findings from the data collected in 2019[4]. For a comprehensive evaluation of the DSI's NYS we invite the reader to refer to the 10 Year commemorative report.[5]

1.2 Methodology

The study used a pathways framework (Figure 1), collecting information on participants' educational and labour market transitions. This framework allowed for the detailing of participants' transitions between studying, working and unemployment. This report describes how participants' pathways converge into the NYS programme and then, after participation, diverge into further studies, employment or unemployment.

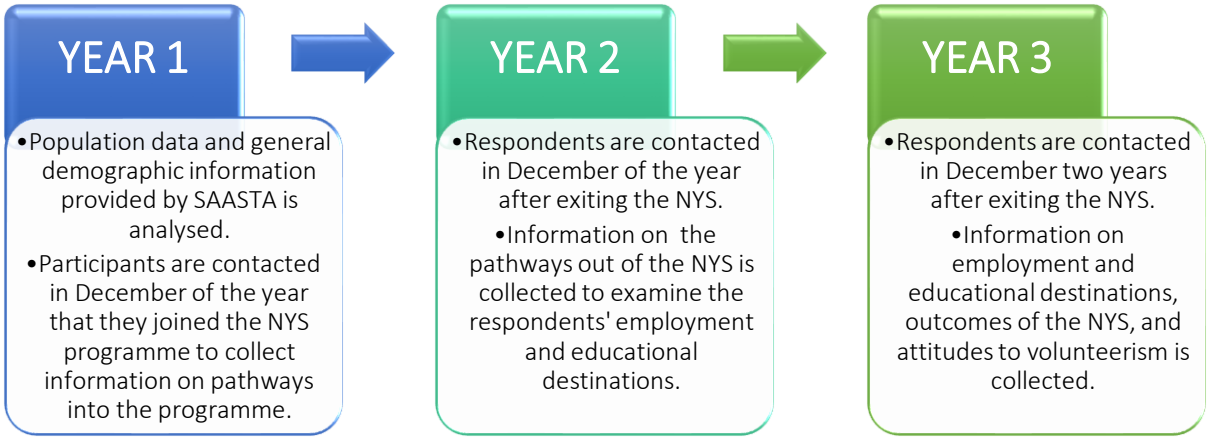
Figure 1: Pathways framework



[4] This is Year 1 data for the 2018 cohort, Year 2 data for the 2017 and Year 3 data for the 2016 cohort.
[5] Juan, A., Hannan, S., Zulu, N. and Reddy, V. 2018. *The DST National Youth Service: Work experience for unemployed science graduates.10-year commemorative report (2007- 2017).* Report to the Department of Science and Technology. Pretoria: Human Sciences Research Council.

The HSRC contacted the participants in the year of entry into the NYS programme and then for two subsequent years. The South African Agency for the Advancement of Science and Technology (SAASTA) provided the HSRC with a database of participants for the period in question. Participants were tracked annually from the year that they entered the NYS until two years after exiting the programme. The tracking plan for each year's cohort is shown in Figure 2.

Figure 2: Tracking plan for each cohort



The tracking of participants, to determine both the educational pathway into the programme and the educational and employment pathway on exiting the programme, was undertaken as a retrospective study. The study uses a pathways framework, collecting information on participants' educational and labour market transitions and trajectories. This framework allowed for the detailing of participants' transitions between studying, working and unemployment. This report describes how participants' pathways converge into the NYS programme and then, after participation, diverge into further studies, employment or unemployment. The goal of the NYS is that participation in the program will facilitate the pathways into careers and in STEM.

Data

The 2018 NYS programme contact database included information about the 182 participants; their race, gender, age and qualifications. The contact database included telephone numbers as well as email addresses of the participants. Participants were contacted through a call centre and the survey was administered telephonically. Participants were tracked for two years subsequent to entering the NYS. Table 1 sets out the number of participants for each year, and the numbers tracked in the subsequent years. The highlighted cells (in green) indicate the data that was used for this technical report.

Table 1: Tracking and data collection information

Cohort	Participants (Population Database)	Respondents Contacted in Year of NYS Entry (Year 1)	Respondents Contacted a Year after Exiting NYS (Year 2)	Respondents Contacted Two Years after Exiting NYS (Year 3)
2016 (1 August 2015-31 July 2016)	331	243	123	99
2017 (1 August 2016-31 July 2017)	188	103	83	Data to be collected in 2019
2018 (1 August 2017-31 July 2018)	182 (29 respondents did not have contact numbers)	112	Data to be collected in 2019	Data to be collected in 2020
Total	702	458	206	99

The 2018 baseline sample of respondents exhibited the following demographics: 96% Black African, 63% female and average age of 27 years. As evident in section 2.1, this is very similar to the demographics of the 2018 full population. We are thus able to make inferences from the respondents' data with some degree of certainty. Due to the high levels of attrition (which is expected in a tracer study), for the 2016 and 2017 cohorts, we had only present findings for those participants who responded to the survey and not to each cohort respectively.

