

Science + Art: Designing Accessible Education for Students in Nigeria

A wide-angle photograph of a school courtyard in Nigeria. In the background, a large group of students in white and green uniforms are lined up in front of several school buildings with green roofs. The foreground is a dirt courtyard. A few people are visible on the right side, including a man in a white uniform walking and another man in a brown uniform sitting on a bench. The sky is blue with some clouds.

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1:00-2:00 pm

Wellesley
Centers for
Women

The Team



Special Courtesy

Dr. Layli Maparyan

Wellesley Centers for Women

Wellesley College

Background

A nation's ability to compete in global society is heavily dependent upon the quality of the education sector and citizens' access to quality education.

Nigeria is in a unique position as the world's 7th most populous country (200 million residents as of 2019) and is projected to become the 3rd largest country by 2050.

National efforts to improve educational opportunities, especially in the fastest growing industries related to science, technology, engineering and mathematics (STEM), are an engine of the country's economic growth and influence Nigeria's standing in global society.

Schools in rural areas of Nigeria, especially in the northeastern region, often lack basic educational materials such as textbooks, not to mention instructional material related to STEM and the arts.

The S.T.E.A.M. Summer Program was designed to address these gaps by delivering culturally informed, hands-on S.T.E.A.M. instruction to students in northeastern Nigeria, including the states of Gombe and Bauchi.

Project Rationale

To excite students, teachers, and administrators on the prospect of STEAM education using a hands-on, student centered approach.

To fill in educational gaps, in practical ways, using 500 of the innovative STEMkits designed and created by Wellesley College students in collaboration with researchers at the Wellesley Centers for Women.



What is S.T.E.A.M.?

Science

Technology

Engineering

Art

Math

Curriculum Design and Development

Initial interest from other projects

- Boston Museum
- STEMkit

Collaboration between multiple partners to build STEMKits embracing all content areas:

- STEMkit Team – videos, experiments, teacher's manual, with assistance from individuals and institutions
- Content area experts (science, art, math, technology/engineering)

Educational Approach to STEAM Camp

Interdisciplinary

Student-centered (Great School Partnerships, 2014)

Experiential

Culturally responsive and sensitive

Community engaged

STEAM Camp Curriculum Overview

	Day 1	Day 2	Day 3	Day 4
Science	Genetics & Fingerprinting	pH Indicator/ Density Osmosis/ Density	Period of Pendulum	Blood Typing Kits
Technology/ Engineering	Egg Drop (Shock Absorption)	Vinegar Rocket	Da Vinci Bridge	Electric Circuit & Pulley Systems Playground
Art	Custom Cubes	Beading Local Drummers and Singers	Free Drawing	Handprint Flag Playdough
Math	Paper Cup Calculator	Math Dice Math Snakes	Math Memory Game	Math Race Challenge

Project Materials

Imported Material (20%)

- STEMkits
 - Measuring tapes
 - Plastic bag
 - Pipettes
 - Timer
 - Double ball pendulum
 - Test tubes
 - Pictocolors
- Laser Cut Wood Presskit
- Pencils
- Markers
- Crayons

Local Materials (80%)

- Hibiscus tea
- Soap
- Oil
- A4 paper
- Carbon paper
- Tissue paper
- Plastic cups
- Strings
- Salt
- Tape
- Yam
- Vinegar
- Bleach
- Baking powder
- Plastic bottles
- Beads
- Chalk
- Scissors
- Lemon Juice
- Pipe cleaners
- Wood planks and sticks
- Jars/Vase
- Liquid glue
- Paints
- Skewers and toothpicks
- White fabric
- Paint
- Large plastic bags
- Plastic spoons
- Plastic bottles
- Flip Flop
- Batteries
- Copper wires
- Lightbulbs
- Newspaper
- Plates
- Corn flour
- Wheat flour

Theoretical Approach

African Worldview

- Ubuntu (I am because we are)
 - Collective Responsibility
 - Interdependence
- Fluidity of time
- Harmony with nature

Participants

1250 students between the ages of 10 and 14 from 115 schools in Northern Nigeria:

- Bauchi (urban city)
 - 3 Days
 - 272 students
- Hinna (rural village)
 - 4 Days
 - 667+ students
 - 2 sessions per day
- Gombe (urban city)
 - 5 Days
 - 311 students
 - 2 sessions per day

Science





Technology/ Engineering

Art





Math

Lessons Learned

Credibility as currency and capital

A need for pre-travel workshops on identity and culture

Importance of community buy-in for project success and sustainability

Understanding, valuing, and creating programs and policy from the African worldview

Building Credibility Through Local Relationship Building

- Inspector General of Police
- Director General of State Security Service
- Commissioner of Police
- Director of States Security Service
- Local Security Apparatus (Hunters)
- Village Vigilantes
- Local Youth Leaders
- Friends and Associates
- Village Heads
- Minister of Information (past)
- Chief Judge of Abuja
- Bashir Dalhatu
- Member-House of Representatives
- Chief Mullah of Bauchi
- Chief Judge of Bauchi
- Emirs of Gombe, Bauchi
- Perm. Sec. of MoE –Gombe
- Chief of Hinna
- Nigerian Ambassador of Italy

Next Steps

Development of a strategic plan for the project.

Ownership and sustainability through collaboration with the Ministry of Education, the University of Gombe, and Office of the Vice President of the Federal Republic of Nigeria.

Development of comprehensive curriculum and teacher professional development on student centered teaching and learning.

Facilitation of continuous dialogue between Ministry of Education, traditional institutions, local teachers, and schools.

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STEMkit

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Arlene Lieberman

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Ann Salama

Silvio Dionisotti

University of Rome Students:

Simon Mullier

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Sadeen Qurdan

Bashir Dalhatu

Abubakar Musa

Labaran Maku

Chief Justice of Bauchi, Rabi

Musphata

Chief Justice of FCT, Justice

Ishak Bello

Virgilio Dionisotti

Mallam Abdulhali

Yaya Dija

Suleiman Halliru

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Babayo Liman

Inspector general of Police

Police Commissioners of

Bauchi and Gombe

Director General of the State

Security Service of Nigeria

Directors of State Security

Services of Abuja, Bauchi,

and Gombe

President, University of

Gombe

Chief of Hinna, Abubukar Aliyu

Emir of Gombe

Emir of Bauchi

Emir of Dutse

Ali Baba Dalhatu

Aisha Maigari

Aisha Muhammad

Binta Shuia'bu

Muhammad Shuia'bu

Kabiru Adamu

Abubakar Meshellia

Hauwa Muhammad-Goggo

Vigilantes

Uncle Mohammed (Driver)

Uncle Abullahi (Cook)

Teachers from Supporting

Schools in Nigeria

Many other unsung heroes

Joe Mutuah

Denis (CSO)

MoE Bauchi

MoE Gombe

Secretary Gombe State

Government

Nisa Premier Hospital Abuja

Abubakar Ibrahim Ajiya

Zainab Yunusa Kaltungo

Audu Magaji

Hinna Elders and Youths

Dauda Batari

Baba Hussaini

Affiya Dalhatu and family

Barbara Slayer

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Lena Park Fab Lab

Laila Pearson

Photographers:

AMA

Nasiru

Security agents

Work Hard...Play Harder!



Sharing & Questions