

GMMDC

**Govan Mbeki Mathematics
Development Centre**
empowering young minds

GammaTutor™ - an innovative new teaching device for schools in SA

Contributed by GMMDC Director Prof Werner Olivier

After a year of development and testing, the GMMDC is ready to launch the GammaTutor™, a highly innovative pocket-sized plug-and-play device that was developed in partnership with Gamma Education Services.

The device is set to be the flagship development of the Centre in its quest to improve the teaching and learning of maths and science in South Africa.

The GammaTutor™ device is designed to be used with the GammaTutor™ software Package, which was also developed by the GMMDC as a separate offline Android app for teacher support, or as after-school learner support at any second site of learning.



When plugged into a data projector, a TV or any screen, it becomes a comprehensive mobile maths and science teaching and learning resource centre for the classroom – or indeed anywhere. It truly is a valuable 'Teaching Assistant in your Pocket' and is destined to have a noticeable impact on teaching practice in school classrooms as well as after-school support, as it can be used to create 'second sites of learning' for after-school study.

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GammaTutor™ has a comprehensive set of pre-installed digital resources, which are activated at the click of a mouse. The result is that the logistics of presenting lessons and accessing support material in classrooms or study venues has never been easier.

Teachers who use this device with a wireless mouse can move around the classroom while teaching, which improves the interaction between teacher and learner. The pre-installed apps contain quality interactive digital material that is aligned with the curriculum, to assist with lesson preparation and presentation. This takes a huge load off the teacher in terms of the time it takes to prepare quality lessons.

Finally, the small size of the device makes it easy to manage. It can be popped into a pocket or locked in a briefcase for security, and carried easily from one class or teaching venue to another.

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Maths in Manmade Designs or Maths in Nature

Contributed by Carine Steyn, Academic Programme Manager



MATHEMATICALLY ARTISTIC Learners: Winners in the GMMDC National Math Art competition include (back, from left) Paarl Gymnasium's Hano Nieuwoudt, Redhill High's (Johannesburg) Kiara Knopfmacher and Luke Ferreira, Diocesan School for Girls' (Grahamstown) Erin Powers, Framesby High's (Port Elizabeth) Kara van Heerden, Eden College's (Durban) Dorina Cherneva, Sibangani Matsa from the University of Johannesburg's Metropolitan Academy, Beaconhurst High's (East London) Morgan Durrheim and (front, from left) Fish Hoek High's Caitlin Wilde, Sir Pierre van Ryneveld High's (Johannesburg) Busisiwe Mbonani and Eunice Girls' High's (Bloemfontein) Lauren Damstra. School with most entries: Eunice Girl's High, Bloemfontein

The first National Math Art competition held by the Nelson Mandela University's Govan Mbeki Mathematics Development Centre (GMMDC) in May this year was a roaring success. A provincial competition last year was so well-received it was extended to a national competition.

The competition aims to encourage learners to view maths differently, as well as to see how maths is embedded in objects around them. The learners had to create a 2-dimensional artwork in one of the following two categories: Mathematics in Manmade Designs or Mathematics in Nature. The artworks were judged on the creativity of linking mathematics to art and on their explanation of how they portrayed mathematics in their artwork.

"It aims to develop creative young minds and an awareness of the skills challenges of the Fourth Industrial Revolution"

In 2018 we received 113 entries from 36 schools. In 2019 we were surprised with 593 artworks from 75 schools all over South Africa. The judges had a difficult task in selecting the 12 winners. The prizegiving was held in the Nelson Mandela Metropolitan Art Museum on Saturday, 8 June.

The entries were exhibited at the Nelson Mandela Metropolitan Art Museum in June 2019 and a selection of artworks was also exhibited in Linz, Austria at the International Bridges Math Art Conference in July 2019.

The competition adds an innovative educational layer to the GMMDC's 'techno-blended' approach to teaching and learning of maths and science. It aims to develop creative young minds and an awareness of the skills challenges of the Fourth Industrial Revolution.