1.3 Signposting for the rest of the report

In Sections 2 and 3 of this report, we look at the participants of the NYS programme, their demographics and experiences of the labour market prior to entering the programme. In Section 4, we document the respondents' NYS programme journey from discovering the programme to being placed at institutions, and describe the experiences of the respondents in the NYS programme workplace. Section 5, looks at respondents' experiences and career trajectories after exiting the NYS programme. Section 6, looks at volunteer activities that the participants have undertaken. Section 7 provides concluding comments.

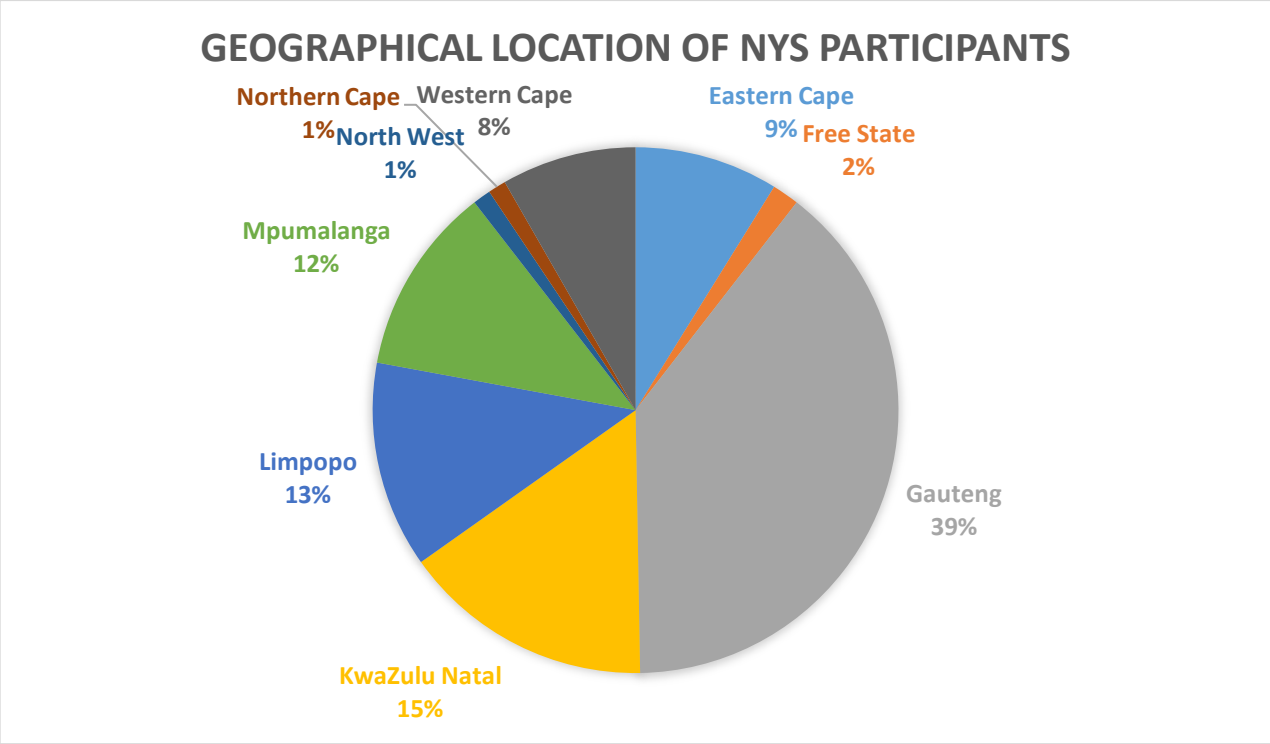
2. Demographic and Educational background of 2018 participants

This section describes the demographic and educational backgrounds of the participants to the National Youth Service (NYS) program.

2.1 Who participated in the NYS in 2018?

The average age of the participants within the contact database was 26.6 years with a standard deviation of 2.3, ranging from 23 to 34 years. Sixty four (64) percent of the participants were female and the remaining 36 % male. 97 % of the participants were African, 2.2 % Coloured and 0.5 % White. Figure 3 shows which provinces the participants were living in. there is an uneven distribution in the numbers of participants with three provinces, Gauteng (39%), KwaZulu-Natal(15%) and Limpopo (13%) making up just over two third of the participants.

