



AIMS network of Higher Education Institutes in 6 African countries in partnership with 42 universities around the world

AIMSSEC is the Schools Enrichment Centre of AIMS South Africa (African Institute for Mathematical Sciences) and was established in 2003. The objective of AIMSSEC is to play a key role in the extension of educational opportunities for disadvantaged communities in South Africa; and to raise standards by improving the quality of teaching and learning of mathematics.

AIMSSEC currently provides professional development for mathematics educators in South Africa. A blended learning programme has been developed by a team of local and international experts which aims to model excellence to educators. During residential sessions AIMSSEC emphasises on Planning for Learning and Inquiry Based Learning and demonstrates a variety of teaching strategies supplemented

with high quality course materials. A tutor system allows for ongoing mentoring of the teachers throughout their courses.

AIMSSEC is a community of academics, researchers, teacher trainers, school teachers and subject advisers; all working in mathematics education who share a commitment to lifelong learning and a dedication to improving the teaching and learning of mathematics. The AIMSSEC community involves all those who have taught on the AIMSSEC courses as well as former students. There is a shared belief that we must learn from mathematics education research and that teaching for the 21st century must be different from the past because different skills are needed in this radically changed and rapidly changing society.



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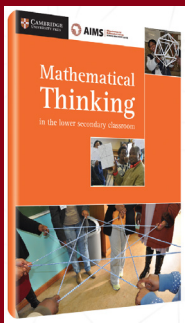
OVERVIEW OF AIMSSEC

AIMSSEC's blended learning professional development courses are intended for primary and secondary mathematics teachers, subject advisers and field trainers from disadvantaged rural and township schools to empower them to help other teachers in their areas. AIMSSEC continues to support them through an online teachers' network after they have finished their courses. A total of 1,774 teachers have completed the Mathematical Thinking (MT) three-month course and 215 students have completed the Advanced Certificate in Education (ACE) two year AIMSSEC course and are now looking for opportunities to study further. With 14 years' experience administering, teaching and coordinating blended/distance learning, AIMSSEC

courses involve:

- Moodle and e-learning;
- monthly assignments and formal end of year examinations;
- interactive telematic (TV broadcasts) as well as interactive whiteboard sessions;
- residential face-to-face contact sessions with teachers from all parts of South Africa – we have held twenty-seven such residential courses in the Western and Eastern Cape Provinces; and
- a distinguished team of more than fifty-five international mathematics education experts have assisted on these courses.

From August 2016 - August 2017 AIMSSEC presented sessions to 100 teachers who attended the AMESA Western Cape conferences and to 250 teachers who attended AMSEA National Congress.



To support the cascade model of teacher professional development, the AIMSSEC local and international team is writing a series of books consisting of teacher self-help-workshop guides. In February 2016, the first book, 'Mathematical Thinking in the Lower Secondary Classroom', was published by Cambridge University Press (CUP). Since then, teachers, lecturers, and education professionals from countries such as Kenya, the UK and the USA as well as South Africa, have been reacting positively to the book and writing reviews. To access these reviews, please visit: <http://aimssec.ac.za/our-work/mt-book-series/> Each chapter in the book is linked to the Curriculum and Assessment Policy Statements (CAPS) and pace setters. The book can be ordered from either Amazon or the CUP website <http://www.cup.co.za/products/mathematical-thinking-in-the-lower-secondary-classroom>

