

Faculty of Science News

Govan Mbeki Maths Development Centre

Editorial

The year 2017 started with a flurry for the GMMDC as an extended range of mathematics and physical sciences development projects were implemented in more than 80 secondary schools across six educational districts of the Eastern Cape province. An active professional learning community training and support programme for in-service mathematics educators was also established in each of the six development nodes.

The successful development programme in schools in the Queenstown region was also implemented for the first time in the Mthatha district in 2017. Working closely with and in full support of local leadership of the DBE in the region, an ICT assisted mathematics and physical sciences programme, which integrates learner and teacher development, was implemented in ten project schools.

The recent successes of the Tablet-assisted Incubation programme for selected learners with potential has also led to a new learner incubation programme being introduced for selected learners from eighteen project schools in King Williamstown. More than one hundred top mathematics and physical sciences learners will attend a structured two-year support programme at a centralized venue. The aim of this programme is to facilitate learner access and successful study at higher education institutions in the future.

This year also saw the first implementation of a fully developed TouchTutor® CAPS physical sciences digital T&L resources alongside the Mathematics material on Tablets. Judging by the project successes in Semester 1 of 2017 and the high level of excitement and appreciation that were expressed by stakeholders over this period, the GMMDC programme is set to again make a marked contribution to mathematics and physical sciences education this year.



Old Mutual generously sponsored learners from its Education Flagship Programme schools with bursaries for a second year in 2017. Seen here with the recipients and members of the GMMDC are Old Mutual's Mr Willem Schutte (back row), Ms Kanyisa Diamond, Senior Project Manager (centre, front) and Mr Dali Matta (right, front)

The integrated
TouchTutor® Maths
and Science Support
Programme
implemented in
more than 80
schools across six
educational districts
in the Eastern Cape
Province in 2017

NEW android application for TouchTutor quiz



Dr Phil Collett (left) and Prof Werner Olivier (front) congratulate the winners of the pilot Provincial TouchTutor Maths Quiz

The TouchTutor® Quiz is an android application, downloadable from the Google Playstore, and developed by the GMMDC in partnership with local IT company, Avo Choc. The app gives the GMMDC the capability to run on-line quizzes and competitions in any subject, as well as provide curriculum support material drawn from a large database of mathematics problems from grade 8 to 12 which learners and teachers can use for testing and revision.

In 2017 the app has been used for the first time to run the TouchTutor® Maths competition which has become an annual event in the Eastern Cape. The loading of Maths curriculum material is also well advanced and Science will follow.

Plans for 2018 include diversifying the content base, including gaming elements and using the app to facilitate the popular Maths Relay competition format for schools in other districts. GMMDC will be using social media to build networks of users and tutors to support their learning with TouchTutor®Quiz.

STEAM Innovation through ERASMUS project



Dr Phil Collett, second from right, with Project Leader Dr Zsolt Lavicza (far right) and Prof Noah Dana-Picard and Dr Sara Hershkovitz from Israel

Ongoing collaboration between the GMMDC and European and Israeli partners under the Erasmus Mundus HE mobility grant has established innovative new STEAM projects and has been the catalyst for various presentations by GMMDC staff at local and international conferences.

GMMDC was privileged to host Dr Kristof Fenyvesi from Finland's Jyväskylä University as a keynote speaker at our GeoGebra Conference in June 2017. His STEAM experience workshops excited and motivated learners and teachers from the region and the GMMDC has acquired the 4-D Frame system which is now used in local STEAM workshops to encourage cross-curricula experiential learning.

Prof Werner Olivier did a presentation on GeoGebra for promoting links between Geometry and Art at the GeoGebra Global Gathering in Austria in June 2017 and consolidated links with Erasmus project partners.

Dr Philip Collett attended the Bridges 2017 Conference at the University of Waterloo in Canada where he presented a paper on geometry concept development using puzzles based on indige-

nous arts. He also had further opportunities to work with the project partners in STEAM workshops, a highlight being a workshop on introductory robotics with 4D Frame, with Korean originator Dr Hogul Park in attendance.

