

Enhancing STEM Opportunities for Rural Nigerian Schools through Mobile Tech Labs. *IEEE SMC EDI Initiative Project 3/11/2025*

1. Introduction

The project “Enhancing STEM Opportunities for Rural Nigerian Schools through Mobile Tech Labs” was initiated under the IEEE Systems, Man, and Cybernetics (SMC) Society’s Equity, Diversity, and Inclusion (EDI) initiative. The initiative aimed to strengthen STEM education in underserved rural Nigerian communities by providing mobile laboratories equipped with tools for Physics, Chemistry, and basic Technology and Engineering experiments.

These mobile labs were designed to travel to schools lacking laboratory facilities, bringing hands-on experiments and demonstrations directly to students, thereby inspiring curiosity, creativity, and interest in science and technology.

2. Objectives

- To improve access to practical STEM education in rural schools.
- To expose students to real-world Physics and Chemistry experiments using modern lab equipment.
- To inspire interest in Technology and Engineering through hands-on demonstrations.
- To train teachers on the effective use of experimental kits for classroom instruction.
- To promote the IEEE SMC Society’s visibility and encourage membership in rural academic communities.

3. Project Implementation and Activities

After acquiring essential STEM Mobile Tech Lab equipment, including portable Physics kits, Chemistry experiment sets, electronic components, and basic engineering tools, the project team began school outreach programs in Enugu State, Nigeria.

3.1. School Visits

- **Kings Kids Secondary School, May 31, 2025:**
The team launched the first outreach, introducing students to practical Physics experiments such as electric circuits, light reflection and refraction, and basic mechanics. Chemistry sessions covered acid-base reactions, solubility tests, and simple titrations. The demonstrations of basic Technology and Engineering experiments
- **Christ High School, Abor – June 14, 2025:**
The second outreach expanded into chemical reaction demonstrations, pressure and motion experiments, and renewable energy projects. Teachers were guided on how to integrate the experiments into their existing science curriculum.

Both schools expressed deep appreciation for the experience, noting that such hands-on practical had been missing due to the absence of functional laboratories.

4. Outcomes and Impact

- **Direct Beneficiaries:** Over 200 students and 6 science teachers gained hands-on experience in practical STEM learning.
- **Teacher Empowerment:** Teachers learned how to handle portable lab kits and adapt them for classroom use.
- **Increased Student Interest:** Students showed heightened enthusiasm and engagement in Physics, Chemistry, and Engineering concepts.
- **IEEE Membership Growth:** The visibility and success of the outreach led to increased membership in the IEEE Systems, Man, and Cybernetics Society.
- **Chapter Formation:** The initiative directly inspired the formation of the IEEE Nigeria Section SMC Chapter, creating a platform for continuous professional and academic engagement.

5. Lessons Learned

- Portable labs are highly effective in areas without established laboratory infrastructure.
- Engaging students through real experiments significantly boosts learning retention and enthusiasm.
- Teacher participation is vital for sustaining the project's impact.
- Collaboration among IEEE societies enhances the outreach's diversity and impact.

6. Sustainability and Future Plans

- Continue outreach to more rural schools in Enugu State and neighboring communities.
- Establish STEM Clubs in participating schools to encourage peer-to-peer learning.
- Conduct train-the-trainer workshops for science teachers to build local capacity.
- Seek partnerships with local education boards and NGOs to expand mobile lab coverage.

7. Acknowledgements

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