



THE MATHS IN ART: Finland's Kristof Fenyvesi – a leading international researcher for Science, Technology, Engineering, Art and Mathematics (STEAM) education and guest speaker at Nelson Mandela University's GeoGebra Conference – stands inside a giant dome structure built by pupils

Linking maths and art

Teachers, pupils to experience subjects' connections

FROM the perfect symmetry of a snowflake to the intricate patterns on a puff adder's skin to spiral galaxies in space, nature is filled with mathematically precise patterns.

These patterns extend to the world of art, including colourful fashion designs, architecture, African and Islamic art, and much more.

There is a connection between maths and art. And while there is a global push for maths-, science- and technology-related education, there is a new shift that is including art in the mix.

STEAM education – the acronym for Science, Technology, Engineering, Art and Mathematics, and a variation on the better-known STEM – was introduced to South African teachers and pupils in July by Nelson Mandela University's Govan Mbeki Mathematics Development Centre (GMMDC), at its fourth annual GeoGebra Conference.

GMMDC is home to one of 187 global institutes for GeoGebra, which is free, open-source maths software used in millions of maths and science classrooms across the globe, to enable teachers and pupils to visualise and experiment with

geometry, algebra, tables, graphing, calculus and statistics. However, this year's conference will also demonstrate the link between GeoGebra and art.

"STEAM education is a much more practical, relevant and career-linked way of teaching maths and science," GMMDC head Prof Werner Olivier said.

International guest speaker at the conference – which was attended by 70 teachers and TVET college lecturers from across the province – was Finnish STEAM researcher Kristof Fenyvesi, vice-president of the world's largest maths, art and education community, called the Bridges Organisation.

Fenyvesi also ran his international "Experience Workshop" at the Uitenhage Science Centre, giving 30 pupils from under-resourced schools a practical taste of how art and maths connect, as they built giant soccer balls and 3m-high by 5m wide igloo-like domes using GeoGebra to understand the structures.

"The Experience Workshop gave the pupils the opportunity to learn mathematics through art, and to do art through mathematics," Olivier said.



AT THE CORE: Prof Werner Olivier is head of Nelson Mandela University's Govan Mbeki Mathematics Development Centre, which is hosting the GeoGebra Conference

ics," Olivier said.

The same practical maths-art activities were included in the GeoGebra Conference, which took place at Nelson Mandela University, and was themed "Steaming ahead: Promoting creative cross-curricular collaboration with GeoGebra".

Olivier said: "A GeoGebra community has been established across the world by teachers, pupils and lecturers, as they continue to develop GeoGebra resources.

There are about 800 000 GeoGebra apps and files which people can download for free to bring the maths and science curricula to life."

He said in addition to "popularising" the study of maths and science, GeoGebra had also built strong links with major organisations, such as Google, Microsoft Office and the Bridges

Organisation. As part of a formal research project in collaboration with the International GeoGebra Institute (based in Cambridge, England) and several national role-players – including Get Ahead College in Queenstown, which is aiming to set up a STEAM centre – GMMDC is also working towards developing resources for the world's first master's degree in maths and art,

which will be available at Johannes Kepler University in Linz, Austria.

The GeoGebra conference tied in with the GMMDC's hi-tech approach to maths and science. The Centre has developed a curriculum-aligned teaching and learning model for high school pupils and teachers, which is available on tablet, laptop or desktop computer,

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and includes video lessons, animated PowerPoint presentations, self-tests and many other resources, including GeoGebra.

GMMDC uses the model to boost teachers' skills and help pupils improve their knowledge and performance in maths and science, through Saturday incubator schools and technology-assisted peer support (TAPS).

GMMDC will also introduce STEAM at the Open Design Festival this month.