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SACE accredited Professional Development for Maths Teachers

Compiled by Carine Steyn, Academic Programme Manager

The GMMDC was excited to receive SACE accreditation for our GET phase (Grade 8 & 9) professional development programme for Maths Teachers in March 2019.

A similar SACE accredited programme for FET Maths Teachers (Grades 10-12) was registered in July of 2018.



Teachers from Queenstown hard at work at Get Ahead College

The professional development programmes for both phases follow a TPACK (Technological, Pedagogical and Content Knowledge) approach and aim to establish professional learning networks (PLN's) of in-service teachers who engage in 21st century teaching practice in classrooms.



Teachers from East London and King Williamstown receiving training in the use of GeoGebra 2019.

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Each programme is designed to improve teaching methods. They cover a range of CAPS-aligned topics combined with training in the use of technology in the classroom. Each programme is divided into eight full-day short learning programmes (SLP's) that cover key content from academic focus areas of the curriculum. During each SLP, teachers are assessed using pre- and post tests and also have to complete a self-study assignment. For the completion of the assignments, teachers are encouraged to use technology.



Senior phase teachers from King Williamstown discussing number patterns

More than 150 in-service FET teachers in the Eastern Cape have participated in successful Maths TPACK programme deliveries since July 2018. Sessions were held in East London, King Williamstown, Queenstown, Bedford and Port Elizabeth and teachers from the sponsored GMMDC projects were selected to attend the sessions. The participating teachers expressed their appreciation and strong support for the training, quality of resources and technology skills development that were provided. A cohort of GET teachers also started their own SLP courses dedicated to TPACK and issues concerning grade 8 and 9 mathematics in January 2019.



Teachers at the library in Somerset East

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Maths and Science Incubation programme lifts Grade 12 results

Compiled by Prof Werner Olivier, Director

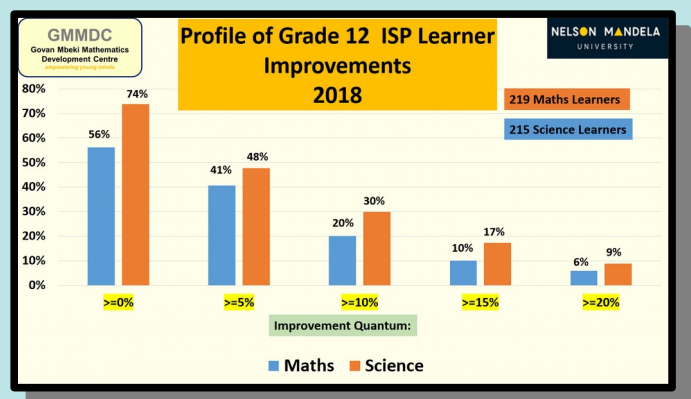
The 'techno-blended' maths and science Incubator School Programme (ISP) that was run last year by the Nelson Mandela University's Govan Mbeki Mathematics Development Centre (GMMDC) resulted in 70 learners out of the 330 Grade 10-12 participants improving their marks by more than 10 percentage points.

About 80% of the participants achieved bachelor passes despite the resource challenges in their rural schools. The sponsored programmes were run in Port Elizabeth, Queenstown, King William's Town, East London and Mthatha.

The top achievers received results in the 90s. Mvuyisi Njenje, 17, from Mthatha, achieved 100% for maths.

The most-improved learner was Queenstown's Yamkela Sondlo, 17, whose maths and science marks shot up from 32% and 31% respectively at the end of Grade 11, to 64% and 78% at the end of Grade 12.

King William's Town teenager Luphelo Tshemese, 17, who passed matric with a remarkable 80% for maths is now studying civil engineering at Nelson Mandela University. Two years earlier, he had been failing Grade 10.



The secret of the success of the 17-week ISP, run at central venues on Saturday mornings, hinges on the innovative TouchTutor®, an offline interactive Android app. The app is an extensive digital maths and science learning support resource that includes narrated videos science experiments, Power Point presentations, past exam papers, self-tests with scoring and feedback, a built-in calculator and a glossary of terms in several indigenous languages – all aligned with the CAPS school curriculum.