Figure 3: Geographical location of NYS Participants



Source: Contact database

2.2 Grade 12 Participation and Performance

Table 2 shows that approximately 18% of the respondents completed matriculation or grade 12 year before 2008, implying that these respondents experienced 10 years or more between completing high school and participation in the NYS. This lengthy duration could indicate potential for a non-linear transition from schooling, to university and then to work. Comment cannot be made, however on post-schooling activities prior to 2008.

Table 2: Year in which respondents completed Grade 12 (Cohort 2018, N=112)

Year	Frequency	Percent %
2014	4	3.6
2013	15	13.4
2012	25	22.3
2011	16	14.3
2010	19	17.0
2009	10	8.9
2008	3	2.7
Before 2008	20	17.9
Total	112	100.0

Source: Year 1 survey database

Table 3 below describes mathematics; physical science and biology participation in grade 12[6]. From these responses it would seem that a small number of participants did not participate in mathematics (11.5%)[7], Biology (23.2%) or physical science (8.0%) in grade 12.

Table 3: Participation in mathematics, biology and physical science in Grade 12 (Cohort 2018, N=112)

Subject	N	%
Mathematics	108	88.5
Physical Science	103	92.0
Biology	86	76.8

Source: Year 1 survey database

Tables 4 describes performance of the NYS participants in the STEM subjects. For each subject, the symbols with the largest proportion of respondents are highlighted in green.

Table 4: Grade 12 Performance in Biology, Physical Science and Mathematics (Cohort 2018, N=112)

Performance (Symbol, %)	Biology (%)	Physical Science (%)	Mathematics (%)
A (80-100%)	4.5	1.8	.9
B (70-79%)	21.5	11.6	10.7
C (60-69%)	21.5	26.8	31.3
D (50-59%)	17.9	31.3	26.7
E (40-49%)	6.3	11.6	21.4
F (30-39%)	5.4	8.2	4.5
G (0-29%)		0.9	

Source: Year 1 survey database

Although the average performance of the respondents is not exceptional, the participants all attained passes in Grade 12, which were high enough to access tertiary qualifications.

2.3 Tertiary academic profile of 2018 NYS participants

This section looks at the academic profile of the NYS participants such as the tertiary institution they attended and degree qualification. The profile of educational qualifications of participants is as follows:

- 4.4 % (8) hold NATED 6
- 30 % (54) of participants hold diplomas
- 43.4 % (79) hold bachelor's degrees
- 19.8 % (36) hold postgraduate honours degrees, and
- 1.6 % (3) hold Masters degrees

[6] The survey did ask about the type of pass that the respondents achieved (i.e. distinction, bachelor, and diploma), however this question was not answered well and the data was not used.
[7] These participants may have taken Mathematics Literacy in grade 12

It is disconcerting that over a fifth (21.4 %) of the NYS participants hold a qualification higher than a Bachelor's degree and yet are accessing the NYS programme rather than employment.

Tables 5 and 6 describes the highest qualification of the NYS participants, when they entered the NYS programme, by race and gender. National statistics[8] indicate that African females are the most vulnerable demographic in the labour market. The over representation of African females in this cohort supports such findings that suggest that they have the most difficulty finding a job that is commensurate with their qualification.

Table 5: Qualification of participants by race (Cohort 2018, N=182)

	Qualification level					
Race	N6 Certificate	National Diploma	Bachelor	Honours	Masters	Total
African	8	54	79	33	3	177
Coloured	-	-	2	2	-	4
White	-	-	-	1	-	1
Total	8	54	81	36	3	182

Source: Contact database

Table 6: Qualification level of participants by gender (Cohort 2018, N=182)

	Qualification level					
Gender	N6 Certificate	National Diploma	Bachelor	Honours	Masters	Total
Female	4	30	54	26	2	116
Male	4	24	27	10	1	66
Total	8	54	81	36	3	182

Source: Contact database

Participants studied at many of the countries tertiary institutions, the largest group having studied at universities (Table 7). Popular discourse is that graduates from Historically Black Universities cannot find jobs. Table 7 shows that it does not seem to be the case for this cohort as 34 participants are from historically Black universities while the others attended higher ranked universities.

