

## Editorial

Semester 1 of 2016 saw an active period of consolidation for the GMMDU as the FirstRand Mathematics Education Chair programme drew to a close at the end of 2015. The escalation of the scope and nature of R&D activities of the unit over the past two years has also resulted in an urgent need to be upgraded to an Engagement Centre. An application in this regard is currently being considered by management of the Science Faculty. The recent maturation of the Integrated TouchTutor™ Support Programme (ITSP) also allowed for the implementation of a much more holistic approach to critical mathematics and science support needs in under-resourced secondary schools this year. This also allowed the unit to extend the scope of our development collaboration with key funders in the private sector. As a result the balance of the development work of the unit shifted this year to include more school based mathematics and science support for learners and teachers. At the same time, the unit made great strides to bring the development of a professional version of the TouchTutor™ application for Android as well as the CAPS Physical Science content package for Grades 10-12 to its finality. A project to extend the digital resource basis for the techno-blended teaching and learning model for mathematics to include the Senior School Phase (grades 7-9) has also been given a boost in the first half of 2016. All indications are that the TouchTutor™ package for Grades 7-9 will be completed before the end of the year and be ready for use in schools in 2017. Strategic initiatives to establish a core group of lead mathematics teachers in the province who could assist peer teachers to improve the quality of the teaching and learning of this subject were also implemented in collaboration with the Department of Basic Education. Another exciting development which was started in the first semester of 2016 is the consolidation of the mathematics and science school support model via mobile phones. A local company was commissioned recently to assist with the development of a software application which will run independently as an offline mathematics and science support package on Android devices. This package will also facilitate more exciting and flexible school based mathematics and science competitions in future and will allow for the phasing out of the Mxit based school support and competition model that was used by the unit over the past four years. Hence the 1<sup>st</sup> semester of 2016 saw a beehive of R&D activities in the unit. This in an attempt to consolidate our existing mathematics and science development agenda while positioning the unit to play an even more central engagement role in addressing the crisis in mathematics and science education in secondary schools and TVET colleges.

# GMMDU Newsletter

Govan Mbeki Maths Development Unit

Jan - June 2016

## Maths and Science Support for Cookhouse Windfarm Schools

Eight high schools Eastern Cape Midlands area are benefitting from the engagement of the Govan Mbeki Mathematics Development Unit (GMMDU) at NMMU with the Cookhouse Windfarm Community Trust. The collaboration provides resources and expertise to support Mathematics and Science teaching and learning as part of a three year programme to uplift maths and science performance in the schools in order to create more opportunities for more learners from these communities to access higher education and employment opportunities.

Developed specifically for learners with potential but in need of support, the curriculum-aligned, offline programme, developed by the GMMDU, puts the spotlight on improving teachers' professional capacity and supporting learners to consolidate and improve their knowledge and skills.

Central to the project is the comprehensive TouchTutor™ package called which uses video-based Maths and Science content, animated PowerPoint lessons, learner workbooks, self-tests and a range of additional curriculum-aligned digital support material, to support learning and teaching of Mathematics and Science. The package is available on laptops for teachers – which can be used as teaching aids in the classroom – and Android tablets for learners, to be used as “personal tutors” after school hours and in the Incubator Schools which have been established in Somerset East and Bedford. Desktop models are available at each school in the form of a resource centre to ensure more pupils have access to the support programme.

Participating schools include Gill College, Johnson Nqonqoza SSS and Aeroville SSS from Somerset East, Cookhouse SSS, Templeton High School and Lonwabo SSS from Bedford

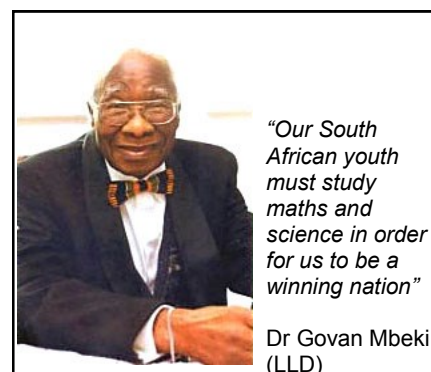
and Adelaide Gymnasium and Siphon Camagu SSS from Adelaide. The programme involves teachers in communities of practice which provide opportunities for skills and content knowledge development as well as a supportive environment for sharing strategies for tackling the challenges inherent in education in under-resourced rural contexts. For the learners there is the opportunity for cooperative learning as part of the Friday afternoon incubator school classes and also at TAPS sessions after school. Individuals and groups can independently access digital learning material on the desktop computers.

