

## Lessons learnt from capacity building program

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*Abstract* — The lack of skills transfer hinders capacity building in developing countries. Not having effective skills programs remains a challenge in the workplace, where opportunities and practical learning can be afforded to our inexperienced up-and-coming engineers (subsequently referred to as Future Engineers). The Future Engineers are students who have completed their N6 modules from accredited Technical and Vocational Education and Training (TVET) colleges. The capacity building program, set on construction projects, aims to address some of these challenges. The mission of the program is to expose up-and-coming engineers to the majority of civil works (ensuring that they are hands-on during their 24-month-long practical training), with the aim of producing competent technicians, supervisors and entrepreneurs.

The program has its own management that is involved in the road construction sector and has adequate knowledge and experience. The program also focuses on research to keep abreast with new developments. It constantly engages the main contractors in the civil engineering sector to involve the future engineers in their projects. The program also has its own specialist focus areas in which a few of the candidates are then groomed. Part of the program is having workshops and accredited training courses during the year to further assist in improving the learners' technical ability and knowledge.

With constant improvement on the program, there is hope for our communities and the country.

**Keywords** — scarcity, TVET, training, Future Engineers

### I. INTRODUCTION

The scarcity and lack of skills transfer hinders capacity building in developing countries. Not having effective skills programs remains a challenge in the workplace where opportunities and practical learning can be afforded to inexperienced up-and-coming engineering graduates.

South Africa, as a developing country, still faces challenge in terms of education, especially poor rural areas. Lack of relevant information remains a challenge in a society to understand the rationale behind having an engineer, technician and artisan. Due to all these factors, students often end up at the wrong institutions. There is also a growing trend of companies offering experiential training based on where one studied.

The important question is why does the Department of Education allow TVET students to upgrade their Certificate to a Diploma? The required 24-month-long practical training allows students to be better equipped with experience before obtaining their qualifications compared to the 6 months and 12 months

required by other qualifications. If we are looking for experience, why not look at such capacity building programs?

Experiential training programs afford students an opportunity and addresses government objectives of skills transfer and capacity building.

The TVET training program (Future Engineer's program) is one of SANRAL Southern Region programs where students who have completed their N6 modules are selected to undergo experiential training for 24 months. The program began with 15 students at the beginning of 2017 and by the end of 2017 had 97 students. The program has received great support from all 8 Eastern Cape Colleges, the Department of Higher Education and the Premier's Office.

### II. BACKGROUND

Students fresh out of high school and entering the tertiary life are not prepared for the harsh conditions life throws at them as young adults. Poverty stricken and with limited options of furthering their education, they opt for attending a college with the hope of improving their circumstances at home.

However, they are not aware of the fact that the gigantic civil industry will not even recognize their qualifications. They are so excited about finishing their N6 certificates with the hope of changing it into a Diploma, but their applications for in-service training will fall on deaf ears because of where they studied. They will just be adding to the statistic of unemployed youth.

The solution to this problem seems simple yet radical. Why not allow TVET college students who completed their N6 certificate to do their in-service training in order for them to obtain their National Diploma?

This transformation started when SANRAL Southern Region decided that it was time to open some doors for college students. Initially the plan was to take on only 5 students, but because of the huge response from the applicants 15 students were taken on.

The students had high expectations when they were called on Friday the 9<sup>th</sup> of February 2017 and made their way to a small Village in Whittlesea. They commenced work on the 13<sup>th</sup> of February 2017 and were later met by the project manager who had a one-on-one session with all 15 of them, explaining thoroughly what their responsibilities would be and what the desired outcome of the program was.

Their initial expectations were erased soon after hearing what the project manager had to say, and with labour intensive practical training the excitement of working on a SANRAL project quickly faded. The harsh reality that they were now faced with was enough to send the students home, even before the project could begin.

They were dumbstruck by the fact that everything they had been taught at college meant absolutely nothing. The civil engineering they were taught at college was considered building at University. This meant that the students were not equipped with the necessary technical knowledge in order to be able to work on a SANRAL project. The process of equipping students with the necessary technical knowledge in order to find the balance between practical and theoretical knowledge was not easy, but with the help project management team, it was a success.