[8] Statistics South Africa Quarterly Labour Force Survey Q2, 2018

Table 7: Tertiary institution attended (Cohort 2018, N=112)

Type of Institution	Institution	Frequency	Frequency by inst. type
University	North West University	1	80
	Rhodes University	1	
	University of the Witwatersrand	2	
	Nelson Mandela University	3	
	University of Free State	3	
	University Of Cape Town	4	
	University Of Western Cape	4	
	Walter Sisulu University	4	
	University Of Fort Hare	5	
	University Of Venda	6	
	University of Zululand	7	
	UNISA	9	
	University Of KwaZulu-Natal	9	
	University Of Pretoria	10	
	University of Limpopo	12	
University of Technology	Cape Peninsula University Of Technology	2	19
	Durban University of Technology	2	
	Vaal University Of Technology	4	
	Tshwane University Of Technology	11	
TVET college	Central Johannesburg College	1	7
	Ekurhuleni West College	1	
	Nkangala College	1	
	Sedebeng College	1	
	Tshwane South College	2	
Private college	Damelin College	1	6
	Fort Cox Agriculture and Forestry Training Institute	1	
	ICESA College	1	
	PC Training Business College	1	
	Pinnacle University	1	
	Richfield College	1	
	Rosebank College	1	
Total		112	112

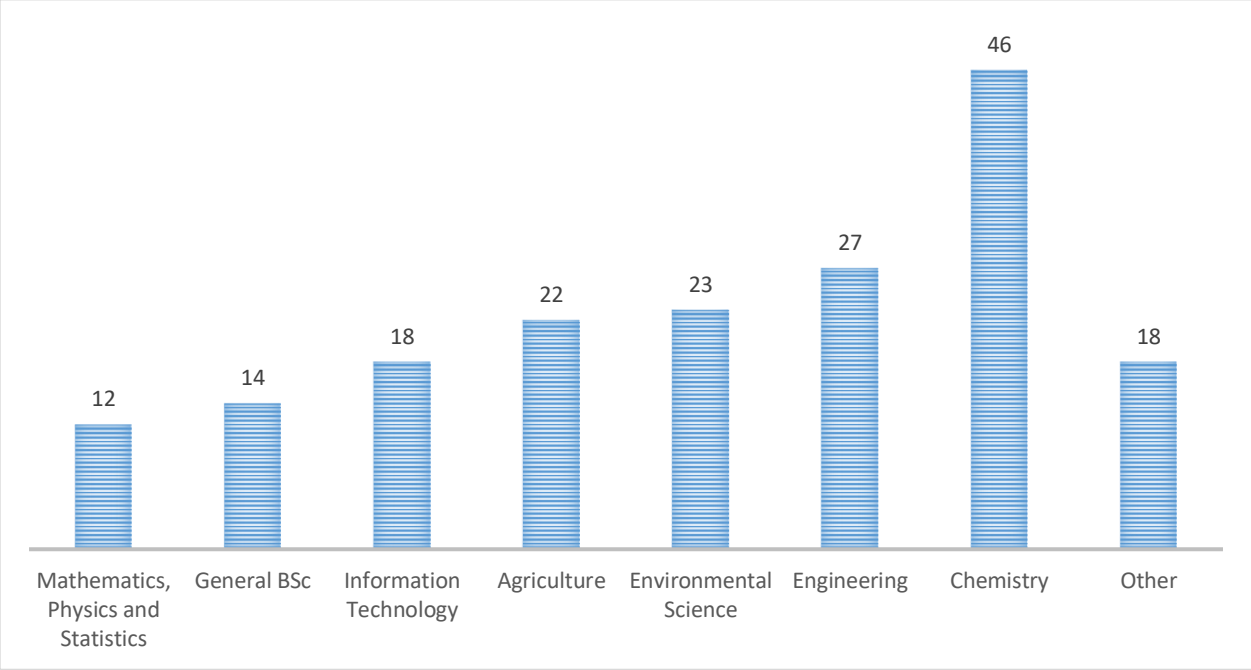
Source: Year 1 survey database

The field of study is an important factor in the discussion of NYS participants. This is so, since it may be that preference is given to a particular field by an employer or graduate which either increases or decreases the likelihood of easy transition into employment, and thus wishes to access the NYS programme. Figure 4 sets out the number of participants by aggregated field of study. The highest number of participants studied engineering. The 2018 Occupations in High Demand list[9] indicates that

[9] Government Gazette No. 41728

the fields of study of the NYS participants are areas where there are skills shortages in the country. This points to other factors at play in the labour market that prevent these participants from entering.

Figure 4: Number of participants by field of study (Cohort 2018, N=182)



Source: Contact database

Participants were asked why they chose to study STEM subjects and modules. Most participants (64.3%) indicated that they were interested, whilst the rest had varying reasons as indicated on the table 8 below. Thus two-third reported a genuine interest in studying and working in this area.

