

Impact Case Studies Submission

Title of the Impact Case Study: Tangible Africa

Submitting University: Nelson Mandela University

Name, position and email address of Contact Person:

Prof Jean Greyling, HOD, Dept of Computing Sciences, Science Faculty.

Underpinning academic work

The project originated from an Honours project by Byron Batteson (2017) during which he investigated the use of Tangible Coding to introduce learners to coding without the need of computers, internet or electricity. This is also referred to as unplugged. The app he developed makes use of tangible tokens and image recognition, where coding constructs are implemented to solve a grid challenge on the phone's screen.

Since 2017, various follow-up coding apps utilising the same principle have been developed, complemented by an extensive suite of training and teaching materials.

The work has resulted in numerous research outputs, including 5 journal papers, 12 conference papers, 8 PhD studies (with one complete), and 7 Master's studies (with 2 complete). Currently, Ethics is being applied for an IFIP study driven by a UK academic on the impact of the project on the SA coding landscape.

Narrative description of the impact

The single project that has had the most impact from Tangible Africa's work is the Teacher Union Collaboration project, involving teacher unions SAOU, SADTU, and NATU. From 2022 to 2024, these collaborations resulted in introducing over 40,000 teachers to unplugged coding over the three years. This included schools for the blind as well as special needs learners. There is a general agreement amongst those involved that this had a major impact on creating a positive attitude towards unplugged coding, as an answer to resource challenges in South Africa.

This had an impact on having the gazetted Coding and Robotics Curriculum for Foundation Phase (2024) to be totally unplugged. The training material used was SACE-accredited and is now available online, where nearly 1000 teachers have obtained certificates for doing the training.

In support of the rollout of the C&R Curricula, Tangible Africa has extended our products to include the delivery of free weekly CAPS-aligned lessons from Grade R to 7. This started in February 2025 and is ongoing. Over 3000 teachers have already registered and are using the weekly lessons.

Since 2018, Tangible Africa has established a powerful relationship with libraries, starting with Joburg Libraries, and now extending to Cape Town, eThekweni, and Ekurhuleni. A partnership with the Year Beyond NPO has also introduced tangible coding to over 100 libraries across the Western Cape. The biggest impact of this has been introducing coding to learners, especially in libraries, which are typically low-resourced. Libraries are also reporting that the coding opened doors to local schools for better collaboration.

Introducing coding in schools that normally lack the necessary resources has opened career expectations for learners. Additional career awareness and nurturing complement this. As a result of our work, we are aware of many students currently studying computing (or other STEM) qualifications at universities such as NMU, UCT, UP, and UKZN. Furthermore, the work of Tangible Africa has encouraged individuals and corporates to support learners and students within the project financially.

Other projects which have significant impact:

- Annual #Coding4Mandela project – in 2025, over 50,000 learners participated in various coding-related activities. This will culminate in an international virtual “Tangible Coding World Cup” – last year teams from over 20 countries participated. This project has played a significant role in “popularising” coding in schools, contributing to the demystification of coding for teachers.
- Tangible Africa has an active footprint and partnerships in 15 countries over 5 continents. In Ireland, our games have been identified as having potential to give teachers confidence in teaching their new Curriculum and Resources (C&R) curriculum in primary schools. This resulted in a PhD study investigating the rollout of our game packs, featuring a Micro:bit, to 3,000 primary schools.
- We are in the process of equipping academics in mainly Education Faculties to be able to use our coding games and material to empower teaching students to introduce coding in schools. Currently, no universities have teaching curricula linked to the new school curricula. Therefore, our “low barrier of entry tools” are seen as an ideal way to empower education students for immediate impact.

Evidence and sources to corroborate the impact:

Media coverage

Tangible Africa’s story is covered multiple times across various media platforms – over 50 stories covered per year since at least 2023.

University World News - University’s outreach work cracks code for student success – 8 February 2024
<https://www.universityworldnews.com/post.php?story=20240207192114333>

Sunday Times – 1 October 2023
[SA a shining star in the Amazon firmament](#)

Positive attitude towards “Unplugged Coding”

The Herald – Tangible coding just clicks with Africa’s kids – 23 March 2023
[Tangible coding just clicks with Africa's kids](#)

Special Needs

Mpuma Kapa TV News Bulletin (English interview with Robyn Fick from Bona Ubuntu)
<https://youtu.be/7jRe8zGlySI?si=okukfpWzlt5fi2UJ>

Preparation for curricula roll-out

Newsroom Africa – Teachers to be equipped with coding – 6 January 2025
<https://www.youtube.com/watch?v=qeV-hM4f90o>

The Herald – Free programme offers support ahead of Coding and Robotics Curricula. – 24 October 2024
<https://www.heraldlive.co.za/news/2024-10-24-free-programme-offers-support-ahead-of-coding-and-robotics-curricula-for-primary-schools/>