Collaboration with partners was further strengthened by participation in the Cape Town Open Design Festival which showcased STEAM as an imperative for education in the future.

Project plans for 2018 include further incorporation of STEAM workshops into the learner and teacher development projects of the GMMDC, further research and materials development and a visit to Nelson Mandela University by professors from the Metropolitan University of Budapest.

The Erasmus project has been highly productive as a catalyst for innovative and creative partnerships to advance the STEAM agenda which seeks to integrate creative design thinking and the Arts into cross curricula education in traditional STEM fields. Through the project the GMMDC has advanced its practice by interacting with internationally renowned figures and key national policy makers in the field.



Delegates at the annual GMMDC GeoGebra Conference . The event was held on the south campus of Nelson Mandela University

Govan Mbeki Mathematics Development Centre Annual GeoGebra Conference

Late June – early July, the Govan Mbeki Mathematics Development Centre (GMMDC) hosted Dr. Kristóf Fenyvesi from the University of Jyväskylä, Finland, as part of their GeoGebra Institute’s annual conference.

Dr. Fenyvesi conducted an Experience Workshop – an experience-centred Math / Art project – that seeks to give learners an opportunity to learn mathematics through the arts, and to do art through mathematics. These Experience Workshops are part of the large STEAM

(Science, Technology, Engineering, Arts, Mathematics) movement that wants to promote inquiry-based, cooperative, playful and experience-oriented mathematics education, connecting problem-solving in science and art education with hands-on activities and digital modelling – in short, phenomenon-based learning and co-teaching.

To disseminate the idea of STEAM education, the first part of the workshop was held at the Uitenhage Science Centre. In the morning, directed by Dr. Fenyvesi, high school learners from selected schools built a geodesic dome (as pictured) using Korean 4Dframe materials. In the afternoon, the learners built smaller

models – C60 buckyballs (much like a soccer ball) and nanotubes (though of course not to nano (10^{-9}) scale, but greatly enlarged). The excitement of the learners, the joyful noise and focussed concentration spoke volumes about the learners participation and active learning through this experience-oriented activity.

As part of the GeoGebra conference, Mathematics and Physical Sciences educators were also ‘put through their paces’ building a geodesic dome and then the smaller models. It is an open question who learnt faster – the learners, or the educators, though both groups thoroughly enjoyed the experience.



Learners involved in building bucky-ball and 4D frame during experiential workshop

Launch of extended Capitec Foundation support programme for Mathematics and Physical Sciences in Mthatha

The current Capitec Foundation support programme for Mathematics and Physical Sciences education in Queenstown, was extended during 2017 to the Mthatha District. Ten secondary schools in Mthatha were identified to participate in the support programme.

A total of 90 Grade 10 to 12 learners from Attwell Madala SSS, Kokolweni SSS, Excelsior SSS, Ngangelizwe SSS and Umtata

HS were selected to participate in the Saturday Incubator School Project (ISP) for Mathematics and Physical Sciences presented at Umtata HS and which is coordinated by Mr M Kumar who is supported by 3 Mathematics and 3 Physical Sciences facilitators.

Two Mathematics teachers from each of the 10 identified schools will be provided with support in the form of 4 one-day Professional Learning Community (PLC) training workshops which is presented by the GMMDC.

The project in Mthatha was launched on 10 February 2017 at the Umtata High School by Professor WA Olivier of the GMMDC and Capitec Foundation representative Mr N Khoza. The Mthatha district office was represented by Ms Siphambo and Principals from each of the 10 schools were invited to attend.

During the launch each of the 90 selected learners were issued with TouchTutor tablets, scientific calculators and learner study guides for Mathematics and Physical Sciences. Each of the 10 schools were also provided with a data projector as well as laptop computer installed with TouchTutor support material for Mathematics and Physical Sciences.



Grade 11 class of 2017, Mthatha—launch of project



Grade 12 class of 2017, Mthatha—launch of project



Learner actively engaged with ISP Programme in Mthatha



Coordinators, Facilitators and representatives from Capitec Foundation and GMMDC