Table 8: Reasons for choosing STEM subjects (Cohort 2018, N=112)

Reasons	Frequency	%
Employment gain	7	6.3
Formal qualification gain	15	13.4
Prestige	2	1.8
Promotion / Advancement pursuit	2	1.8
Skills improvement	7	6.3
To prepare for work in a sector with scarce skills	7	6.3
Interest	72	64.3
Total	112	100.0

Source: Year 1 survey database

The main reason indicated for following a science study route was out of interest and to improve the skills base as well as prepare for work in a scarce sector. Respondents recognise the shortage of skills in the science sector and thus it must be a surprise that they are unable to gain employment.

2.4 The funding of studies

Access and inclination to study STEM related qualifications may rely upon the availability of funding. We thus included items about bursary access in the survey. 57.2% of respondents indicated that they applied for a bursary to study, and 25.9% of respondents successfully obtaining funding. 25.9 % got their bursary in the STEM fields and 5.4 % got it in other non-STEM fields. The survey did not ask about whether the respondents had received a student loan or NSFAS funding.

3. Pathways of NYS Participants before entering into the NYS Programme

In this section we will discuss the pathways and transitions into the NYS programme, the tertiary education of the participants (including their career intentions when at high school), the funding of their studies and their job search efforts before entering the NYS.

Across the cohorts, respondents accessing the NYS followed four distinct pathways into the programme: (i) respondents who were unemployed, (ii) respondents who were underemployed as they were working part-time or were working in fields not related to STEM, (iii) respondents who proceeded directly from a higher education institution into the programme, and (iv) respondents who were working. We have categorised the last two groups of pathways as "unintended" as the intention of the programme is to provide work experience for those STEM graduates who are experiencing barriers in gaining relevant work experience. Table 9 illustrates the proportion of respondents falling into each category.

Table 9: Labour market status immediately before entering the NYS programme (Cohort 2018, N=112)

Pathways	Frequency	%
Studying	39	34.8
Unemployed	60	54.5
Underemployed	9	8.1
Working	4	3.6
Total	112	100.0

Source: Year 1 survey database

The majority of respondents were involved in a number of other activities, experiencing interrupted work and educational pathways into the programme. Our analysis of the respondents' pathways into the programme shows that:

(a) Only 14.3% of respondents made a smooth pathway from Grade 12 to a tertiary education institution, and then into the NYS. It is however concerning that these respondents went to the NYS rather than the labour market.

(b) 43.8% stated that they were unemployed and looking for a job.

(c) 20.5% respondents were studying and searching for work.

Participants were asked why they applied for the NYS programme. Table 10 indicates below that majority (75.9%) needed work experience, whilst others had varying reasons such as needing income, not finding any other work in their field of study.

Table 10: Reasons for joining NYS (Cohort 2018, N=112)

Reason	Frequency	%
I needed work experience	85	75.9
Volunteering was an opportunity for me to give back	12	10.7
I needed the income	8	7.1
I could not find any other work in my area of study	4	3.6
The income helped support me while I studied	3	2.7
Total	112	100.0

Source: Year 1 survey database

Almost 76% of the respondent indicate that the main reason for joining the NYS was that they needed work experience. This ties in to one of the aims of the NYS – to provide work experience for science graduates. The second highest reported reason was that the NYS programme was an opportunity to give back highlighting the service dimension of the programme.

4. NYS programme placement

In this section we discuss the placement of the 2018 cohort Participants and the experiences of the respondents in the host institutions.

The 2018 participants were placed at 46 different host institutions across the country. These institutions have included: science centres, schools, observatories, zoos and research councils. There is a mix of public and private host institutions. Table 11 sets out the names of those institutions and the number of participants that were placed in each.

Table 11: NYS programme participant placement (Cohort 2018, N=182)

Host institution	Number of participants
Agricultural Research Council	3
Anglo American Science Centre	5
ArcelorMittal Science Centre	8
Bostec	5
Brickplay Training	3
Cape Town Science Centre	7
Schools (Department of Basic Education)	11
Eskom Expo For Young Scientists	1
FOSST Discovery Center	5
Giyani Science Centre	4
Isibusiso Esihle Science Discovery Centre	3
Ithemba LABs	1
Izingolweni	2