While significant challenges have surfaced in relation to the poor educational background of learners and the ability of schools to consistently retain a full quota of qualified teachers, there are encouraging signs of teachers and learners taking the initiative to use the material provided by the programme to lift performance and professional practice. In response to the acute support needs of Grade 8 and 9 learners, the GMMDU is fast-tracking its materials development project for the GET phase so as to make its products available at this level as well as FET. In addition to the formal programme, various schools have shown initiative in organizing supplementary holiday programmes and weekend workshops.

In the broader scenario of rural schools tending to drop mathematics and science from their curricula, the Cookhouse Windfarm Community Trust Maths and Science Programme is a beacon of hope in challenging times for these communities. In addition to the GMMDU, the Trust has contracted other service providers to engage with schools about management, learner development and motivation, without which academic progress is more difficult to achieve.



Learners from the Bedford Maths and Science Incubator School Programme receive their tablets.



*“Our South African youth must study maths and science in order for us to be a winning nation”*

Dr Govan Mbeki (LLD)

# Mathematics Lead Teachers across the province - DBE partnership

IN a bid to boost mathematics results in secondary schools throughout the Eastern Cape, more than 200 teachers have been identified in collaboration with the DBE as "Lead Mathematics Teachers" in the province. Each of the 23 DBE districts of the Eastern Cape is represented by a number of teachers who will assist their colleagues at under-performing schools.

Lead teachers, who are mostly from disadvantaged schools, were trained to share specialized mathematics T&L resources, boost CAPS mathematics content of fellow teachers and mentor teachers in their districts to get involved in various extra-curricular classes, like winter school programmes, while also utilising innovative digital teaching and learning resources that have been developed and distributed by the GMMDU.

The first cohort underwent four days of training, from 02-05 June 2016, through a programme jointly run by Nelson Mandela Metropolitan University's Govan Mbeki Mathematics Development Unit (GMMDU) and

the Department of Basic Education. Training took place at the Coega Village Conference Centre – and a further four days' training are planned for later this year.

The above initiative comes in the wake of a 1-year NMMU accredited CAPS Mathematics Content and Skills Upgrade Programmes (MATHSUP) for in-service teachers that was successfully run by the GMMDU over the past three years. More than 700 Eastern Cape teachers have benefitted from this collaboration with the DBE which also saw substantial investments from the ETDP SETA towards the training and resourcing of the teachers. Most of the current cohort of lead Grade 10, 11 and 12 Mathematics teachers were selected on the basis of their top performance in the MATHSUP programme.

The overall aim of this strategic project is to empower a cohort of selected in-service Maths teachers to turn around the achievement in mathematics outcomes in the province.



Lead Mathematics Teacher Training at Coega Convention Centre – June 2016

# BKA Integrated Support Programme

Govan Mbeki Mathematics Development Unit has partnered with BK Administrators, as sponsors, to support the teaching and learning of Mathematics and Science in selected schools through teacher training and learner support programmes by utilising the TouchTutor™ software.

BK Administrators, a charitable trust based in the Border region, identified schools in Queenstown (Get Ahead College, Queens College, Girls High School and Hangklip High School), King Williamstown (Dale College, Kingsridge High School and de Vos Malan High School) and Port Alfred High School, as suitable schools to incorporate the GMMDU's TouchTutor™ software into their support programmes.

