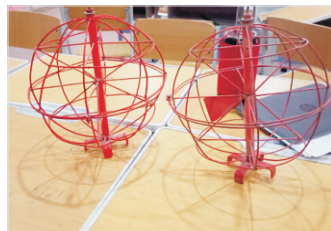




Atomic structure - Hands on activities with balloon covering empty bottle's mouth



Atomic Structure - Dividing droplets hands on activity



Geometry - Physical model to touch and see latitudes, longitudes and coordinates



Students lifting potato with straw Force - Students using magnet and iron filings, observing the pattern (on the right)



Geometry - Physical model to touch and see latitudes, longitudes and coordinates



Chemistry teacher engaging students in the construction of atomic structure using local materials



Proposed CL4STEM Modules Training Options

ACTIVITIES	CL4STEM LITE (VIRTUAL ONLY)	CL4STEM PREMIUM (BLENDED)
Face to Face Orientation	X	✓
Virtual Zoom Orientation	✓	X
Modules	1- Nature of Science/Mathematics 2- One (1) Module in either Bio/Chem/Phy/Maths	1- Nature of Science/Mathematics 2- Two (2) Module in either Bio/Chem/Phy/Maths
TE COP Contact Hours	4	16
Virtual IT Support	✓	✓
Classroom Observation	1	4
Duration	6 weeks	12 weeks
Minimum Cohort Number	50	50
COST	N150,000 per teacher	N250,000 per teacher

Explore CL4STEM

CL4STEM IBBUL, Nigeria: <https://connectedlearningforstem.org>

Publications: <https://connectedlearningforstem.org/publications>

News: <https://connectedlearningforstem.org/News>

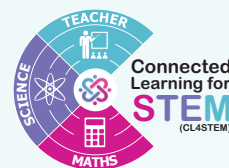
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Contact us:

info@connectedlearningforstem.org

Address:

KM 3 Lapai-Minna Road
PMB 11 Lapai,
Niger State,
Nigeria.



CONNECTED LEARNING FOR STEM

FOR TEACHER CAPACITY BUILDING IN STEM (CL4STEM)

#CL4STEM IN NIGERIA

Pilot CL4STEM Project and its Gains in Nigeria

1. Introduction

The Connected Learning for Science, Technology, Engineering, and Mathematics (CL4STEM) project was launched in April 2021 as a South-South collaboration among higher education institutions to adapt and pilot the Connected Learning Initiative (CLIX) (<https://clix.tiss.edu>) in Nigeria, Bhutan, and Tanzania. The project was aimed at building the capacities of high/secondary school teachers in Science and Mathematics for fostering higher-order thinking with inclusion and equity in their classrooms. The CL4STEM is funded by the International Development

Research Centre (IDRC), Canada, under the Global Partnership for Education Knowledge and Innovation Exchange (<https://www.gpekix.org>). Ibrahim Badamasi Babangida University, Lapai, Nigeria, is the lead of the CL4STEM project consortium which includes Samtse College of Education, Bhutan and Open University of Tanzania as the country partners. Tata Institute of Social Sciences, India, is the technical consultant to the project. The Nigerian collaborators are Bayero University Kano and Kaduna State University.

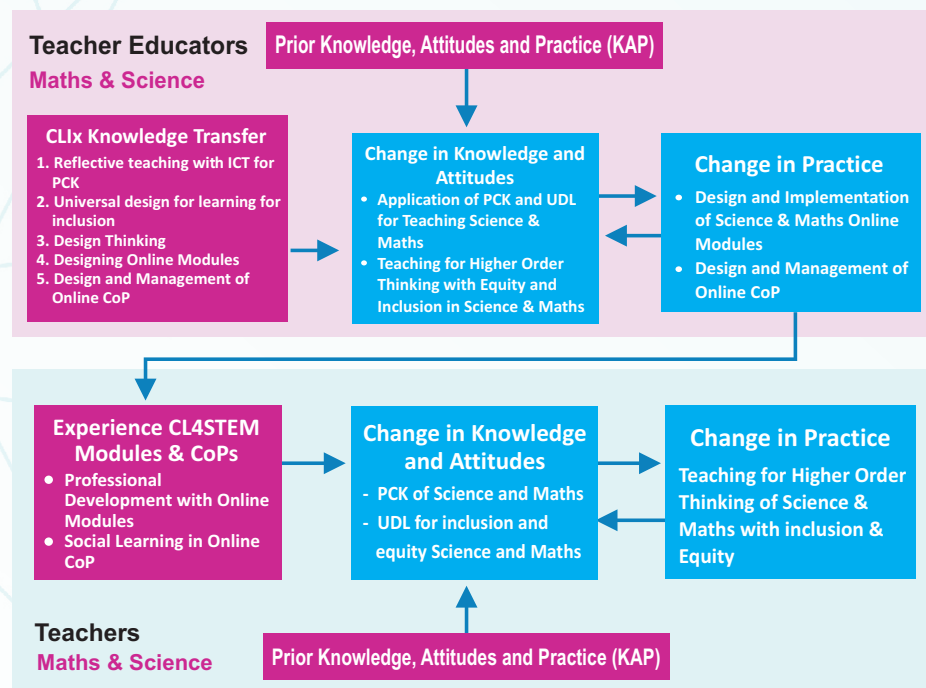
Partners



Funded by



2. Methodology



3. Results-Impact on teachers' Knowledge, Attitudes and Practice

S/N	Themes	Change	Nature of change
1	Knowledge of Subject Matter	—	No observable change
2	Nature of Science /Mathematics	—	No observable change. Teacher training institutions do not seem to emphasize this
3	Instructional Strategies	✓	Change from teacher centric strategies to use of hands on materials & activities from CL4STEM modules
4	Students' Misconceptions & Conceptual Difficulties	✓	Use of multiple representations & group work to address learning difficulties. Many were able to identify misconceptions. Few planned strategies & resources to address them.

5	Representation of the Content	✓	Use of a variety of resources from modules & compared them with their earlier use of chalk and talk. Drop in use of only textbooks & increase in use of hands on activities, adapting locally available materials, charts, models, ICT resources and videos
6	Context for Learning	✓	Adapt appropriate local materials, hands-on-activities & group work to address lack of material resources
7	Curriculum knowledge	—	No observable change
8	Equity and Inclusion	✓	Collaborative learning in groups. More use of multiple representations
9	Classroom Management	✓	Grouping to manage large classrooms during activities
10	Assessment	✓	Increased of formative and diagnostic assessment strategies

4 Conclusion and Future Prospects

The results of the pilot CL4STEM project in Nigeria with regards to teachers' instructional practices revealed a shift from the traditional classroom practices to the innovative instructional and assessment practices embedded in the CL4STEM modules. The findings clearly showed that the teachers' knowledge attitudes and perception towards engaging their students in classroom practices were enhanced. The prominent instructional practice employed by teachers was a collaboration or group work in which the students were engaged in exchange of ideas among themselves and between them and the teacher to address equity and inclusion. While the

increase in teachers' use of formative and diagnostic assessment strategies promote higher order thinking in their students.

The collaborative classroom environment during the CL4STEM activities encouraged the students to construct arguments, ask questions, justify their claims, criticise each other and make decisions; these could enhance higher order thinking skills. The positive impact of the project with regards to instructional and assessment practices among others, provide a very strong basis for further scaling of the project.