Physics Without Frontiers- SA

Theoretical and Computational Sciences Outreach Programme in Rural Primary Schools

Contents

Introduction

What's ICTP PWF-SA

A program hosted by Nelson Mandela University for the first time ever in the country. The initiative, part of the International Centre for Theoretical Physics (ICTP), aims to introduce both teachers and learners to the exciting world of theoretical and computational sciences.

Collaboration

Entities involved

ICTP-PWF

NITheCS

Yebo Tutor

SAASTA

Univen-VSRC

South African Institute of Physics

Tangible Africa

SA Universities' Science Centres

Event Overview

Date: September 16–20, 2024

Locations: Five schools in Limpopo Province:

1.Moria Primary School
2.Segoreng Primary School
3.Malesa Primary School
4.Badimong Primary School
5.Toronto Primary School

Participants: Over 140 learners and 9 teachers, 1 DoBE representative.

Nelson Mandela University

ICTP
PHYSICS WITHOUT

ICTP-PWF

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Department of Basic Education

Schools

Key Activities

For Teachers:

- Workshops on coding tools (e.g., Kodable, Ranger's Coding Game, Kahoot!).
- Professional development on integrating computational sciences into the curriculum.

For Learners:

- Interactive hands-on activities using coding platforms.
- Team-based problem-solving and computational thinking exercises.

Figure 1: Learners and their facilitator during activity days.

Figure 2: Learners and facilitators during activity days.

Impact and Deliverables

Teachers:

- Gained confidence and skills in computational sciences.
- Equipped to integrate coding into their classrooms.

Learners:

- Enhanced understanding of coding and problem-solving.
- Inspired interest in STEM fields.

- Goodie Bags for learners.
- Certificates for teachers.

Programme Statistics Overview

District Circuits

•Total: 2 Circuits.

Mankweng and Mamabolo.

Teachers:

•Total: 8 teachers.

Distribution by school

•Total: ~140 learners.

Distribution by school and by gender.

