

## An evaluation of the impact of CBE's Maths & Science Support Program in South African Provinces

### Abstract

This research brief examines the impact the CBE's program on improving the grades of learners in mostly disadvantaged schools in various provinces in South Africa. There is a need to drive and facilitate skills and career development, and transformation, in the Built Environment (BE). The Council for the Built Environment (CBE) undertook a program to improve the results of Mathematics and Science (M&S) in schools in South Africa. The purpose of this program was to support and provide interventions to improve the grades of learners in M&S subjects and subsequently increase the number of learners who will embark on careers in the BE. The qualitative and quantitative research methodology adopted in conducting the study. Document analysis and a questionnaire survey were used to gather quantitative data. The findings from the different provinces revealed remarkable insights about the CBE M&S program. For an example in Mpumalanga, the study revealed that 56,7% of the project learners achieved at least level 4 which represents an improvement of 34% as compared to their grade 11 results. In the contrary, the shortcomings among the schools included the short duration of the program and teachers not being directly involved. Some schools indicated that the learners were not provided with transport and that the program did not offer beneficiaries bursary opportunities for tertiary education.

### Introduction

There is a general view that there is a need to increase the number of African learners, particularly those from previously disadvantaged communities who embark on M&S orientated careers such as qualifications in the BE. Among strategies and interventions to achieve this objective is the deliberate promotion of the uptake and pass rate in M&S at high school levels. As M&S are prerequisites for BE qualifications, it is acknowledged that students of previously or currently disadvantaged communities are poorly educated in M&S subjects and need to be supported. Consequently, the CBE decided to provide primary support to specific learning areas (quintile 1 to 3) that serve the poorest communities which need interventions in implementing M&S education development.

The CBE M&S support programme is aimed at grade 12 (matric) level to attract them into BE professions. The CBE executed this programme through formally appointed service providers based on their experience of implementing similar M&S programmes. The project began in 2014/2015 in

Limpopo, Gauteng, Northwest and the Free State. The programme was also approved for implementation by the CBE in three other provinces, namely KwaZulu-Natal, Eastern Cape and Mpumalanga for the 2015/2016 financial year.

Schools were approached and engaged through the medium of letters. M&S teachers were identified at participating schools as either tutors or as motivators of their learners. Grade 12 learners, who showed potential to improve their marks through the support programme, were identified. Learners attended weekend, afternoon and holiday classes in M&S. There were variations in the implementation of the programme within the provinces, depending on the demands at the selected schools as well as the implementing service providers.

The scope of the M&S programme allowed for at least 450 students in grades 10 to 12 to benefit from it. The project focussed on the following aspects:

- enabling (improve skills needed to excel in M&S),

- career guidance (provide information about career opportunities and bursary schemes in the BE),
- CBE skills development (staff members also promoted career awareness to selected M&S learners),
- visits to the BE industry (ensure learners were familiar with the idea of studying and working in the BE).

As stated above, the programme was implemented through formal appointments with multiple service providers and stakeholders. Participants were:

- Provincial Departments of Education: KwaZulu-Natal, Eastern Cape and Mpumalanga
- Service Providers: Nompumelelo Institute of Leadership, Maths Centre and Kusile Labs and Technology
- CBE M&S Support Programme administrators
- Individual schools in the three provinces

The specific objectives of the project were to:

- Assess the impact of the CBE M&S programme on learners
- Identify the number of students in the programme interested in BE qualifications
- Assess the impact of the programme from the perspective of the Provincial Departments, teachers and schools
- Assess the overall value-add of the programme, highlighting the shortcomings
- Select one similar programme elsewhere to compare the impact and value for money

## Methodology

To achieve the aim of the study, a mixed method i.e. qualitative and quantitative approach was adopted. Sampling techniques were used to identify schools, learners and service providers who were involved in the CBE M&S programme from 2014/2015 to its end in March 2017, therefore a case study research design was adopted. Document analysis and a questionnaire survey were used as instruments to gather quantitative data on the number of students who participated in the programme, their performance, grades, attrition, retention, throughput rates, resources as well as the uptake in BE disciplines.

Key informants from the CBE, Department of Basic Education, Provincial Departments, and tertiary institutions were interviewed. Each participating school's principal, teachers and members of the governing body were also interviewed.

Statistical analysis was undertaken to analyse the quantitative data, while qualitative data gathered through interviews and observation were analysed using content analysis.

## Research Findings

Findings reported were obtained from data collected in Mpumalanga, Gauteng, KwaZulu-Natal, Northern Cape and Eastern Cape.