HIGHLIGHTS

- AIMSSEC is endorsed by SACE (South African Council for Educators) as a service provider (Provider Number: PR11011) to offer the Mathematical Thinking Course to practising teachers.
- AIMSSEC formed part of a European Commission FP7 Science in Society consortium that has been conducting research with eight (EU) Universities. The title of the research programme is "Improving Progress for Lower Achievers through Formative Assessment in Science, Technology and Mathematics Education" (FaSMEd). In short: "The project uses evidence based approaches to transforming teaching to raise achievement in mathematics and science in primary and secondary education through the development of technologically enhanced practices of formative interpretations of assessment within day-to-day teaching approaches". As the only African partner AIMSSEC is very proud to have formed part of this team. The research findings were reported in two main areas: firstly, the responses of the teachers to the process of taking part in the research and secondly, what happened in the classrooms. The research was a qualitative social science research, which broadly aimed to improve teaching and learning in mathematics, relevant to researchers with an interest in understanding how mathematics teaching could be improved. The contribution that AIMSSEC made towards the international FaSMEd project can be found at <http://aimssec.ac.za/our-work/research/>. The FaSMEd project ended in December 2016.
- In 2011, the Eastern Cape Department of Education (ECDoE) commissioned AIMSSEC to train 12 subject

leaders from each of their 23 school districts (total of 276): 4 Intermediate Phase, 4 Senior Phase and 4 FET Phase teachers. These districts cover the whole of the Eastern Cape Province including rural areas with high levels of poverty and poor infrastructure. AIMSSEC joined forces with the Faculty of Education of the University of Fort Hare to offer the ACE course for the Eastern Cape teachers administered by AIMSSEC, taught jointly, and accredited by the University of Fort Hare. 2016 was the last year of the project.

- AIMSSEC was awarded a three year grant by the Department of Higher Education and Training (DHET) through the National Skills Fund (NSF). The funding was used for operational costs and to expand AIMSSEC's teacher development programmes. Two additional lecturers were appointed using this fund. The grant was re-awarded in July 2017 for a further three year period.
- From 15-28 October 2016 AIMSSEC lecturers shared their expertise by training 46 secondary school mathematics inspectors for the MasterCard Foundation Teacher Training Pilot (TTP) programme in Yaoundé, Cameroon. Expertise was provided in mathematical thinking and problem solving, the use of ICT in the teaching and learning of mathematics and specific content areas such as calculus and permutations.
- AIMSSEC received the UNESCO-Hamdan Prize in April 2012 for Outstanding Practice and Performance in Enhancing the Effectiveness of Teachers in developing countries within marginalised or disadvantaged communities. As laureate of the prize, AIMSSEC has been invited to many international conferences to report on how the prize has benefitted the institution.

AIMSSEC as a winner of the UNESCO-Hamdan Prize (second cycle 2011-2012)



In recognition for its work, AIMSSEC was awarded the UNESCO-Hamdan Bin Rashid Al-Maktoum Prize for outstanding practice and performance in enhancing the effectiveness of teachers. The photo shows Sheikh Hamdan Bin Rashid Al-Maktoum handing over the award to Dr Barrie Barnard (Academic

Manager from AIMSSEC). The ceremony took place in Dubai on 24 April 2012.

The \$90 000 prize money was paid in eight payments of \$11 250 each. This allowed AIMSSEC to appoint a full time lecturer from January 2013 to December 2014. AIMSSEC is truly grateful to have received the award which enabled the organisation to extend the staff compliment by one lecturer for two years. Furthermore, ever since receiving the Hamdan award, other funders such as the South African National Government have also come on board, and the collective efforts have enabled the organisation to extend the staff compliment even further.

AIMSSEC's involvement with the UNESCO-Hamdan Award has been truly inspiring and has helped the organisation to re-dedicate its efforts to providing quality teacher training and to extend the work of AIMSSEC to the other AIMS centres in Africa: AIMS Cameroon, AIMS Tanzania and AIMS Rwanda.

BEST PRACTICES

The AIMSSEC style of teaching is transformative. Learning is through guided discovery, with an emphasis on understanding, mathematical thinking, discussion, collaborative learning and challenges rather than just mechanical practice. Learning how to learn and to take responsibility for one's own learning is of paramount importance.

The only experience that most teachers have had is of transmission mode teaching where learners are expected to memorise facts and mathematical procedures even when they do not understand them. Rote learning and drilling to answer test questions result in the majority of learners disliking the subject and having little or no confidence in their own mathematical ability. In the modern world mathematical thinking and logical reasoning, and the ability to use and apply mathematics to solve problems, are the important skills. AIMSSEC gives teachers the experience of engaging in enquiry based learning and problem solving themselves, and provides activities and resources to help teachers to modify and change their own teaching styles.