At the launch of the programme on 22 July at de Vos Malan High School teachers and Principals from the schools gathered with representatives of the GMMDU and BKA to sign MOUs and receive sets of 10" Android tablets. Schools had previously been provided with desktops and teachers' laptops had been loaded with the TouchTutor™

system and a wealth of additional teaching and learning material.

Schools have committed to a process of identifying needs and strategies to use the resources to support Mathematics and Science teaching and learning with the aim of boosting performance in these subjects at the schools. Teachers will be involved in a community of practice around the effective use of the TouchTutor™ system and more general strategies for the effective educational use of IT, including the dynamic graphics package GeoGebra.

Professor Werner Olivier and Dr Philip Collett of the GMMDU presented an overview of the Unit's techno-blended model and a framework for the management of the programme. Mr Hugh Wormald, Chairman of the BKA Board, encouraged schools to utilise the opportunity fully and stressed the significance of individual commitment and action by teachers and learners which lead to an improvement in schools, particularly in the disciplines of Mathematics and Science which are key drivers of economic and social development.

# Tablet Assisted Peer Support (TAPS) for mathematics shows great promise

The TAPS model seeks to empower learners to engage in self-directed learning and provide a very strong support for not only conceptual content gaps learners may have, but also the gaps left in teaching in the classroom as many teachers do not finish the curriculum in time.

This support programme is the latest learner development model to emerge out of the unit's comprehensive Integrated TouchTutor™ Support Programme (ITSP) model for mathematics and physical science in secondary schools. The ITSP include Saturday incubator schools, a school-based desktop support model for learners, and laptop-assisted professional skills training for teachers. The tablet, desktop and laptop models are all pre-installed with the innovative TouchTutor™ digital support package.

TAPS was piloted for the first time in 2015 as part of the FirstRand Mathematics Chair programme in 10 schools in Port Elizabeth and in the Old Mutual Flagship Education Maths and Science Programme in 18 secondary schools in King Williamstown. Strong evidence has emerged recently that confirms that the TAPS programme holds great promise to make a noticeable difference to mathematics learning in disadvantaged schools throughout the Eastern Cape.

So far this year, the TAPS programme has seen almost 1000 tablets distributed to Grade 10 to 12 learners with potential in over 50 schools in the King William's Town, Somerset East, Queenstown and Port Elizabeth areas. It has also attracted the attention of key funders in the private sector and enjoys the full support of the department of Basic Education at district and provincial levels.

The TAPS model has been designed to assist learners after-hours at disadvantaged schools, where there are many challenges including disruptions to teaching, a lack of capacity, or teachers themselves who struggle with core areas of the curriculum. As it turned out, TAPS can even help learners where there are no maths and science teachers at all.

How TAPS works is that selected learners meet after school, in groups with their peers. A teacher from the school (or a retired teacher from the community) facilitates the programme which is closely aligned with the mathematics curriculum implementation in schools. Each learner on the programme receives a tablet containing user-friendly TouchTutor™ for use on a 24/7 basis. This allows learners to interact with video lessons, animated PowerPoint lessons, and digital maths applet illustrations, all fully aligned with the CAPS curriculum for Grade 10 to 12. It also includes lesson aligned self-assessment and feedback, interactive language support (in isiXhosa, English and Afrikaans), past matric papers for revision and even career guidance. The entire package is offline which ensures learner access the T&L material anywhere and anytime.

Learners can work through the material on the tablets on their own, but at the TAPS session, they engage with their peers and receive topic-specific guidance via structured TAPS guides and from a knowledgeable person, in line with the school curriculum. The TAPS model is currently also used in the delivery of the Saturday incubator school programme that the GMMDU offers to top Maths and Science pupils who aim to get into university.



**Tablet Assisted Peer Support (TAPS) Programme in action at schools and incubation programmes**



PHELOKAZI Nguqu (**below**), 18, is studying medicine at the University of Cape Town. It's a dream come true for the rural Eastern Cape matriculant from King Williamstown – and one she attributes to a unique learning opportunity via the TAPS programme in her school last year. The Dimbaza youngster's maths marks climbed from 76% in Grade 11 to 86% in her matric finals, while her science marks shot up from 65% to 92% – a result of her being selected to attend a pioneering teen-orientated, technology-linked TAPS pilot programme, covering the entire maths and science syllabus from Grade 10 to 12.