Numerous workshops were attended by the students before any activity took place on site, so as to make them fully aware about that particular activity theoretically before doing it practically. The hunger for knowledge and recognition within the civil industry is what pushed the students beyond their mental limitations. This paved the way for thousands of other college students who were never given a fighting chance.

The number of students increased from 15 to 97 by December 2017. This vast increase in the number of students who were now part of the SANRAL project meant that another step had been taken towards bridging the gap between college and university students. That was when the program's five-year vision was born. The five-year plan clearly detailed what the desired outcomes of the program were and how it was to be implemented. In order for the plan to be implemented it had to be shared with the 97 students who were part of the program first so that they could be able to see beyond their mental limitations.

Along with the five-year plan came other unimaginable opportunities. These opportunities included involvement and support from all the TVET Colleges in the Eastern Cape, which meant that the program and students' efforts were no longer falling on deaf ears. The industry was beginning to pay attention.

The students' hard work was speaking volumes and forced the civil industry to not only recognize them but to also want to be part of the program. Their hard work reached the Premier's Office, who also wanted to be part of the program. The Premier's office has since proposed that more college students from all over the Eastern Cape be added to the program.

The intake of new students took place on the 3<sup>rd</sup> of April 2018. The program is rapidly growing and has many attributes that South African companies need in order to produce competent engineers. The new students added to the program by the Premier's Office have since been assigned to SANRAL projects all over the Eastern Cape.

Although bridging the gap in the industry may take a while, the industry is now paying attention.

### III. PROBLEM STATEMENT

The lack of experiential training programs that focus on skills empowerment are making the gap between the experienced and less experienced bigger.

### IV. SCOPE OF THE PAPER

This paper introduces a new training program that has been earmarked to capacitate college students to upgrade their N6 college certificate to a diploma. The program structure and activities are discussed as well as the lessons learnt (to date) from offering such a program.

### V. PROGRAM 24-MONTH-PLAN AND STRUCTURE

The intent of the program is to ensure the training, capacity building and skills development of prospective civil engineers from TVET colleges from across the Eastern Cape in order to produce competent civil engineers that will be recognized worldwide. This will benefit our country by developing entrepreneurs, producing competent supervisors and sound foremen for the industry.

The Future Engineers program is committed to producing specialists. The program training includes ancillary roadworks (as described in Committee of land transport officials (COLTO)), such as walkways as shown on **Photo 1** below, stone pitching (which includes protection against erosion) (5100), gabions (5200), guardrails (5400), fencing (5500), road signs (5600) and road marking (5700). **Photo 2** below shows the FEs busy with gabion work for erosion and safety protection along the N6 in Queenstown after completing the concrete walkway. **Photo 3** is the work being done by the FEs along the R396 in Tsolo as part of a slope stability protection measure. The future engineers erected gabion baskets along the battered slope.



**Photo 1:** Future engineers constructing a concrete walkway as part of their training



**Photo 2:** A completed walkway and gabion work as a safety measure and erosion protection along the N6 in Queenstown



**Photo 3:** Slope stability protection measure on R396 in Tsolo

The program training plan includes manufacturing which produces kerbs and pavers according to the recommended and approved standards (SABS). This affords possibility for more innovation resulting in manufacturing kerbs and pavers (depending on quantities on site), creating more jobs while leaving a skill within the community.

The program is also fully involved in the preferential procurement process and the pre-qualification process (according to SANRAL) for targeted enterprises. This is one of the most important processes that allows smaller sub-contractors to have an opportunity to participate in a project.

The structure has a program leader who monitors and oversees all activities on a daily basis whilst ensuring that the purpose of the program is being met. Under the program leader there are two champions of specialist works: one is for road signs and the other for civil works. Their primary purpose is to ensure that technical skills are developed within the program whilst also working very closely with the Health and Safety officer ensuring the program is competent in terms of all the Occupational Health and Safety Acts (Act 85 of 1993). The program also has team leaders which serve the purpose of mainly supporting the above-mentioned groups and mentorship of the Future Engineers on site and in all aspects, especially technically. The team leaders also work together with the interns that are coming from university. Then there are quantity surveyors who deal with the financials of the program and support the students in all quantity surveying related activities.