JNF Walter Sisulu Environmental Centre	1
Johannesburg City Parks & Zoo	1
KwaZulu-Natal Science Centre	6
Mintek	1
Mondi Science Centre	7
MST Academy	17
South African Nuclear Energy Corporation	2
Nelson Mandela Bay Science and Technology Centre	4
North West University	2
NSTF	1
National Zoological Gardens of South Africa	13
Osizweni Education & Development Centre	2
Phalaborwa Foundation	1
P-STEM Foundation	1
Reuben Dlamini Foundation	1
SAASTA	18
South African Environmental Observation Network	1
South African Mathematics Foundation	2
South African National Biodiversity Institute	4
SANSA Space Science-Hermanus	1
Sci-bono Discovery Centre	2
Sci-Enza Science Centre	5
SciFest Africa	1
Square Kilometre Array (SKA)	1
Stellenbosch University Botanical Garden	1
Thandela Consulting	5
University of Johannesburg Soweto Science Centre	4
Undeveloped Graduates into Science (PTY) LTD	2
University of KwaZulu-Natal Science and Teaching Education Centre	1
University of Limpopo Science Centre	4
Unizulu Science Centre	5
UWC Science Learning Centre For Africa	4
Vuwani Science Resource Centre	2
Missing	1
Total	182

Source: Contact database

Participants undergo formal workshop or capacity development to enhance their skills sets. Table 12 sets out the numbers of those who attended training and those who found the training useful. Of those who attended project management training, less than half found it useful. For all other types of training almost all those who attended found it useful.

Table 12: Respondents who attended training and who found it useful (Cohort 2018, N=112)

Training	Attended training	Found it useful
Project management	42	19
Presentation Skills	59	57
Events management	36	31
Facilitation skills	45	42
Life Skills	86	84
Leadership skills	55	54
Computer skills (Basic)	33	32

Source: Year 1 survey database

Respondents indicated that a number of their skills were enhanced through their participation in the NYS programme (Table 13). The main skills that respondents had gained were the expertise to communicate science, technical skills and the ability to manage more responsibly. The NYS programme thus succeeded in providing the participants with the opportunity to experience a workplace and understand the dynamics of workplace interactions.

Table 13: Self-reported most important skill gained through the NYS programme (Cohort 2018, N=112)

Type of Skills	Frequency	%
Ability to communicate science to others	48	42,9
Technical skills	20	17,9
Ability to manage more responsibility	16	14,3
Ability to work in teams	10	8,9
Interpersonal skills	9	8
Science, technology and engineering skills	9	8
Total	112	100

Source: Year 1 survey database

Ability to work in teams, interpersonal and STEM related skills were perceived to have limited improvement. In terms of the goal of assisting participants in transitioning into STEM related careers, the NYS programme may, therefore, require more of a specific focus on imparting technical skills required of a STEM work environment. Regardless of this, 85.7% of respondents indicated that participation in the NYS programme improved their employability, with a further 1.8 % responding that their employability was enhanced, though not related to their subject knowledge (Table 14).

Table 14: NYS outcomes in terms of increasing employability (Cohort 2018, N=112)

Response to whether the NYS increase employability	Frequency	Percent
Yes	96	85.7
Yes, but not to jobs related to qualification	2	1.8
No	6	5.4
Not sure	8	7.1
Total	112	100.0

Source: Year 1 survey database

5. Pathways out of the NYS

In this section we detail the pathways of the respondents from the 2016, 2017 and 2018 cohorts out of the NYS programme. Attention is paid to the labour market trajectories of the respondents.

Participants were asked to indicate their current activity, Table 15 indicates that majority of 2018 cohort respondents (39.3%) were still volunteering on the NYS programme, whilst the second largest percentage of the participants are working (25%) and some are neither working nor studying

Table 15: Current activity of NYS participants

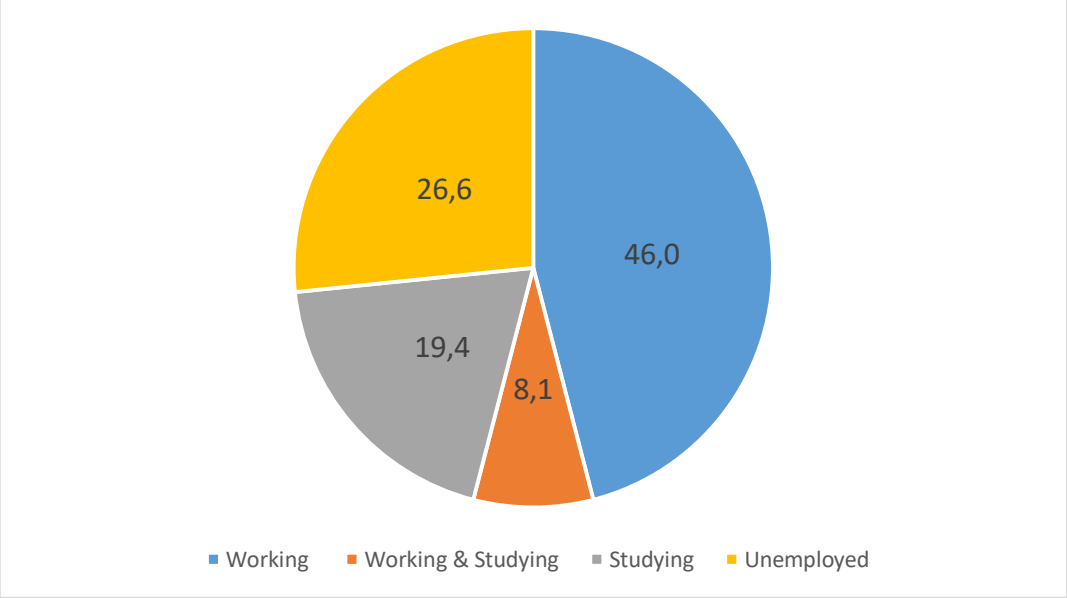
Current activity	2 Years after exiting (2016 cohort)		1 Year after exiting (2017 cohort)		Year of entry (2018 cohort)	
	Frequency	%	Frequency	%	Frequency	%
Working	41	50,6	45	45,5	28	25,0
Working & Studying	10	12,3	6	6,1	4	3,6
Studying	11	13,6	23	23,2	14	12,5
Unemployed	19	23,5	25	25,3	22	19,6
Still in the NYS programme[10]	0	0	0	0	44	39,3
Total	81	100	99	100	112	100