The MT course is a pre-requisite for the ACE course to train Mathematics Subject Leaders, designed by AIMSSEC, an innovative, blended learning, technology enriched programme to upgrade the teachers' subject knowledge and to improve their teaching skills. They attend residential units during school holidays and then engage in distance learning once they are back at work in their schools. This enables teachers from rural areas who are far from other universities to get the training they need. These teachers are committed to ten hours a week home study, to submit regular assignments and to write exams at the end of each year. AIMSSEC helps teachers to meet the challenges they face as described by the following two teachers:

"To me the course was a life-saver! I have operated up to now on a survival mode, this has changed my way of thinking totally. The exercises were very practical and useful. I wish all maths teachers can do this. By observing the lecturers it became very clear on exactly how I must engage with my learners. I have learnt a lot on how to assess what kind of exercises to give. It also showed me that maths is fun! I will surely use all the information given to make the difference in my learners' lives! The interaction between teachers and lecturers and teachers and teachers was special."

(Ishmael Lekgetho, FET Teacher Free State Province)

"The new South African mathematics curriculum brings back geometry and probability. At this moment there are so many teachers worried and stressed out about having to teach these topics. The ACE course made us experts in these topics and I can help so many teachers in understanding probability. I can't wait to implement my knowledge. Most importantly, this course has made me a life-long reflective teacher. It gave me the chance to research my potential in the classroom. It has made a huge impact on how I approach almost everything in class - always looking for better strategies that will benefit the learner. The ACE course not only made me a good maths teacher, but I really can say that it moulded me into a mathematician. The results show this at my school, but it is not only about the results - my learners also love their maths. All over South Africa we have struggling maths teachers. We need an organisation like AIMSSEC. They made me a good, confident maths teacher. I definitely know many others will benefit from the AIMSSEC short course and the ACE course."

(Hubert February, FET Teacher Western Cape Province)

Most of the teachers now have access to the internet through cellphone technology. They are guided in their studies by the lecturers who answer their questions online on the course management system. The AIMING HIGH Teacher Network (www.aiminghigh.aimssec.ac.za), set up to support lifelong learning, offers resources for teaching mathematics and enables teachers to share ideas, to ask for help and advice and to support each other.

AIMSSEC broadcasts whole day TV lessons for mathematics teachers via satellite to learning centres in Polokwane, Richards Bay, Durban, East London, Port Elizabeth, Queenstown, Mthatha, Klerksdorp, Bloemfontein and Stellenbosch. AIMSSEC has set up new ITE Learning Centres so that teachers can take part without having to travel long distances from home. The broadcasts address teaching issues and subject content for different age groups. Teachers also have time to meet and work with other teachers on assigned tasks, which is valuable for those who study alone in isolated communities.

The unbelievable pace at which technology has evolved and affected the lives of teachers and learners of the 21st century is staggering. In order to remain relevant and in sync with the developments, AIMSSEC continually strives to research and introduce the latest educational technologies that are critical for teaching and learning. AIMSSEC explores, engages and empowers teachers with the latest and best mathematical software and applications that help teachers to deliver effective, engaging and informative lessons. From the research, AIMSSEC also makes recommendations to teachers, schools and departments on relevant software, hardware, and supporting infrastructure, and thereafter offers training and support to them. To empower the teachers, foster collaborations, and promote sharing, AIMSSEC has created Professional Learning Networks in the form of blogs, mobile applications, and Social Media. This has gone a long way into transforming some of the rural South African classrooms into fun, interactive, engaging, inquiry based learning environments.

**For more information please visit <http://aimssec.ac.za/>
or contact: Dr Barrie Barnard, AIMSSEC Academic Manager, barrie@aims.ac.za**