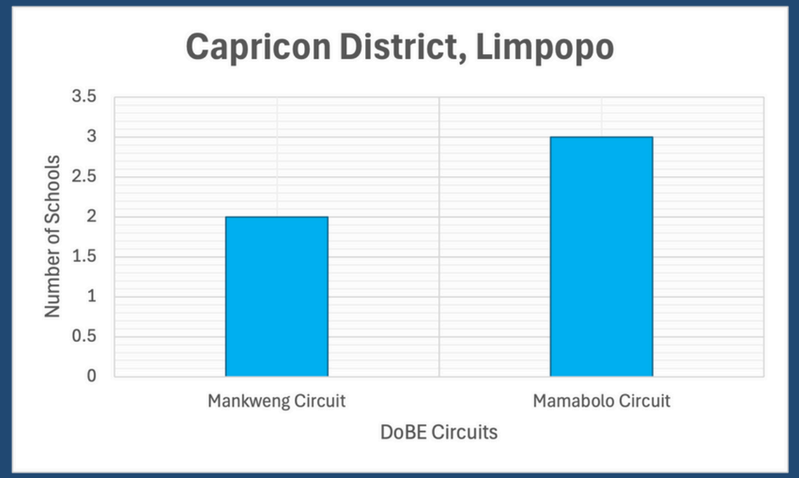
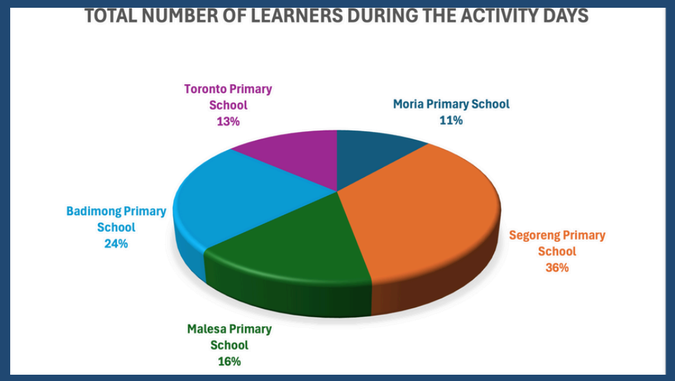
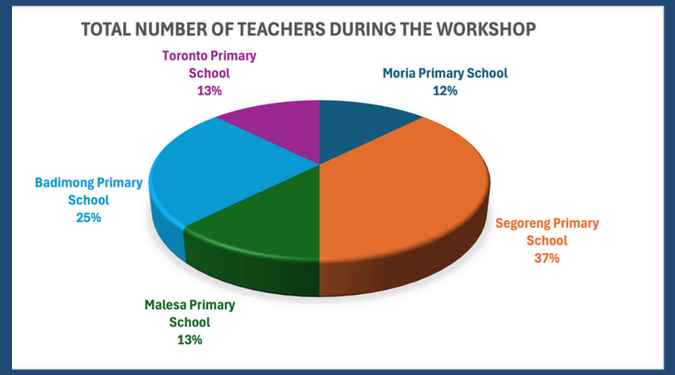
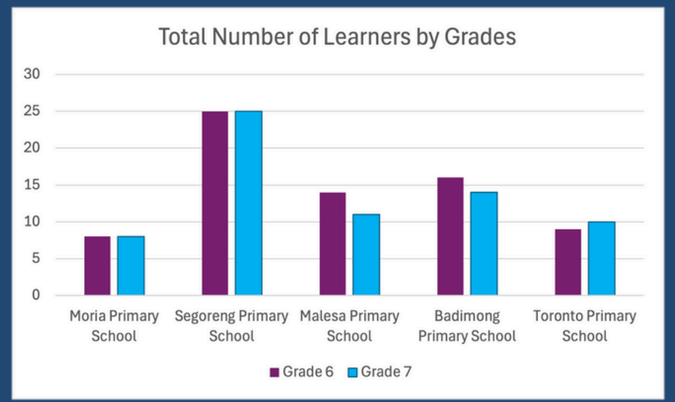
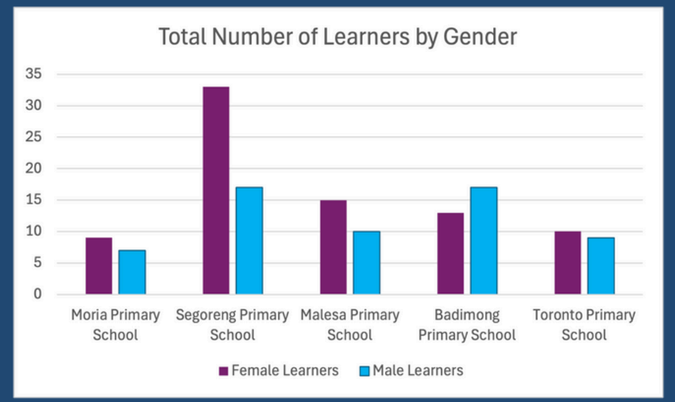


Figure 3: Plot and pie charts showing Distribution by school and by gender.









Programme Statistics Overview

Activities:

- Tangible Africa's Ranger's CodingGame
- EV3 Mindstorm Robotics Training
- Yebo Tutor Activities
- Kodable
- Kahoot! Activities

