Tabletop Games as Low-Cost STEM Teaching Tools in Sub-Saharan Africa

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Abour the Speaker

Founder

ROBOTSAVE – robotics & STEM education NGO, Cameroon, France

Ambassador

TME Education, SeeedStudio & Cameroon Flying Labs representative

Engineer

Electronics,Sensor Networking IoT, TinyML & drone pilot (University of Gustave Eiffel, France)

1000+

Youth Trained

7

UN SDGs Addressed

5+

Countries Reached

RobotSave Initiative

01

Hands-On Workshops

Arduino, Raspberry Pi, and XIAO ESP32S3 sessions in secondary schools, universities, and community spaces across Cameroon.

02

Youth Empowerment

Training future engineers and educators from underserved regions with practical, project-based learning experiences.

03

Expanding Reach

Partnering with TME Education, Seeedstudio and Cameroon Flying Labs to scale into East Africa and beyond through replicable models.

Areas of Research & Practice

Robotics & Embedded

Arduino, ESP32, Raspberry Pi

TinyML & Edge AI

On-device intelligence

Game-Based Learning

Non-digital STEM games

Precision Agriculture

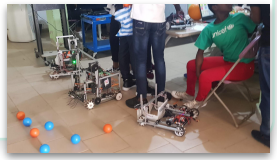
IoT & LoRaWAN sensors

Drone Technology

Aerial mapping & surveying

SDG Impact

7 UN goals addressed



Why Non-Digital Tabletop Games?

- ✓ No electricity or internet required
- ✓ Cost-effective — reproducible locally at low cost
- ✓ Accessible for learners with special needs
- ✓ Easy to localise (language, cultural context)
- ✓ Deployable in schools, libraries, and community centres

Physics Concepts Modelled

- ⚡ Electric Circuits
- 🎯 Forces & Motion
- 🔗 Logic Gates
- 🌡️ Thermodynamics
- 🔢 Probability & Stats

Field Experience: Cameroon Classrooms

Secondary Schools	Board and card games used to teach electric circuit fundamentals (Logic Circuit)without hardware. Students built circuits on paper before ever touching a breadboard.	Comprehension ↑ 40% vs traditional lecture
Community Centres	Tile-based logic gate games introduced to after-school groups. No teacher training required - rules designed for peer-to-peer learning.	Engaged learners ages 10–25
University Level	Dice-based probability simulations supplemented physics lab sessions where equipment was unavailable, reinforcing statistical reasoning.	Adopted in 2 partner universities

Design Principles for Local Adaptation

01

Language First

Translate rules and cards into local languages (French, Fulfulde, Ewondo). Visual-primary design reduces literacy barriers.

02

Cultural Relevance

Use locally familiar contexts (farming, market trade, river navigation) to embed physics and maths concepts.

03

Reproducibility

All game components printable on standard paper. Dice can be hand-made from cardboard. Zero specialist materials needed.

04

Teacher Independence

Games designed for peer-led sessions. Facilitation guides bundled, but sessions run without a physics-trained teacher present.

Contribution to the UN Sustainable Development Goals

SDG 4

Quality Education

SDG 5

Gender Equality

SDG 9

Industry & Innovation

SDG 10

Reduced Inequalities

SDG 11

Sustainable Cities

SDG 13

Climate Action

SDG 17

Partnerships

Conclusion

1. Non-digital tabletop games are a proven, affordable bridge for STEM education in low-resource contexts.

2. Localisation of games (language, culture, materials) is feasible, low-cost, and essential for real adoption.

3. Field experience from Cameroon confirms strong engagement across formal, informal, and community settings.

4. Collaboration between African educators and international researchers is key to scaling these solutions.

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