Report 2016

MATHEMATICS EDUCATION TEAM 2016

A highlight of the year was when we were awarded the Best Teaching Team Award from the College of Humanities for 2016.

In 2016, we have had to cope with a reduced staff complement of only 7 members as compared to the end of 2013 when we had 14 people, which is 50% of capacity. We hope to have more staff appointed in 2017. Despite this reduction in capacity, we are excited that we have managed to implement many initiatives that go beyond our normal teaching and research duties this year. All of us in the Mathematics Education team believe that our work is important to the country and we try to work as hard as we can to convey our passion and commitment to our students so that they can feel encouraged and excited about becoming teachers. The permanent staff members in the mathematics education team are Prof Bansilal, Mrs. Eshara Dowlath, Ms. Busisiwe Goba, Dr Zanele Ndlovu, Dr Jayaluxmi Naidoo, Mr Thokozani Mkhwanazi and Dr Vimolan Mudaly. We are grateful to Mr Phatha Mahlabela, Ms Cathrine Kazunga, Mr Sbu Mabaso, Ms Botshiwe Likwambe who have taught on the various programmes in 2016.

We present a short description of some of the activities some of the activities that we have run for our students which cut across modules in the curriculum and this is then followed by details of our international collaborations and other activities. We end off by describing our teaching and research and supervision commitments.

1. WORKING BEYOND THE UNIVERSITY CURRICULUM

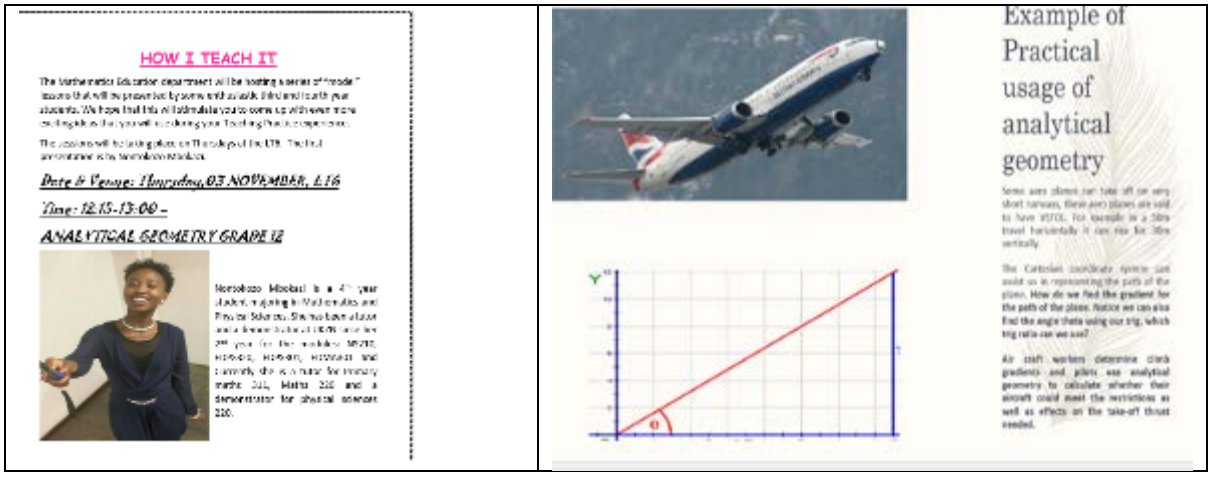
We believe that the work we do, can make a difference to the province and the country in that we are producing mathematics teachers. The education system needs effective mathematics teachers who can make a difference to the quality of mathematics outcomes of the system. We therefore take every opportunity to motivate our student teachers so that they can be the best they can when they start teaching. We have tried to plan initiatives that are not bound by the curriculum so that students can be better grounded in teaching skills that will make a difference to them. Some of these initiatives are detailed below.

HOW I TEACH IT

A series of "How I teach it" sessions were presented by B.Ed. Mathematics FET students during the Thursday lunchtime seminar sessions. Staff members worked with students in their planning and students made up publicity posters that described their teaching philosophy. During the presentations there were lively discussions emanating from mathematics education students and staff which contributed to an overall excitement in the department. The programme appears below:

Venue LT 6	Time: 12:10 – 13:45		
Date of presentations	**Student 1**	**Student 2**	**Chair of session**
13 October 2016	Phoswa Sifiso	Nhlakanipho Mhlongo	T Mkhwanazi
27 October 2016	Tina Dolwana	Wandile Zulu	J Naidoo
3 November 2016	N. Mbokazi	Siyabonga Mahlambi	S Bansilal
10 November 2016	Mduduzi Mbatha	Nkosi NBH & Mthethwa, S	Z Ndlovu

Here is a copy of a profile by one of the presenters and a slide from a presentation



1.2 SUPPORT AND DEVELOPMENT OF STUDENT TUTORS

We have employed close to 40 student tutors across the various modules to run tutorial sessions with our B.Ed. as well as the PGCE students. They fulfil an important role in our discipline by providing additional support to our students so that students can be given regular feedback and assistance with the content of their modules. To ensure that they do their work effectively we meet regularly and work on a collaborative basis so that they are supported at all times as well. Mr Mkhwanazi has run a series of workshop for his tutors – see below.