## OLD MUTUAL SCHOLARSHIP PROGRAMME:

NMMU students receive scholarship boost through Old Mutual - beneficiaries were all previously part of the Old Mutual Education Flagship programme. Here with the students are Buyiswa Yaya (top left) and Renita Affat of the NMMU Trust, Mr Dali Matta, Old Mutual, Prof Muronga, Dean of Science at NMMU and Prof Olivier, Head of the GMMDU



**See Video Link:**  
<https://www.youtube.com/watch?v=HOs4tBI6A2k>

# GMMDU in the NEWS

Publication: Herald (Morning Free)  
Date: 13 Jun 2016  
Page: 5

## Top teachers get specialised training

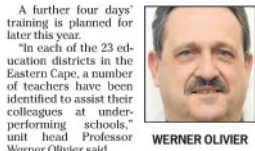
Herald Reporter

Varsity mathematics unit and education department expand help to improve marks

**I**n a bid to boost mathematics results, a group of top-performing Grade 10, 11 and 12 teachers, all from disadvantaged schools, have been selected to mentor and assist others.

They will also help with structured exam revision.

A total of 150 teachers identified as "lead mathematics teachers" in the province have completed four days of training through a programme jointly run by NMMU's Govan Mbeki Mathematics Development Unit and the Department of Basic Education.



WERNER OLIVIER

A further four days' training is planned for later this year.

"In each of the 23 education districts in the Eastern Cape, a number of teachers have been identified to assist their colleagues at under-performing schools," unit head Professor Werner Olivier said.

"The lead teachers will share resources, boost content and encourage teachers to get involved in various extracurricular classes, like winter school programmes, while using innovative digital teaching and learning resources that have been developed by the unit."

Department skills development chief director Duma Ncanywa said the lead teachers would work closely with district subject advisers.

"In the coming years, the department will also be setting up similar structures, including the establishment of professional learning centres, for grades 7 to 9 maths teachers to enhance the quality of teaching and learning," Ncanywa said.

Port Elizabeth FET level district mathematics adviser Cecil Heradien said the Eastern Cape's lead teacher initiative – the only such initiative in the country – would greatly benefit teachers and pupils.

"It will help teachers become more confident in teaching curriculum content," she said.

As the only maths subject adviser in the Port Elizabeth district, Heradien oversees about 200 maths teachers at 80 high schools, making it difficult to provide individual support. But lead teachers will now be able to form small cluster groups with their peers, an initiative which will address this challenge.

Heradien said the project would expose more teachers to using technology in their classrooms.

"Not only will it save time [drawing sketches], but it will also help pupils to better visualise the concepts."

The NMMU unit has run accredited mathematics content and skills upgrade programmes (Mathsup) for more than 700 Eastern Cape

teachers over the past three years, and the lead teachers have been handpicked as those who performed at distinction level, within this group.

Each of the teachers who attends Mathsup receives a laptop with the unit's innovative technology-linked teaching and learning programme (packaged as TouchTutor).

This has been developed in line with modern pupils' learning requirements, the unit says.

It is used not just to boost their own understanding of the maths curriculum, but also as a teaching resource to be used in the classroom.

The unit says TouchTutor includes video lessons, interactive PowerPoint presentations, assessment (with feedback), language support and other digital features, fully aligned with the grade 10 to 12 syllabus. It offers the same for physical science teachers.

Publication: New Age, The  
Date: 13 Jun 2016  
Page: 24

## Bid to boost maths results

Skills Development selects top teachers to mentor, assist their colleagues at under-performing provincial schools

INA REPORTER

**I**N A bid to boost maths results throughout the province, a group of academically top-performing grade 10, 11 and 12 maths teachers from disadvantaged schools have been selected to mentor and assist other teachers in their districts and also help with structured exam revision.