## VI. 24 MONTHS TRAINING

College institutions require students to complete twenty-four (24) months of experiential training to gain experience in line with their studies and be able to convert their National Certificate into a National Diploma qualification. This experiential training exposes students to various construction/civil engineering activities. As part of their training, they are required to spend at least 6 to 12 months of their training fully exposed on site and participate in labour intensive activities such as fencing, gabion channels, surfacing seals, manufacturing of kerb, block paving and layerworks. The aim is to get them to understand the basics of construction activities that they were never taught at college.

Leadership skills is one of the core qualities that students are taught. As Future Engineers they will one day be the directors of companies, site agents or general foremen of certain organizations outside of the program. During training they are granted opportunities to practice these leadership skills by being team leaders of their fellow colleagues or supervisors in training. During the training period they are also given additional study material, such as Colto, SARTSM, SAPEM, TRH and SABITA manuals, that they can use to grasp the technical aspect of the labour intensive activities they do on site. This literature study helps them to understand why things are being done in a certain way.

The students are trained to become specialists in their fields. This encourages them to try to understand and improve their technical ability and knowledge, forces them out of their comfort zone, realize their own potential and grants them an opportunity to assist their fellow students and even SMMEs. By training the students in specialist areas the program also ensures that students are given an opportunity to specialize in the activities that they enjoy doing the most with the hope that some may open their own specialist companies in future.

There are on-going workshops and trainings that the future engineers have been privileged to attend, such as Traffic Safety Officer/Roadwork Traffic Management, Basic Computer Literacy, First Aid and Health and Safety Representative. They have also been introduced to research and innovation workshops where they are given a platform to research industry related topics, give their input on the challenges facing the roads and construction sector and come up with recommendations that can contribute to the industry. In March 2018 some of the students got the opportunity to share their research at the annual Science Festival Africa aka *Sci-Fest Africa* that was held at Grahamstown.

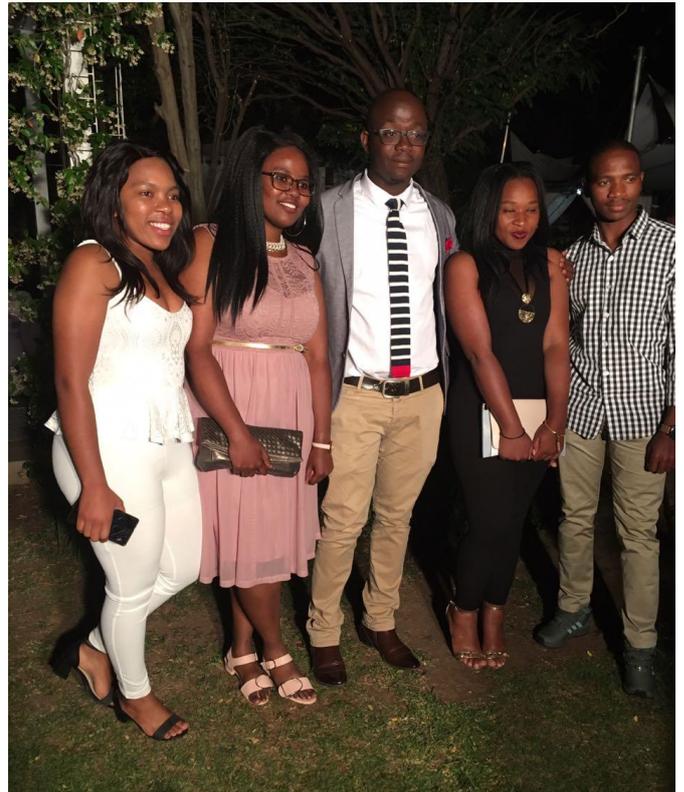
Good report writing skills are vital in the construction industry. Through article writing and weekly report writing the students get to work on acquiring and improving this skill. The management structure in place monitors students' progress and reviews their logbooks that they must complete and submit to college for them to be able to obtain their National Diplomas.

