

AI-POWERED STEAM GAMES FOR INCLUSIVE LEARNING

Idea: AI powered Inclusive STEAM Education

Essential Question:-

How can AI-powered game systems close STEM learning gaps in low-resource schools?

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Location: Yewa North, Ogun State, Nigeria



ENGAGE

The Inequality Gap

In our rural public school we experience:

- No functional science laboratory
- Limited electricity
- Minimal digital exposure
- Low STEM confidence
- High climate vulnerability

68% of students report difficulty understanding abstract science concepts.

Most have never interacted with robotics or AI.

This is not just a learning gap. It is a digital equity gap.

We asked How can we make STEM tangible, exciting and accesible - even in low-resource settings?



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Why This Matters

AI is reshaping global education.

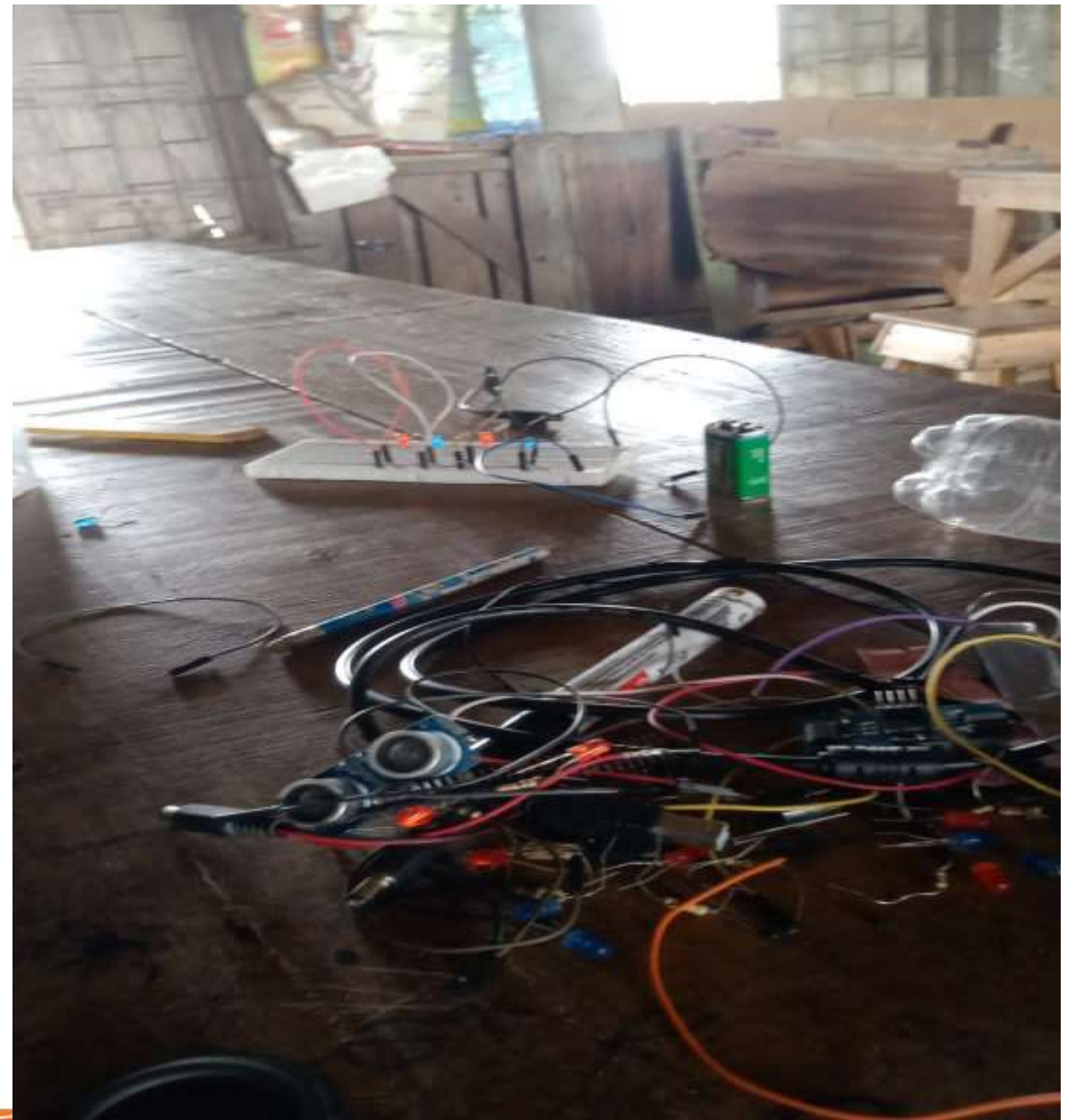
Yet underserved learners remain:

*Consumers of technology
Not creators*

*Without intervention, the AI revolution widens
inequality.*

Inclusive education must mean:

- *Access to tools.*
- *Access to innovation.*
- *Access to opportunity.*



Engage

What We Observed

- Through attendance logs and classroom observation:
- Engagement doubled during hands-on sessions
- Students participated more during game-based learning
- Girls showed increased participation in collaborative tech activities

Students in underserved communities don't lack intelligence. They lack access.



Engage

Our Vision

- To build AI-powered STEAM games that:
- Simulate laboratory experiences
- Adapt to learner performance
- Function offline
- Integrate climate problem-solving
- Develop 21st-century skills

We decided to build a digital lab ecosystem inside the classroom.



INVESTIGATE

Research & Investigation

We conducted:-

- Student engagement surveys
- Pre/post concept tests
- Curriculum gap analysis
- Game-based learning review
- Digital feasibility study (low-bandwidth tools)

We asked:

- What technology works where infrastructure is limited?



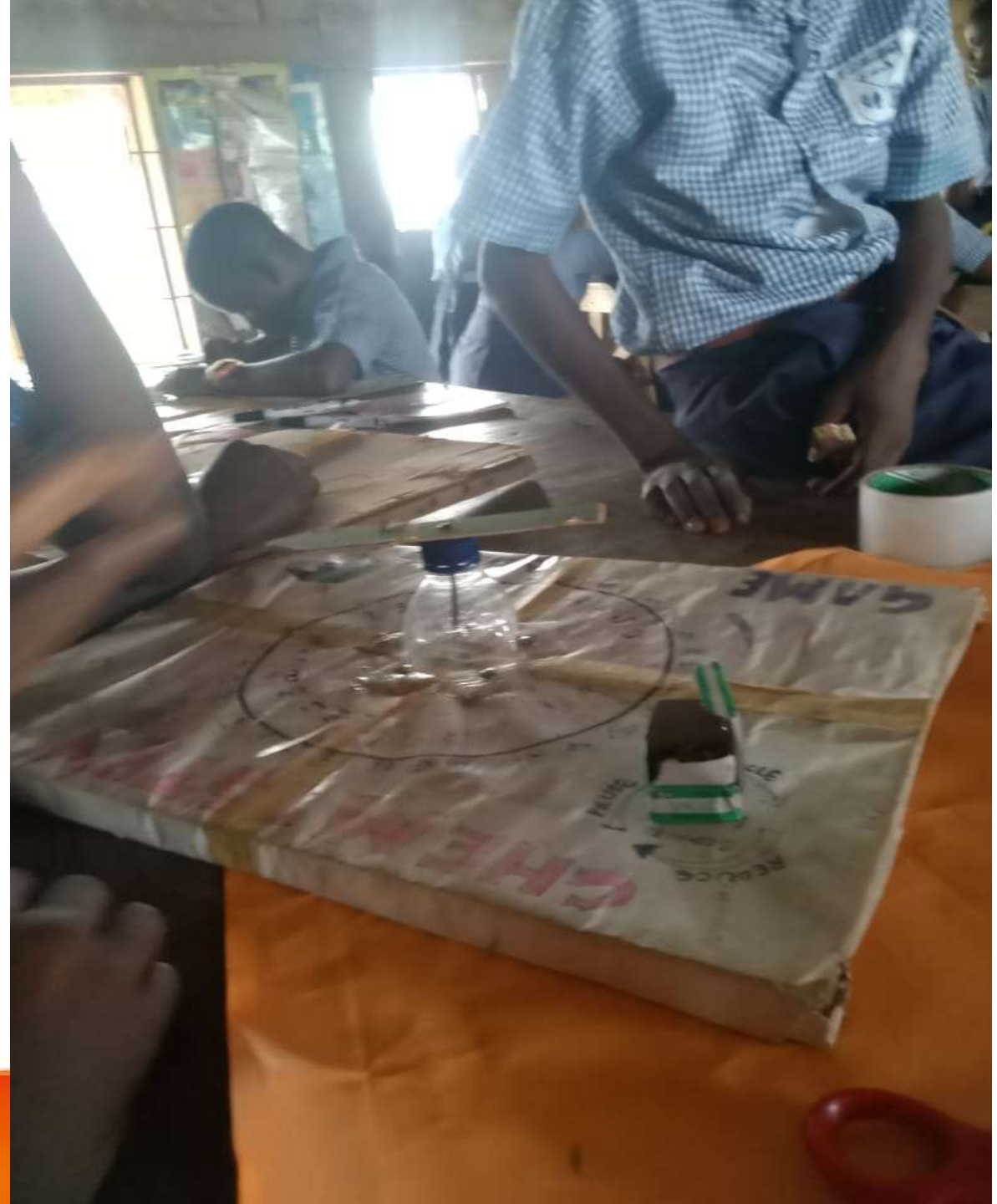
INVESTIGATE

Key Findings

- 75% prefer interactive learning
- 68% struggle with abstract science
- 0 lab access
- Plastic waste present in community

Conclusion:

- Hands-on + AI + local relevance = transformation opportunity



INVESTIGATE

Technology Architecture

Our system integrates:

- Layer 1 — Arduino hardware & sensors
- Layer 2 — AI adaptive response algorithm
- Layer 3 — Game challenge interface
- Layer 4 — Teacher performance dashboard
- Layer 5 — Climate & sustainability modules

AI analyzes student inputs and identifies:

- Conceptual errors