A total of 150 teachers identified as "lead mathematics teachers" in the province have completed four days of training through a programme jointly run by Nelson Mandela Metropolitan University's Govan Mbeki mathematics development unit (GMMDU) and the Department of Basic Education (DBE).

Training took place at the Coega Village Conference Centre in Port Elizabeth and a further four days training are planned for later this year.

"In each of the 23 DBE districts of the Eastern Cape, a number of teachers have been identified to assist their colleagues at under-performing schools," GMMDU head Prof Werner Olivier said.

"We want to empower a cohort of selected in-service maths teachers to turn around the achievement of mathematics outcomes in the province."

"The lead teachers will share resources, boost content and encourage teachers to get involved in various extra-curricular classes, like winter school programmes, while utilising innovative digital teaching and learning resources that have been developed by GMMDU."

Duma Ncanywa, the DBE's chief director of skills development said the lead teachers would work closely with



ENHANCING TEACHING: NMMU and the department of basic education are training 150 leading mathematics teachers from disadvantaged schools in the Eastern Cape to assist and mentor their colleagues.

district subject advisers.

"In the coming years, the DBE will also be setting up similar support structures, including the establishment of professional learning centres, for grades 7 to 9 maths teachers to enhance the quality of teaching and learning in their classrooms."

Cecil Heradien, subject adviser for mathematics (FET level) in the Port Elizabeth district, said the Eastern Cape's lead teacher initiative, the only such initiative in the country, would greatly benefit both teachers and pupils.

"It will help teachers become more confident in teaching curriculum content to pupils," As the only maths subject

adviser in the Port Elizabeth district, Heradien oversees about 200 maths teachers at 80 high schools, which makes it difficult to provide individual support.

Lead teachers will now be able to form small cluster groups with their peers, which will address this challenge.

Heradien said the project would also expose more teachers to using technology in their classrooms.

"Not only will it save time (drawing sketches), but it will also help pupils to better visualise the concepts."

GMMDU has run accredited mathematics content and skills upgrade programmes (Mathsup) for more than 700 Eastern Cape teachers over the

past three years and the lead teachers have been hand-picked as those who performed at distinction level, within this group.

Each of the teachers who attends Mathsup receives a laptop with GMMDU's innovative technology-linked teaching and learning programme, which has been developed in line with modern pupils' learning requirements.

It is used not just to boost their own understanding of the maths curriculum, but also as a teaching resource to be used in the classroom.

TouchTutor includes video lessons, interactive PowerPoint presentations, assessment (with feedback), language

support and a host of other digital features, fully-aligned with the grades 10 to 12 syllabus.

It offers the same for physical science teachers.

GMMDU runs Mathsup in parallel to its flagship incubator programme for selected pupils with potential, where pupils receive TouchTutor on a tablet, which they can use after school hours as a "personal tutor".

There is also a desktop model – which includes TouchTutor on PCs – which has been introduced at more than 100 schools in the Eastern Cape to assist pupils outside of the incubation programme.

provincenews@thevoice.co.za

Publication: Herald (Morning Free)  
Date: 02 Jun 2016  
Page: 8

## Scholarships a boon for maths, science students

Herald Reporter

**S**IVUYISIWE Gora, 20, falls into the so-called missing middle category of students – deemed not poor enough to qualify for the National Student Financial Aid Scheme (NSFAS).

She achieved outstanding results in her first year of analytical chemistry at Nelson Mandela Metropolitan University (NMMU) last year but, unable

to pay her fees, almost dropped out.

NMMU's debt and down-payment management initiatives earlier this year, in response to the #FeesMustFall movement, meant she could register for her second year – but still had no funding whatsoever. So it was with much relief last week that she received a full scholarship through the newly launched Old Mutual Scholarship Fund Programme.

Gora, of King William's Town, is one of 10 undergraduates at NMMU selected to receive the substantial scholarships, based on their outstanding results in maths and science subjects.

Each scholarship is worth R70 000 to R80 000, depending on the student's financial requirements.