Each ISP participant receives a tablet with the pre-loaded app, which they can use after-hours as a personal tutor. If their marks improve by 10% a year in both maths and science, they receive their own tablet as an incentive. In 2018, more than 20% of the participants earned this reward.

This fits with similar trends over the last three years of the programme. 50% of the ISP learners go on to university while others enter TVET colleges.

GMMDC's selection criteria for its programmes, which starts at Grade 10 level, is that pupils attend disadvantaged schools, and that they show potential.

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GMMDC Sci-Africa Exhibit in 2019

Compiled by Peter Weisswange, Project Leader Science

Early in March 2019, various staff members of the GMMDC made the short journey to Grahamstown for the annual SciFest Africa, the largest science festival in Africa, to set up an interactive stall.

The 2019 festival theme was “Discover your Element”, celebrating the International Year of the Periodic Table of Chemical Elements as proclaimed by the United Nations.

Our focus was to allow visitors to the Festival (primarily learners) to discover the joys of mathematics and the physical sciences in a large number of interactive displays. Learners were engaged through tessellations and tangrams, using their creativity and a mathematical spark to create a kaleidoscope of patterns and colours. It was a real joy to see their concentration and focus as they sought to put these shapes and colours together.

The success of the interactive games, both digital and manual, was proven when learners returned after their normal visit to continue playing in their own time. The enthusiasm of the learners was a highlight.



The stall also featured the latest technology from the GMMDC – the GammaTutor™, the plug-and-play device packed with teaching and learning materials for maths and science. There were numerous enquiries about where this device could be purchased.

Beside the activities, the MathArt and TouchTutor Quiz competitions were strongly promoted, with learners encouraged to take part.

We look forward to next year's SciFest set for April 15 to 21, 2020.

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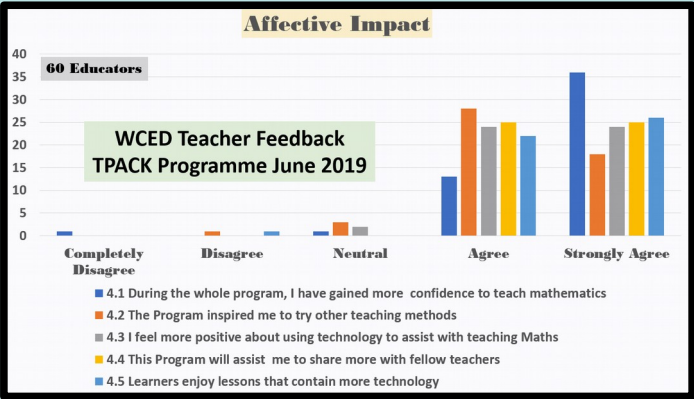
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GMMDC's Professional Maths Development Programme extended to the Western Cape
Compiled by Prof Werner Olivier, Director

A 4-day SACE accredited Professional Learning Network (PLN) programme for mathematics educators was delivered with great success to a group of 60 in-service teachers at Kuilsrivier in Cape Town during the school holiday in June 2019.

Three short learning programmes focusing on key content areas of the CAPS curriculum at FET (Grade 10-12) level were offered using the TPACK (Technological, Pedagogical and Content Knowledge) approach. The programme was commissioned by the Western Cape Education Department (WCED) as part of an effort to upskill mathematics teachers in this province. Data from structured surveys that were conducted with participating teachers after the programme delivery indicate noticeable positive project impact on the content knowledge and skills levels of this group.



Strong appreciation was expressed by both the project teachers and the WCED management for the quality and relevance of the professional development model that was used by the GMMDC.

This project was the first in a series of STEM development project collaborations with the WCED that are planned for the near-future.

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GMMDC in the News - Semester 1 2019



MEMBERS OF THE NATIONAL MATHEMATICS ART COMPETITION IN SOUTH AFRICA. FROM LEFT: PAUL GIBSON'S FOUR BROTHERS, BISHOP HIGGS HIGH SCHOOL, PORT ELIZABETH; THE GROUP OF FIVE FROM THE FRAMESBY JUNIOR SCHOOL, PORT ELIZABETH; THE GROUP OF FIVE FROM THE FRAMESBY JUNIOR SCHOOL, PORT ELIZABETH; THE GROUP OF FIVE FROM THE FRAMESBY JUNIOR SCHOOL, PORT ELIZABETH; THE GROUP OF FIVE FROM THE FRAMESBY JUNIOR SCHOOL, PORT ELIZABETH.