Reflections on Tutorial 5 (12 October 2016)

There was a marked improvement in the tutorial attendance this time with **115** students (~**86.4%**) which is almost 18% higher than what it was in tutorial 4. What surprised me is the fact that the **lecture attendance** was lower this time around with about **98** students **(~73.6%)** attending a lecture that finished just 5 minutes before the tutorial session started. I sensed that this sudden urgency to attend tutorials was imposed on them by the forthcoming Major Test on Friday 14 October following their unpleasant performance in the First Tutorial Test written on 30 September.

Tutorial Group 1: (Tutor: Tina Dolwana)

Attendance

15 out of 22 attended.

Student Preparedness

About 13 to 14 students who attempted the tutorials but only 6 to 7completed the tutorial

Student Engagement

14 students were willing to share their the answers on the board with regards to Tut 4 Part B based on sketching potential graphs but only 4 to 5 shared their answers to Tutorial 5 on finding derivatives from first principles. We fixed very few mistakes when students drew their graphs on the board. Some students didn't seem confident with first principles hence most of them didn't complete it. We were unable to finish the tutorial however I have asked to finish the tutorial in the following session if they attempt the problems. The tuts can proceed swiftly if they do their work beforehand though.

Challenges

At first they were confused with the application of the Squeeze Theorem but at the end they claimed to have understood it once we had done problems that required its application.

An excerpt from a report by Mr Mkwanazi detailing the reflections by a student tutor Tina Dolwana.

1.3 GEOMETRY WORKSHOPS

Geometry is perceived as the most complex part of the curriculum and learners sometimes assume that it does not relate to their daily lives. In South Africa the geometry strand was removed as a compulsory option from grades 10-12 in 2006, but in the latest CAPS curriculum revisions was brought back as part of the core mathematics curriculum in those grades. Currently at the School of Education, many of our pre-service student teachers did not study geometry at school because they were part of Curriculum 2005(C2005). However they are expected to teach geometry when they qualify. This situation has left many anxious and afraid. Compounding the problems of our pre-service mathematics student teachers is the fact that in the current B.Ed. curriculum, there is no module which targets the school level geometry that they missed, because our modules are targeted at NQF levels 6 and above as is the requirement for degrees.

To try and assist our mathematics student teachers, we ran a series of four workshops which covered the school level geometry from Grades 10-12. The facilitator was Mr Moses Mogambery, a well-known expert in the teaching and learning of mathematics from Durban.

Sixty four (64) pre-service students' teachers taking Mathematics Method 3 and Mathematics 420 courses attended the workshops on Saturdays. Each of these workshops was videotaped. The topics for the sessions appear below- we have provided the activity sheets that were used in the sessions, and the video links appear next to these details. The details of the workshops have been posted on our website, with videos of the sessions as well as the actual worksheets that were used.

Date	**Topic**	**Documents for the activities**	**Video link**
Session 1 10 Sept 10-12A.m	Basic geometry of angles, lines, triangles, polygons	Session 1. Angles, lines and triangles	Part 2. Lines and angles Part 3.Triangles
Session 2 17 Sept 9.30A.m-12.30P.m	Chords and circles	Circles chords and angles Activity 1 Circles chords and angles Activity 2	Part 4. Circle geometry
Session 3 24 Sept 9.30A.m-12.30P.m	Tangent lines	Tangents to circles Activity 1 Tangents to circles Activity 2	Part 5. Tangent Properties
Session 4 1 October 9.30A.m-12.30P.m	Similar triangles and proportionality	Ratio and proportion activity 1 Activity 2 similar triangles Problems on similar triangles activity 3	Part 6. Ratio and Proportion Part 7. Similarity
Session 5 8 October 9.30-1.30	Revision and test		

The students were awarded certificates of attendance and certificates of achievement which indicated whether they passed the test or if they achieved beyond 75%. As shown in the timetable these workshops were held on Saturdays and it is commendable that staff attended these workshops and supported the students in this endeavor even though it does not add to any workload counts.

A photo of some students and staff at one of the geometry workshops appears below.

	Some staff and students at a geometry workshop

1.4 ANNUAL AWARDS AND FOURTH YEAR FET STUDENTS FAREWELL

Each year, we hold an awards day incorporating a farewell lunch for fourth year Mathematics FET students. This year it was held on Wed 23 November. There were 120 students and staff who attended the function. Students who performed very well were recognized with the awarding of special certificates. The student tutors who were involved in providing support to our mathematics students were given tokens of appreciation and certificates of recognition. Furthermore the students who participated in the "How I teach it" presentations were also recognized and given gifts in the form of teaching resources.

		Dr Vimolan Mudaly presenting his motivational talk to the students.

	Students enjoying the food and social atmosphere.

	Photograph of some students and staff at the function

	Students taking out photos with Mr Mkhwanazi to remember their times spent learning and working hard.