Library partnership

Cape Town Today – 13 June 2023
[Revolutionizing Education and Community Empowerment through Mandela Day Coding Tournament - Cape Town Today](#)

Impact on Career Choices

Good Things Guy – 13 April 2023

[Coding Game Opens the Door to Dream Job](#)

Coding4Mandela tournaments

Engineering News - 32000 young people participate in this year's coding4Mandela event. – 8 August 2024
<https://www.goodthingsguy.com/fun/youths-coding-africa/>

The Herald – 21 August

[Gqeberha coding initiative has spread across Africa and Southeast Asia](#)

International Impact

Irish Times - Every primary school to get free coding kit and teaching resources – 7 March 2024

<https://www.irishtimes.com/ireland/education/2024/03/07/every-primary-school-to-get-free-coding-kit-and-teaching-resources/>

News24 - Tangible Africa goes global.- 22 May 2024

<https://www.news24.com/news24/community-newspaper/pe-express/tangible-africa-goes-global-20240520>

ITWeb – 6 December 2024

[AWS pledges \\$100m towards digital learning | ITWeb](#)

Completed studies M&D studies

PhD study - Anel van Rooyen. Building blocks of foundation phase educational robotics teacher training across the Digital Divide. University of Pretoria. Completed 2025.

Masters study - Goba-Hlongwane, T. Preparing Foundation Phase teachers in KZN to teach coding. University of Pretoria. Completed 2023.

Quotes supporting impact

Yonela Plaat - 4th Year Education Student at University of Johannesburg

"Me and my colleagues were introduced to the world of unplugged coding, proving that teaching learners how to code doesn't have to start with computers or expensive equipment. Sometimes, all you need is a grid mat and a bit of creativity."

"The innovative work done by Tangible Africa is putting South Africa at the forefront of widening access to technology education through their wide range of offline unplugged coding games and activities, teaching coding through play."

Evidence Makoena – Tangible Africa trainer

"I had the opportunity of introducing tangible coding to a school in Soweto, through teaching an education student. The school where the student is doing her practical training, had no idea what coding was about. The

teachers sees her placement as an opportunity to empower the learners at the school. When I visited the school, I saw 3 grade 7 classes with approximately 40 learners in each class and their enthusiasm to learn our way of coding was unmatched.

Kamva Pieta – Leap 1 School, Langa, Cape Town.

For our learners, being part of the World Cup means so much more than just a competition—it's a chance to showcase their skills on a global stage, not just in South Africa. Competitions like these inspire them to dream big beyond their circumstances, and being part of such an opportunity shows them that they can achieve anything they set their minds to.

Jeff Nyoka – E-Learning Manager for City of Johannesburg Public Libraries

"The Tangible Africa coding program gave us an opportunity to introduce coding to children in our libraries. This increased our collaborations with schools. Tangible coding is now one of our annual key programs that we formally report on."

Jacqui Boule – Head: Youth and After School Programme Office, Western Cape Department.

"YearBeyond's partnership with Tangible Africa has enabled children and communities to dream. Even parents and librarians are joining in. Tangible Africa has been a magnet bringing the community into libraries. It has given children hope that anything is possible, it has made parents and caregivers proud and it has opened pathways into the economy for the youth offering the programme in libraries."

Faseega Solomon, SADTU Vice President for Education

"Tangible Africa's approach proved that unplugged coding is a powerful educational tool, which strengthened SADTU's motivation to introduce it to our members. This demonstrated to the DBE that coding can be effectively taught, without computers, inspiring policy change to integrate unplugged coding in the foundation phase."

Mrs A. Mankonkwana, teacher at Blackheath Secondary School

"Since Tangible Africa started coding workshops with our Grade 8 and 9 learners in 2024, we have seen an increase in enrolments for mathematics, because the learners now see its value for STEM careers. Consequently, we introduced Mathematics as a Grade 10 subject, for the first time in 2025."

Dominique Cave, lecturer at Two Oceans Graduate Institute.

"I love your lessons, and am recommending that my Coding and Robotics student teachers all subscribe."

Awards

- In 2022, the project received the Nelson Mandela University Engagement Award.
- In April 2022, Prof Greyling (the founder) received the Distinguished Service in ICT Award from the Institute of IT Professionals South Africa
- In November 2022, the project was the runner-up in the African Union Education Innovation Award
- In 2023, the project was the winner of the Henley (Business School) Innovation Fund
- 2020 - Nelson Mandela University Engagement Award

"Tangible Africa's program has provided Joburg libraries the opportunity to introduce coding to children visiting our libraries. This increased our collaborations with schools as they also did not know how to introduce coding as a subject."

Signed off on behalf of the University by (Name, position and email address):

Date: 8 September 2025
----- Prof JH Greyling
Associate Professor, Dept of Computing Sciences
Nelson Mandela University

Jean Greyling