NMMU's Govan Mbeki Mathematics Development Unit – which runs its highly successful technology-linked

maths and science incubator school programme at 18 high schools in the King William's Town area through the Old Mutual Education Flagship Programme – manages NMMU's scholarship programme and will also mentor and support the students.

The Old Mutual programme – a R25-million-a-year national initiative which runs at nearly 50 schools, including several in the Free State and Limpopo –

is one of many projects in which the maths development unit is involved.

It aims to boost the performance levels of grade 10 to 12 maths and science pupils, improving their chances of accessing higher education, and growing their teachers' skills.

Old Mutual is also partnering with two other universities (Free State and Limpopo), which will see a total of R2-million given to financially needy, deserving students this year.

Gora, who had applied unsuccessfully for many bursaries, said she had at first not believed the email confirming her selection.

"Only when I saw [it] was addressed to me, I knew it was true."

Another recipient is first-year mechatronics student Bandle Danza, 19, of East London, who was overjoyed to be selected.



FINANCIAL LIFELINE: Sivuyisiwe Gora, left, Bandle Danza and Avela Mbelani are delighted with the scholarships they received last week

Publication: Herald (Morning Free)  
Date: 12 Jun 2016  
Page: 12

## Pupils tap into success

Devon Koen  
koen@timeslive.co.za

**H**IGH school pupils across the Eastern Cape are set to benefit from a technology-linked programme which aims to assist them with maths and science.

Since last year, Nelson Mandela Metropolitan University's (NMMU) Govan Mbeki Mathematics Development Unit (GMMDU), in partnership with Old Mutual, has been pioneering the technological programme, which covers the entire maths and science syllabus from Grade 10 to 12.

More than 500 selected pupils from schools in the King William's Town district, received a tablet pre-loaded with the TouchTutor™ software last year, as part of the tablet-assisted Afterschool Peer Support Programme (TAPS).

The software includes video lessons, animated PowerPoint presentations and digital interactive content, which all are fully aligned with the CAPS curriculum for Grade 10 to 12. It also includes self-assessment and feedback, interactive language support, post-matric papers, for revision and career guidance.

The entire package is offline, which ensures learners access anywhere and at any time.

Head of GMMDU at the university, Professor Werner Olivier said "TAPS is the most sustainable programme we have yet developed – and one that could make a difference to disadvantaged schools throughout the Eastern Cape."

Pupils selected to be part of the TAPS programme meet after school to engage with their peers and a teacher from their community.

Each pupil receives a tablet containing the technology-linked teaching and learning model, which has been put together as a user-friendly package – called TouchTutor™.

Pupils can work in their own time on the tablets on their own, or in small groups, where they engage with their peers and re-



FIGURE OUT: The Tablet-assisted Afterschool Peer Support Programme

ceive topic-specific guidance via structured TAPS guides and from a knowledgeable person.

GMMDU has been assisting maths and science pupils for the last eight years and has spent the past five years developing the current model. This year alone the TAPS programme has seen almost 1,000 tablets distributed to pupils in more than 50 schools in the King William's Town, Somerset East, Queenstown and Port Elizabeth areas.

"Often, there are disruptions to teaching, due to a lack of capacity or teachers themselves struggle with core content in the curriculum," Olivier said.

University of Cape Town (UCT) student Thabane Nqutu, 18, who is studying medicine, said it was a transformative year. "I am an Eastern Cape matriculant to be studying at UCT and attributed her success to the unique learning opportunity she received last year."

"This could apply the TAPS programme helped me get into medicine," Nqutu, who received a distinction in maths, and was the top pupil in the King William's Town district, said.

"I've been keen on what I get in Grade 12. Everyone knows it's not easy getting into medicine."

PHILOKAZI NQUTU



Five of the 19 Incubator School learners who improved their maths and science marks by an average of 10% or more in their matric exams in 2015 receive their android tablets as part of an incentive programme. Six of the ISP learners who received tablets are registered as first year students at NMMU.