	Awards to our top achieving students such as Drisana Narraidoo by Dr Zanele Ndlovu, who was also named as the Highest achieving third year student in the whole school

	A certificate of appreciation to one of our hard working student tutors

1.5 NOVICE TEACHER SUPPORT WORKSHOPS

We have found that when our students leave us and are thrust into the school system, there isn't sufficient mentoring and support for them. Therefore we initiated a series of support workshops to help them as they enter the field of teaching. Workshops were held this year on 23 March and 5 August which focused on the teaching of particular topics. The content of the workshops are currently being placed on the website.

	Two participants of our novice teacher support group, at their farewell function in 2015.

2. INTERNATIONAL COLLABORATIONS

2.1 Professor Maria Trigueros

Prof Maria Trigueros (from Mexico) was plenary speaker for a conference hosted by the mathematics education department on the use of APOS theory. Prof Trigueros also ran some workshops during 5-10 September 2016. Academics from institutions in South Africa as well as Zimbabwe presented their work and planned future collaborative research.

	Group photo with some participants

2.2 **Dr Kicki Skog**

The mathematics education discipline hosted Dr Kicki Skog from Stockholm University during the week of 5-9 August, where we planned a joint project to be run across five countries. Funding for the initial visits have been sourced from the NRF.

	Dr Skog visiting with learners at St Benedict's school in Pinetown.

2.2 International Conference Attendance

Five members from the Mathematics discipline (Sarah Bansilal, Busi Goba, Cathrine Kazunga, Jaya Naidoo and Zanele Ndlovu) presented their work at the International Commission for Mathematics Education conference in Hamburg in July 2016.

2.3. Prof Edmund T. Hamann and Prof Guy Trainin from University of Nebraska-Lincoln, USA

Dr Jayaluxmi Naidoo hosted international academics: Prof Edmund T. Hamann and Prof Guy Trainin who were form the University: Nebraska-Lincoln, USA). They visited various schools and planned future collaborative activities.

3. OTHER ACTIVITIES THAT WE HAVE BEEN INVOLVED IN

3.1 Community Outreach

A community Outreach project for learners from Ikusasalentsha Secondary was held on 29 October. The 20 Grade 9 learners were taught geometry using the software Geometer's Sketchpad by Nhlakanipho Mhlongo, Lindokuhle Dlamini and Prof S. Bansilal. Some pictures of the workshop appear below.

	Grade 9 learners working on their activities

	Presentation using Geometer's sketchpad by Nhlakanipho Mhlongo (A fourth year B.Ed. student)

3.2 Rasch Analysis Workshop

A Rasch analysis workshop was run by the mathematics education department on 5- 8 October at Makaranga Lodge. There were 15 participants who were academics from NMMU, University of Pretoria, University of Johannesburg, postgraduate students, teachers as well as subject advisors. The focus of the workshop was to develop capacity for research in the use of Rasch measurement theory to investigate assessments in school and at university level. A further purpose was to explore how research could inform improvements in practice. A picture of the participants appears below.

	After three days of hard work the participants are pleased to take a photo break.

4. OUR USUAL TEACHING AND RESEARCH

4.1. Teaching

We are happy to report that we teach on every programme offered by the School of Education. These are B.Ed. (Intermediate phase); B.Ed. (Senior Phase); B.Ed. (FET); PGCE (GET); PGCE (FET); B.Ed.(Hons); M.Ed. as well as D.Ed. In 2016, we have had over 2000 students that we across our modules.

Many of our modules are taught in teams made up of permanent staff or permanent staff together with contract staff. Some of these include Mathematics Method 3 (three staff members); Primary Mathematics 211(three

staff); Primary Mathematics 311(two staff and one contract), Mathematics 110(two staff); The advantage of teaching in teams is that the students are offered a variety of teaching styles and as future teachers they will develop their own teaching styles based on what they experienced. Furthermore, having more than one person on a particular module ensures that the assessment is more robust and balanced by taking into account different assessment approaches which have to be agreed upon by the teams. The administration of modules that have more than one lecturer can be quite a challenge and workload calculations do not take the additional hours needed for the coordination and joint planning into account. However in the Mathematics Education team we believe strongly that team teaching on modules offer much benefits which is why we continue to build it into our teaching duties despite the increased demands on our time.

4.2 Research and Supervision

Despite having a reduced staff complement, we are pleased with the progress this year with respect to our research and supervision activities. Every staff member has been active in publishing and supervisions, resulting in the fact that we carry an above average supervision workload of 27 masters (3.8 per staff member) and 26 doctoral students (6.5 per staff who have Ph.D.'s). Our publication rate is much higher than the university norm- we have authored 17 accredited journal articles or book chapters. The mathematics education team has presented 22 conference papers in 2016. Staff have made four presentations at international conferences. We are excited at what we have managed to accomplish despite the fact that we are working at only 50% of our capacity.

The Mathematics Education Team:
Prof Sarah Bansilal, Mrs. Eshara Dowlath, Ms. Busisiwe Goba, Dr Zanele Ndlovu, Dr Jayaluxmi Naidoo, Mr Thokozani Mkhwanazi and Dr Vimolan Mudaly.