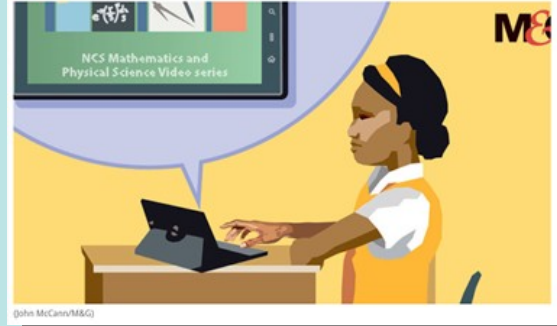
High school kids from across SA shine in unique 'maths-art' competition

Bright sparks prove maths is an art form

After the "maths-art" competition, the winners of the National Mathematics Art Competition in South Africa have been announced. The competition, which is a unique blend of mathematics and art, was held in Port Elizabeth. The winners are a group of five students from the Framesby Junior School, Port Elizabeth. The competition was organized by the GMMDC, which is a joint venture between the University of Johannesburg and the University of Port Elizabeth. The competition is open to learners from Grades 6 to 12, who can choose any visual medium, including photography, drawing, painting, collage or mixed media. The winners are a group of five students from the Framesby Junior School, Port Elizabeth. The competition was organized by the GMMDC, which is a joint venture between the University of Johannesburg and the University of Port Elizabeth. The competition is open to learners from Grades 6 to 12, who can choose any visual medium, including photography, drawing, painting, collage or mixed media.

Programme multiplies pupils' success

Nicky Williams 14 Aug 2019 00:00



(John McCann/M&G)

Tomorrow's teachers use new technology to tutor maths and science

Nelson Mandela University's (NMU) Education Faculty has launched a new initiative to help its pre-service teachers. The initiative, called 'NCS Mathematics and Physical Science Video series', is a joint venture between NMU and the University of Port Elizabeth. The video series is a collection of short, bite-sized videos that cover key concepts in mathematics and physical science. The videos are designed to be used as a supplement to traditional classroom instruction. The initiative is being piloted in the Education Faculty's Bachelor of Education programme. The initiative is being piloted in the Education Faculty's Bachelor of Education programme. The initiative is being piloted in the Education Faculty's Bachelor of Education programme.

Create artwork inspired by mathematics



Learners from Creative Clubs, a project run by the University of the Free State's Social Responsibility Enterprises, create artwork using mathematics as part of a national Maths-Art Competition for high school learners.

To encourage learners to recognise mathematics in the world around them and bring it to life, the University of the Free State (UFS) and Creative Clubs are some of the many partners in the Maths-Art Competition. Biomedical learners can drop their entries at the Social Responsibility Enterprises office at the UFS's South Campus. The unique competition is open to learners from Grades 6 to 12, who can choose any visual medium, including photography, drawing, painting, collage or mixed media. The winners are a group of five students from the Framesby Junior School, Port Elizabeth. The competition was organized by the GMMDC, which is a joint venture between the University of Johannesburg and the University of Port Elizabeth. The competition is open to learners from Grades 6 to 12, who can choose any visual medium, including photography, drawing, painting, collage or mixed media.

Excellent result for Framesby Pupil in National maths-art competition



Winner of a national mathematical art competition in South Africa, Paul Gibson's four brothers from Bishop Higgs High School, Port Elizabeth, are shown with their artwork. The competition was organized by the GMMDC, which is a joint venture between the University of Johannesburg and the University of Port Elizabeth. The competition is open to learners from Grades 6 to 12, who can choose any visual medium, including photography, drawing, painting, collage or mixed media.

Tomorrow's teachers use new tech to tutor learners

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High school pupils from across South Africa

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