- Misconceptions
- Skill gaps

Then dynamically adjusts difficulty.

This enables personalized learning in low-resource settings.



INVESTIGATE

Prototype Development

We developed:

- 🎮 Chemistry AI Game Board
- 🎮 Climate & Energy Simulation Game
- 📊 Digital Impact Dashboard

Topics like:

- Collision theory
- Reaction rates
- Energy transformations
- Waste management systems

Students interact physically and digitally.



ACT

Implementation: We piloted in selected science classes.

Students:

- Built circuits using Arduino
- Solved adaptive AI challenges
- Engaged in climate role-play simulations
- Worked in collaborative teams
- Peer mentors were trained to sustain implementation.



ACT

Measurable Impact

After pilot:

- +30% increase in science class participation
- +22% improvement in quiz performance
- 60% increase in girls' active participation
- 90% of students report increased confidence

Students now describe themselves as:

- “Problem solvers”
- “Future engineers”
- “Technology creators”



ACT

Sustainability Model

We built sustainability into the design:

- ✓ Train-the-trainer model
- ✓ Reusable Arduino kits
- ✓ Open-source software tools
- ✓ Teacher workshops
- ✓ Peer mentorship system
- ✓ Community NGO partnerships

Cost per additional student: approx. \$15–\$20

- This is scalable.



Closing Vision

We are not waiting for laboratories.

- We are building digital laboratories using:
- AI
- Affordable hardware
- Game-based learning
- Student creativity

AI-Powered STEAM Games is not just a project.

It is a replicable model for inclusive, climate-responsive STEM education in low-resource communities.

We believe the future of AI should include everyone.





THANK
YOU