Extramural activities are also part of the program to keep the future Engineers active. For an example sport day (**Photo 4** below), College and school roadshows/Career expo, 67 minutes for Mandela, year-end functions with students, parents, colleges and premier's office (**Photo 5** below). The program also has

vocational-educational trips. The FEs are also encouraged to be involved in the program's long term plans and vision.



**Photo 4:** Future engineers team during 2017 sport day



**Photo 5:** First year celebrations and year end function for the future engineers



**Photo 6:** Program leader at one of the program strategic sessions workshop

## VII. FINDINGS AND THEIR IMPLICATIONS

Every program has its own challenges. Here are some of the challenges and findings that the program has faced and is addressing with the relevant departments:

### 1. Logbooks and training period

The training program differs according from colleges. Some Colleges require 18 months while others require 24 months.

Some of the colleges do not have formalized logbooks for the students to use. This is a serious challenge as they are required to capture what they did on a daily and monthly basis. The lack of logbooks also brought forward doubt as to whether the training being provided by the program is what is needed in order for the students to convert their National Certificate into a Diploma. The program management would recommend that a standardized logbook is used in all TVET Colleges within the Eastern Cape or even South Africa.

### 2. Course content (college curriculum)

Course content from N4 to N6 is mostly focused on building and surveying whereas civil industry also has civil works. It makes it very challenging because the students do not have the basic theoretical knowledge of civil works/road construction as they were not exposed to it at college. This means that before the students receive practical training they first have to receive theoretical training which sometimes is time consuming.

The latest log book activities that students need to complete within their 24 months of training has more than 70% civil works related items which then leads us to ask the question, why are there no civil works modules in their N4 to N6 curriculum?

### 3. Delay of issuing certificates

It has come to the program's attention that there is a delay in the granting of certificates at Pretoria once the students have completed their practical training. The program has since

requested intervention in this regard as it looks at producing 96 students in a year's time from now. The success of the program will also be judged on the number of students who are able to upgrade their qualifications. Thus for the success of the program this is the one area that really requires assistance.

### 4. Quarterly visits from respective colleges

There must be a partnership between the program and the colleges. For this reason, the program has requested regular visits from the colleges to come and see the respective sites that the students have been assigned to. This will allow interactions with the site team so that the program is able to serve the students by giving them the necessary exposure and practical experiential training. The program management team does not want to run this program in isolation as it strongly believes that if everyone involved works as a team, the program will benefit and the South African youth will be equipped with the right exposure, skills and necessary experience.

For the quarterly visits to happen, involvement from the TVET Colleges must be partaken. Unfortunately, the program has not gained full involvement from all the TVET Colleges, which can also be a lack of resources within the colleges and budget constraints. This remains a huge challenge as the program has students from TVET Colleges from all over the Eastern Cape which would mean that it requires full support from all the TVET Colleges and not only a few.

### 5. Very Old students

It has been discovered that a lot of students are very old, not because they studied at a later stage but since they stayed home for years after completing their N6. That then leaves the program with a mixture of old students and young students who were privileged enough to just finish their N6 and be taken in by the program. This age difference has in some instances been one of the biggest challenges the program has faced. The program management has since thought of ways of mixing the different age groups in such a way that the age disagreements are avoided.

### 6. Funds

Budget constraints limits the number of workshops or training courses that can be afforded to the students. Extramural activities have to be limited as well and at times students must use their stipend money so the program is able to attend to its year plans.

## VIII. CONCLUSIONS AND RECOMENDATIONS

The program continues to gain momentum and strives to be the best on the continent. It gives hope to the aspiring young generation, some who have been at home for 5 years after completing their N6. Managing students and having a system that incorporates extramural activities, workshops, courses, generic training and development into their training plan remains the important aspect.

Entrepreneurship remains one of the critical aspects when it comes to eradicating unemployment in our country and the FE program aims to produce entrepreneurs.

These types of programs require the right and passionate management, adequate strategic plan and objectives, funding and co-operation from all stakeholders. One cannot talk of radical transformation without training, skills transfer and capacity building being at the core.

## **REFERENCES**

FET Logbook

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