Source: Years 1, 2 and 3 survey databases

Figure 5 illustrates the activity of all the respondents from the three cohorts at the time of data collection. The largest proportion of respondents were in paid employment (46%) with a further 8.1% of respondents working and studying. Of concern is that one in four NYS completers were still unemployed.

[10] These participants had not exited the NYS yet.

Figure 5: Labour market activity in 2019 (cohorts 2016, 2017 and 2018), %



Source: Years 1, 2 and 3 survey databases

Table 16 sets out the sectors and types of organisations that the respondents were working in. The largest proportions are highlighted. Most of the respondents indicated that they were working in the educational sector and most of the respondents were working for private companies and government funded organizations. It is promising that the respondents have found jobs in a range of sectors and types of organisations.

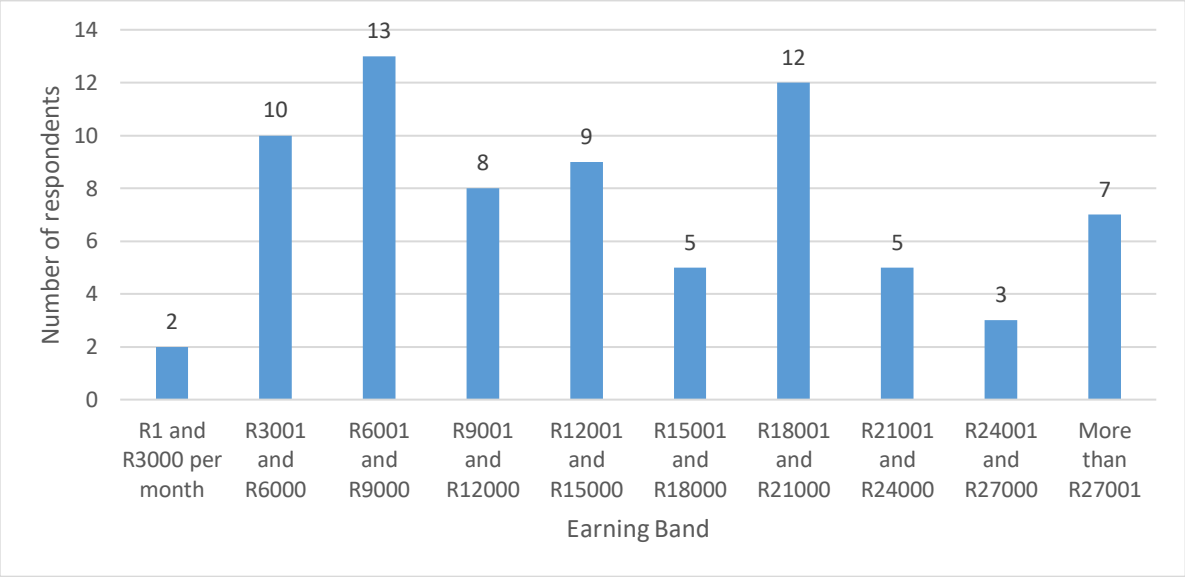
Table 16: Sector of employment (Cohorts 2016, 2017 and 2018) post NYS

