

CODING EDUTAINMENT

In July, almost 500 learners from 95 schools and organisations took part in a week-long virtual coding tournament that was both fun and informative.

The tournament was organised by Prof. Jean Greyling and his team from Nelson Mandela University in Port Elizabeth, who have introduced more than 20 000 learners across the country to coding over the past three years. They normally do this by arranging workshops that use one of the three game-based Android apps they've developed to teach learners the basic concepts of coding without the need for a computer. Lockdown meant that those workshops could not take place, so the team adapted one of the apps, called BOATS, to allow learners to participate in events from home, even if they had no previous coding experience.

The level of coding in the BOATS game is based on the robotics curriculum of lower primary school grades, but the competitive nature of the app makes it fun even for FET Phase learners (grades 10–12). Players have to navigate a boat in a grid representing the ocean, removing plastic litter along the way, with extra points earned for correctly answering multiple-choice questions on plastic pollution in the marine environment. These questions and supporting tips, such as 'Say no to plastic straws', mean that learners are educated on marine pollution as well as coding.

New features added to the original game after lockdown include information on COVID-19 safety measures, and the fact that scores are emailed directly from the app to a central database. Prizes totalling more than R50 000 were up for grabs in the tournament, which kicked off on



Nelson Mandela Day – Saturday, 18 July – and ran until the following Saturday. During this time, 10 227 scores were submitted as the participating learners advanced through the different levels of the game.

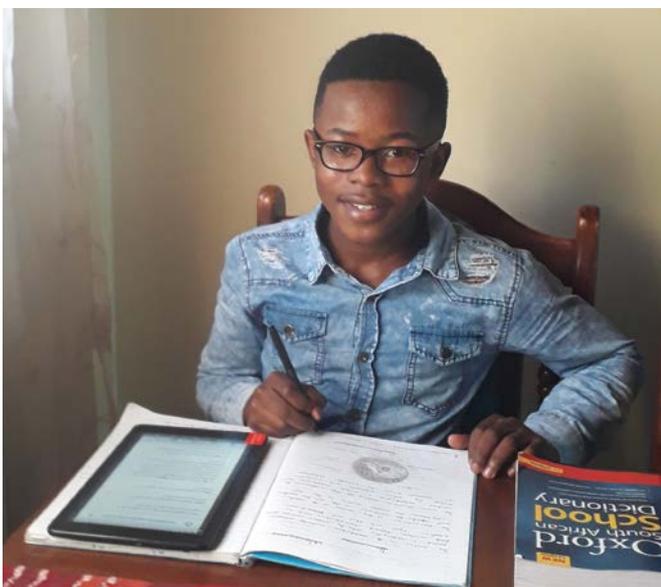
Ultimately, the single highest score was achieved by Grade 11 learner Zukhanye Swartbooi from Khulani Commercial High School in Mdantsane, near East London. He won a tablet for his efforts, as did Grade 9 learner Simamnkele Dekeda from Newell High School in New Brighton, Port Elizabeth. Simamnkele shared the second-highest score with more than 100 other learners, but also completed all 40 levels of the game and was the learner who submitted the most scores. Simamnkele had in fact been the overall winner in the first BOATS virtual tournament held in May, which involved only 180 learners from 30 schools.

Nearly 90 learners won 500 MB of free data each, and a number of cash prizes were awarded. For example, Park Primary School from Lenasia in Gauteng won R4 000 as the best participating school. Six schools won a TANKS coding school kit, which normally costs R3 000. Each kit contains seven lesson plans developed by a teacher, instructional videos for the different levels and coding concepts, the game solutions as well as eight sets of the TANKS game, which is ideal for a class of 40 learners split into groups of five.

TANKS was developed in 2017 by one of Prof. Greyling's computer science honours students, Byron Batteson. It uses tangible tokens, which look like puzzle pieces, and image recognition to move a battle tank around a grid. Learners have to arrange the tokens in a particular order to build the code, then take a photo of it with a smartphone camera. The image recognition internalises the code and executes the tank's movement on the smartphone's screen.

TANKS has 35 levels with increasing complexity and is more advanced than BOATS. Apart from the school kit, it can be purchased as a standalone game set for R150 plus postage, and is available for both iPhones and Android phones, whereas BOATS and the other game, RANGERS, are Android-specific. RANGERS uses the same tokens as TANKS and has the same level of complexity, but it has an anti-poaching theme and the target is to 'Save the rhino'.

Prof. Greyling says the team has received numerous awards and accolades for the games, and for making them available to disadvantaged schools through sponsorships. Most recently, he was invited to be a plenary speaker at the 2020 UNESCO Mobile Learning Week that was to have been



Simamnkele Dekeda, a Grade 9 learner from Newell High School in New Brighton, Port Elizabeth, doing homework using the tablet he won in the coding tournament.



Muller du Plessis, a Grade 2 learner from Gill Primary in Somerset East, was one of 90 learners winning 500 MB of data.

held in Paris in March, but the event had to be cancelled because of the COVID-19 pandemic.

In any case, he says, the feedback he receives from both learners and teachers is rewarding in its own right. During the BOATS tournament, learners sent numerous positive comments that were posted on the project's Facebook page – 'Games powered by Tangibl'. A teacher from Gobinamba High School, situated in a rural area outside Tsomo in the Eastern Cape, expressed heartfelt thanks to the team.

"My children now are developing a passion for computer science. They didn't even know of the career's existence!" said Ms Lusanda Maqungo in her message. "I am going to push forward too due to the motivation from the tournament! My principal and my colleagues are widely smiling, seeing potential in their kids."



The TANKS game, played here by learners from a high school in Cala in the rural Eastern Cape, uses tangible tokens resembling puzzle pieces to build code.



TANKS can be purchased as a game set for both iPhones and Android phones.

An IT teacher at the relatively well-resourced Alexander Road High in Port Elizabeth was equally complimentary. "During this time of lockdown, the tournament allowed our learners to be involved in constructive academic activity that improves their computational thinking, but is also great fun," said Ms Leanda Oosthuizen.

Byron Batterson is still a partner in the project, but he now works as a software development engineer for Amazon Web Services (AWS) in Cape Town. AWS was one of the sponsors of the BOATS tournament, making a number of prizes available and also helping the team honour their commitment to the beneficiary organisation they'd chosen for the event.

The tournament had been advertised as a fundraiser for the Port Elizabeth branch of SANCCOB – the South African Foundation for the Conservation of Coastal Birds – with the intention that R15 would be donated for every learner who entered. But the team had not anticipated the high number of entrants, and would not have been able to pay the R7 350 that the pledge added up to. Fortunately, AWS came to the rescue and provided additional sponsorship, allowing a donation of R8 725 to be made to SANCCOB. These funds would partly make up for the lockdown-related loss of income normally generated by SANCCOB's rehabilitation and education centre through entry fees, merchandise sales and its coffee shop.

The earlier virtual tournament in May raised R6 000, which was used by the Red Band Barista Academy to distribute free coffees to COVID-19 medical workers in the Port Elizabeth area as part of their Coffee4Heroes project.

- For more information, visit the Facebook page 'Games powered by Tangibl', or contact Prof. Greyling at Jean.Greyling@mandela.ac.za.

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