



DigiEduHack Solution
Abuja - Hack the Crisis Nigeria
Challenge: Abuja - Hack the Crisis
Nigeria Challenge 2020

Mobile STEM Laboratory

To upgrade Science labs in schools and students creativity

STEM education in Nigeria is key to her future. key challenges in achieving this is the lack of creative, project based and innovative content to encourage the take up of STEM related careers in the future by students in Nigeria. Secondly, the cost of setting up STEM laboratory is quite expensive.

Team: Mobile STEM Lab

Team members

Olutola Vivian Awosiku

Members roles and background

Olutola Vivian Awosiku : Project Manager

Contact details

100WomenInTechNigeria@gmail.com

Solution Details

Solution description

Learning STEM without resources poses a challenge especially in low cost public and private schools as it creates a bridge between what students are taught and what they experience.

Our motivation for this project is to promote accessibility for students in low resourced public school and low-cost secondary schools with limited STEM resources and to help STEM teachers deliver quality lessons for students to develop 21st century skills by immersing them in real-world project based learning practices.

Our Mobile STEM laboratory helps learners gain deep comprehension of challenging STEM concepts with projects that include simple and compound machines, autonomous robots and sensors, robotic, movement and mechanisms, and design challenges. Students are encouraged to drive their own learning by asking questions, defining problems, challenging their own thinking and developing their own solutions for social good.

Our Mobile STEM laboratory strikes a balance between cost effectiveness, accessibility, usefulness and impacts. It has two major features which are

STEM KITS : This handy innovative toolbox contains

Arduino, Servo, Ultrasonic Sensors, Battery connectors, Kinetics, LED, Motor, Wires, Glue guns and other items to effectively help the students and teachers build solutions for social good in Automation, Motion, AR/VR, Robotics, Renewable Energy e.t.c as low as less than 30\$ and this can serve 10 students per kit. This Mobile lab encourages scientific inquiry and student agency, visualizes the invisible, provides interactivity and uses real world connections.

2) **STEM PAD :** Our solution also provides preloaded well structured videos on our app that inform, guide and train students on different STEM projects which can be accessed both online and offline anytime and anywhere. The stem pad videos simulate science concepts linked with case studies, which helps students interact with abstract and theoretical learnings in a fun and interactive way with a handy kit to build projects as they learn. This is unique because our target stakeholders (students and STEM teachers) have direct engagement with our solution for project based learning

Solution context

STEM education is the bedrock of innovative and highly productive future workforces, integral to the economic development of the continent.

As crucial as STEM education in Nigeria is for its future, the reality is that STEM is still in its infancy in the nation. Not only does the country face economic challenges, it also faces cultural headwinds that combined, may potentially make progress slower. According to an article by CEMASTEIA (Centre for Mathematics, Science and Education Technology Education In Africa) this goal can be achieved, however, there must be a concerted effort to reform African Countries Curricula and related implementation practices at classroom level

One of the key challenges we observed is the lack of creative, engaging and innovative content to encourage the take up of STEM related careers in the future by students in Nigeria.

We believe that contents/projects should be focused on a real-world problem that students solve through research, exploration, experimentation, and the application of skills from across the curricula. Often, PBL concludes with students formally presenting their solutions to the problem.

This hands-on method of learning actively engages students, which leads to a much deeper and lasting understanding of content. Secondly,

STEM AND STEAM EDUCATION is a new body of language in Africa and for Nigeria, the cost of investing in setting up STEM laboratory is quite expensive,

Hence, the importance of our solution

MOBILE STEM LABORATORY KITS, which is a low-cost, mobile and affordable STEAM KITS to bridge the gap and enable students to have hands on learning experience with a physical STEM laboratory.

Solution target group

Our target group includes :

- 1) School (private and public schools)
- 2) Students of all age range
- 3) parents
- 4) Government

Solution impact

Over the past 2 years, Mobile STEM kits has been used to promote improved learning outcomes for STEM subjects students in schools across Nigeria. This project ran as a pilot in 5 Nigerian states (Lagos, Ibadan, Ekiti, Ogun, Osun) with 50 public and low cost private schools and 100 students. STEMPad that aligned to the curriculum for Physics, Chemistry, and Biology were curated and a team of trained educators worked with teachers to reinforce classroom learning of these concepts using the labs.

The Teachers reported the following outcomes based on the evaluation of project survey conducted.

Students became more interested in science and had increased confidence in asking questions in class as well as taking tests and exams.

Students demonstrated a better understanding of topics/concepts taught during the STEM Club sessions.

Students prefer the STEM club method and would like this to be used in the traditional classroom.

Please visit the following links to read success stories of students who uses our STEM lab kits

<https://www.youtube.com/watch?v=fnh3UWHZrA4>

<https://www.youtube.com/watch?v=EGD28WhiNqg>

https://youtu.be/0O3_QsuvPJ4

Solution tweet text

The core idea of project-based learning is that real-world problems capture students' interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context, mobile stem lab encourages students urgency to visualize the invisible.

Solution innovativeness

The Mobile STEM kit and STEM Pad is an innovative approach to empower schools and teachers with project based learning experience at a Low cost and with easy access.

Develop 21st century skills by immersing kids in real-world engineering challenges

Help learners gain deep comprehension of challenging STEM concepts with projects that include simple and compound machines, robotic movement and mechanisms, autonomous robots and sensors, and design challenges. Students are encouraged to drive their own learning by asking questions, defining problems, challenging their own thinking and developing their own solutions.

We provide teachers, individuals, and schools with STEM kits and universal equipments to help upgrade Science labs in schools and introduce hands on Computer Science and Engineering projects to secondary school curriculum. We also offer hands on training on our STEM kits to ensure students engagement is at the highest possible.

Solution transferability

-By partnering with relevant educational agencies to deploy our innovations in their schools which we are currently operating in 10 schools.

-Creating a marketplace for school's innovation to display for sale and help more schools make revenue to develop their schools.

Accessibility :Unlike the physical laboratory that faces geographic constraints, our Mobile STEM kits

can be accessible anytime, anywhere both online and offline and right on the palm of every kid.

Supply : The physical laboratory uses deplorable materials. Our innovation can easily be replicable

Cost (Set up) : Unlike the physical lab, ours is relatively cheap and one off set up

Our solution can be accessed online anywhere, anytime

Solution sustainability

Our business model is Business to Business and Business to customer (Hybrid)

Business to Business:

We adopt this model by partnering with schools and government to deploy our solution through them to the students for effective use, we also supported this model with setting up of STEM CLUB in such schools to facilitate regular usage of our kits for improved learning outcomes.

This model also helps us work with non-profit organisations and philanthropist to deploy our innovation in helping them meeting their organisational goals within the education space.

Business to Customer:

We adopt this model by directly providing every kids with our kits through our community HUB space where students visit to learn and take hands-on activities using our mobile STEM kits.

This model has helped us to reach over a hundred students within poor and underserved communities.

We also leverage the STEM CLUB Community : Our operation includes setting up of clubs in public and low-cost private schools, training of teachers and putting them on an online learning community. We have about 100 Schools all over Nigeria onboarded to our virtual platform. Through this network, our solution will be deployed in each school and teachers training will be made easy because of existing relationships. We have started operations in about 10 of the schools while funding has hindered us to scale to other schools who are as well demanding for the product.

Solution team work

Our team is made up of passionate and result oriented individuals who are keen on driving innovation in the Education sector of Nigeria. We are committed to taking the project further. .