The data, collected through focus groups and individual interviews, assessed the impact of the CBE M&S programme in the participating provinces.

### *Performance of beneficiaries*

#### Mpumalanga

Data on the performance of 150 selected learners in ten schools were obtained and analysed. Their M&S performance in grade 12, at the end of the programme was assessed and compared with their grade 11 results. It was found that 56,7% of the project learners achieved at least level 4, which represents an improvement of 34% as compared to their grade 11 results.

The improvement in performance can be attributed to factors such as the approach to implementation where learners were provided with CAPS aligned maths study guides, synthesised worksheets, learning videos and past exam type questions.

#### Gauteng

A total of 52 grade 12 subject learners benefitted from the CBE programme, despite the decrease in the provincial and national pass rate. In maths, 86% and physical science 80,3% of learners increased their marks or remained the same.

#### KwaZulu-Natal

Comprehensive data of the performance of the beneficiaries in this province was not availed by the service provider. However, the final report to the CBE indicated an increase in grade 11 and 12 learners' performance. Their average scores in maths increased from 35% to 41%, and the average for science increased from 25% to 42%. There were no details on students' grades that could be used to analyse the performance trends before and after the implementation of the support programme.

#### Northern Cape

Eleven underperforming schools with pass rates less than 40% in M&S were selected for the programme in the Northern Cape. This translated to a selection of 150 learners, based on their perceived potential to improve their marks. Of the 150 learners, nine recorded a tremendous improvement in performance. However, analysis of the results using the t-test statistics indicated that in both maths and science there was no improvement in performance.

The reasons for the above could have been that the programme started late, and learners struggled with transportation to the programme venue.

## Eastern Cape

There were no statistics available at the time of the study. However, the service provider reported that the programme was impactful and beneficial for students. The overall aggregate for the district improved substantially. Maths improved from 56% to 63% in 2016. Science was 47% in 2015 and improved to 65% in 2016. The overall percentage increased by 18% from an overall percentage of 47% to an output of 65%.

### *General impact of the CBE M&S support programme.*

This section of the report presents the perceptions of the programme's stakeholders on their involvement as well as the impact of the programme on learners.

## Beneficiaries

In all provinces, programme managers reported that learners were receptive to the programme and well behaved. Their interest and performance in M&S improved in most provinces. There was consensus that the programme had a positive impact on the beneficiaries (schools and learners).

## Stakeholder Participation

Success of the programme can be attributed to the wide participation of stakeholders. The districts supported the programme, ensuring buy-in from the schools, although some schools believed that the district should in future be more involved in the implementation and monitoring.

## Parental Involvement

Buy-in from parents was noted as key to implementation of the programme. Service providers indicated that parents did not want the programme to end. Further comments informed that feedback from parents was positive and they encouraged the learners to attend.

### *Overall value-add and shortcomings of the programme.*

The value-add of the programme can be summarised as follows:

- Overall performance of participating schools increased
- Attitude of learners towards M&S improved
- Teachers from participating schools benefitted indirectly
- Learners who benefitted from the programme shared content with others
- The reputation of participating schools improved

There were shortcomings identified:

- Short duration of the programme
- Teachers not directly involved
- Transport to the venue

- the programme did not offer beneficiaries bursary opportunities for tertiary education

## **Recommendations**

The following recommendations were made to the CBE based on the findings of the programme:

1. The launch and close of the programme must be formal and structured.
2. The programme duration must extend beyond three years to obtain meaningful impact and link to the transformation of the BE agenda.
3. It must include all school learners from grades 8 to 12.
4. The programme must focus on less privileged schools in remote areas.
5. It should provide a structured capacity-building component for teachers in beneficiary schools which addresses issues of school governance and content understanding.
6. Learners with very poor M&S marks should also attend the programme.
7. The programme budget must be allocated to learning materials like study guides, mobile labs, textbooks and teacher incentives.
8. A communication plan should be adopted and implemented through the duration of the programme to keep all stakeholders informed.
9. Efficient transportation should be provided for learners.
10. Learners should be supported with uniforms and stationery.
11. Learners should be offered funding assistance for their tertiary education, especially those who enrol for a BE qualification.

## **Conclusion**

Findings from the provinces revealed interesting insights about the programme viz.:

- Learners' grades in M&S were most positively impacted.
- The most notable shortcoming was the lack of deliberate involvement of teachers from beneficiary schools.

## **Areas for Future Research**

An area for future research is the continuous evaluation of the impact of M&S programmes, inclusive of lower grades such as 8 to 11 with adequate participation.

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Approved

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