Sector	2016 (N=41)	2017 (N=45)	2018 (N=28)
Computer Sciences	7	0	2
Education	10	9	15
Engineering	3	7	3
Environmental Sciences	4	3	2
Health Sciences	3	5	2
Mathematics & Statistics	2	2	0
Natural Sciences	5	5	0
Other (Commerce, finance, administration, social sciences, retail, etc.)	6	12	3
Science communication	1	2	1
Type of organisation			
Parastatal	2	1	0
Government funded organisation	7	8	12
National/provincial/local government	6	3	4
Non-profit (NGO/CBO)	2	2	1
Private company	19	28	8
School	2		3
Science Centre		1	0
University	2	2	0
Hospital	1	0	0

Source: Years 1, 2 and 3 survey databases

For those participants who were working were asked about their earning band as indicated on figure 6, majority of the respondents earn between R3001-R21 001, and only two participants earn between R1-R3001. According to 2018 PayScale data[11], a person with a Bachelor of Science degree could expect to earn approximately R15 600 per month in their first job. Figure 6 shows that 32 respondents were in that earning bracket or more.

Figure 6: Earnings for those respondents working (Cohorts 2016 and 2017)



The participants who were tracked 1 and 2 years after exiting the NYS programme were asked about their quality work with specific reference to whether the respondents found their work dignified and fulfilling. Table 17 sets out the number of respondents who have indicated high levels of agreement with the statements.

Table 17: Respondents who reported high levels of dignified and fulfilling work (Cohorts 2016 and 2017)

Work status	2016 (N=41)	2017 (N=45)	Total (N=86)
Job is in line with studies in STEM	29	28	57
Good working conditions	26	27	53
Job is in line with intended career path	22	26	48
Opportunities for workplace training	22	21	43
High level of job satisfaction	21	22	43
High level of work experience	17	23	40
High rank in organisation	16	19	35

[11] PayScale is a compensation software and data company which helps employers manage employee compensation and employees understand their worth in the job market. See www.payscale.com

Most respondents felt that their jobs were in line with their studies and intended career paths. It is not unexpected that fewer respondents felt that they had high ranking in their respective organisation as these are entry jobs.

6. Volunteerism

As mentioned in the introduction, one of the aims of the NYS programme is to inculcate a spirit of service or volunteerism in the participants. Since 2013, the respondents have been asked about their attitudes to volunteerism to assess whether the programme is achieving this aim. The statements to which the respondents were as follows:

- It is important to me to have a sense of contribution and helpfulness through participating in community service.
- Contributing my skills through the National Youth Service has made the community a better place.
- I will participate in a community service project in the next year.
- I will seek out an opportunity to do community service in the future

Over 90% of the respondents agreed strongly of very strongly with these statements. While not the overt intention of this study, the hope is that these questions may stimulate thought and nudge the respondents into pursuing some kind of community volunteer service in future. When respondents were asked what volunteer activities they had participated in, either through the NYS or in their private capacity, some differentiation was exhibited (Table 18).

Table 18: Number of respondents reporting volunteer activities either in the NYS of privately (Cohort 2018, N=112)

Volunteer activities	Frequency
Tutored school going learners or tertiary students	90
Hosted science exhibition/shows at previously disadvantaged schools	85
Mentored school going learners or tertiary students	81
Making presentations to the general public	75
Participated in outreach activities specifically for youth marginalised because of disability or gender	69
Took mobile laboratories to remote or rural schools	57
Volunteered at a Non-governmental Organisation or Non-profit Organisation	49
Participated in community forums on issues which affect them	47

Source: Year 1 survey database

Table 18 shows that a large proportion of the respondents reported being involved in some form of volunteerism. The highest proportion is for tutoring learners or students' indication some form of give back community service.

7. Concluding Comments

South Africa experiences both skills shortages and graduate unemployment in STEM areas, where the workplace requires first time employees to demonstrate work experience. The main reason indicated by the respondents for following a science study route was out of interest and to improve the skills base as well as prepare for work in a scarce sector. Respondents recognise the shortage of skills in the science sector and thus it must be a surprise that they are unable to gain employment. Thus programmes like the state-funded NYS and the placements are in public sector institutions are important in bridging the divide between graduates and the workplace. It is promising to see that private sector institutions are joining this endeavour.

The good intentions of the programme are, however, only partially achieved as 38.4% of respondents were not from groups specifically targeted by the programme- those unemployed and underemployed. The NYS does, however, act as a mechanism which allows the most disadvantaged groups - with the least social capital - access to labour market networks to gain this experience and thereafter access the appropriate job opportunities. In doing so, this programme has contributed enhancing the STEM Human Capital in the country. A secondary outcome of the NYS is that, because participants were based at Science Centres and schools, they participated in science communication activities with the goal of creating public awareness of science and fostering a closer relationship between the public and science.