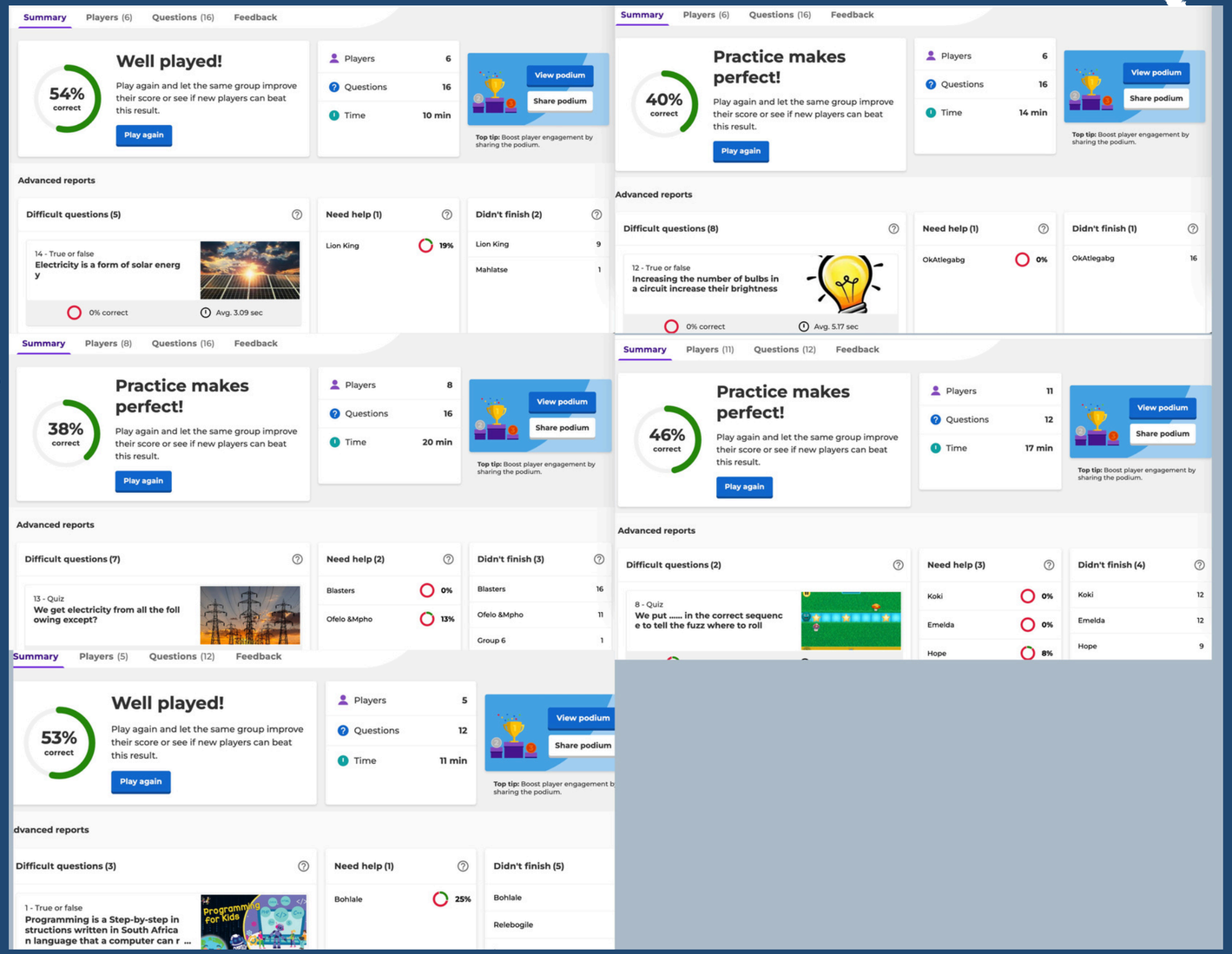


Figure 4: Activity performance results from Kahoot!

Challenges and Solutions

Challenges:

- Limited resources (labs, internet).
- Limited funds.
- High learner-to-teacher ratio.

Solutions:

Use of offline tools like Ranger’s Coding Game.

Low-cost, scalable teaching methods.

Feedback and Recommendations

Feedback:

- **Positive reception of activities and resources.**
- **Suggestions for more tailored support based on school-specific needs.**

(Here I will Include the feedback from the teachers after filling the Google Forms)

Recommendations:

- **Increase teacher participation.**
- **Expand the program to more schools.**
- **Address logistical challenges like transportation, internet, gadgets, etc.**

Financial implications

Contributions:

Direct Sponsors

- ICTP-PWF
- Centre of Broadband Communication (CBC), and NITheCS.

Self Funded Entities:

- The University of Limpopo Science Centre,
- Univen-VSRC,
- SAASTA,
- SAIP, DoBE, and Tangible Africa

Photos

Figures: Teachers during the teacher's workshop event and Learners and their facilitators during activity days.

Conclusion

and Future Plans

Key Takeaways:

- The programme successfully advanced STEM education in rural schools.
- Collaboration with partners was critical to overcoming challenges.

Next Steps:

- Continue expanding the program.
- Strengthen partnerships and secure additional funding.

Acknowledgements

•Teachers and learners for their enthusiastic participation from the following participating schools:

1. Badimong Primary School
2. Malesa Primary School
3. Segoreng Primary School
4. Moria Primary School
5. Toronto Primary School

- NMU, ICTP-PWF, NITheCS, SAASTA, CBC's Yebo Tutor, Univen-VSRC, SAIP & Tangible Africa.
- ICTP PWF - SA coordinating team.
- University of Limpopo Science Centre.

Thank You

For Your Attention

NELSON MANDELA
UNIVERSITY

Q&A