

Strengthening Pre-Service Teacher Education

Evidence from a Scalable 4-in-1 Model Implementation in Nigeria

A quasi-experimental evaluation of an integrated microteaching, Jigsaw, problem-based learning, and TPACK training model across six Nigerian Colleges of Education, and what it means for national teacher-education policy.

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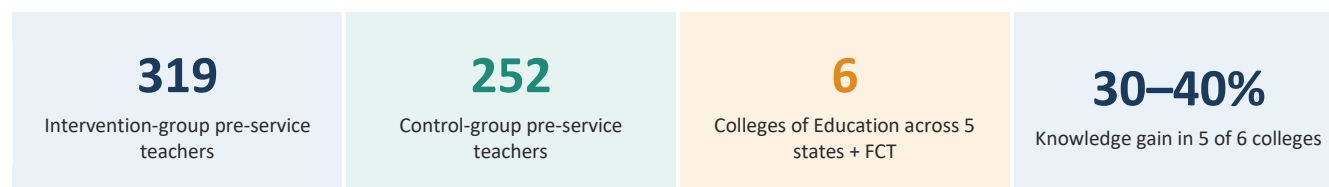
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THE EVIDENCE AT A GLANCE



KEY MESSAGES FOR POLICYMAKERS

- The 4-in-1 model increased teacher competency scores by approximately 30–40% across five of six Colleges of Education (CoEs).
- Jigsaw and Problem-Based Learning produced the strongest learning gains of the four components.
- Technology integration (TPACK) remains constrained by inadequate ICT infrastructure and low digital literacy.
- Pre-service training offers a more cost-effective pathway to teacher quality than repeated in-service training.
- Integrating the 4-in-1 model into NCCE Minimum Standards could accelerate teacher-education reform nationwide.

Executive Summary

Nigeria's teacher education system faces persistent, well-documented challenges: low-quality entrants into pre-service programmes, an imbalance between teacher supply and demand, inadequate funding, poorly coordinated teaching practice, and limited integration of technology. Training remains largely theoretical and poorly aligned with 21st-century classroom demands.

In response, the 4-in-1 model was designed and implemented, integrating microteaching, Jigsaw, problem-based learning (PBL), and Technological Pedagogical and Content Knowledge (TPACK) into a single, structured, practice-oriented and learner-centred training approach.

Using a quasi-experimental, pre-test/post-test design across six publicly funded Colleges of Education, the intervention group (**n = 319**) consistently outperformed the control group (**n = 252**), with knowledge gains of roughly 30–40% in five of the six colleges. Gains were weakest in the TPACK module and in one college, reflecting underlying infrastructural and digital-literacy constraints rather than a flaw in the model itself.

This brief recommends integrating the 4-in-1 model into the National Commission for Colleges of Education (NCCE) Minimum Standards, embedding microteaching as a continuous practice-and-feedback mechanism, and investing in ICT infrastructure and lecturer capacity to unlock the technology-integration component.

The Challenge

Teacher education plays a central role in shaping education-system quality, equipping teachers with the knowledge, skills and attitudes needed to deliver effective instruction across diverse classroom contexts. Achieving the Sustainable Development Goal on inclusive, equitable quality education requires both a larger supply of teachers and better-quality teaching.

Globally, over **387 million** primary-school children and **230 million** lower-secondary adolescents are not achieving minimum proficiency in reading and mathematics with insufficiently prepared teachers identified as a key driver. Sub-Saharan Africa accounts for the largest share of this learning poverty, and Nigeria's crisis is particularly pronounced: low teacher quality, weak pedagogical capacity, and limited use of effective teaching practices are systemic.

Pre-service teacher education, the more sustainable and cost-effective point of intervention has received comparatively little investment and remains poorly aligned with classroom realities. Current programmes are heavily theoretical, emphasise content knowledge over pedagogy, and leave graduates under-prepared to manage classrooms, deliver engaging instruction, or respond to diverse learner needs. Weak ICT integration and gaps in curriculum implementation compound the problem.

The 4-in-1 model was developed to address these gaps directly, combining microteaching, Jigsaw, PBL and TPACK to strengthen teaching practice, collaboration and instructional design among pre-service teachers.

How the evidence was generated

An implementation-science approach evaluated the 4-in-1 model across six publicly funded Colleges of Education — one per geopolitical zone, ensuring national representation: FCT College of Education, Zuba; College of Education, Zing (Taraba); Akwa Ibom State College of Education, Afaha Nsit; Enugu State College of Education; Federal College of Education (Special), Oyo; and Federal College of Education (Technical), Bichi (Kano). A quasi-experimental, non-randomised pre-test/post-test design compared intervention and control groups, with a difference-in-differences (DiD) analysis used to isolate the model's effect on pedagogical knowledge gain.

Policy Outcomes and Implications

The findings show how future teachers can be better equipped — and how that translates into improved classroom engagement, interaction and learning. Five themes carry direct implications for teacher-education policy and practice in Nigeria.

1. The 4-in-1 model measurably improves teaching effectiveness

At endline, the intervention group's knowledge gain was **about 30–40% higher** than the control group's in every college except FCE (T), Bichi, where no intervention effect was observed. Strong outcomes across the other five colleges confirm that evidence-based, learner-centred pedagogy can substantially outperform the traditional lecture-based instruction that still dominates many CoEs. Effective 21st-century teaching requires both traditional skills content knowledge and sound pedagogy and non-traditional skills such as empathy, socio-emotional intelligence, problem-solving, facilitation and technology use.

POLICY IMPLICATION

Pre-service training remains too theoretical and misaligned with classroom demands. The Federal Ministry of Education, NCCE and education stakeholders should adopt evidence-based, learner-centred pedagogy nationally, and prioritise foundational literacy and numeracy interventions, without which even the strongest pedagogical models will underperform for weaker students.

2. Learner-centred models are the strongest drivers of impact

Jigsaw and PBL produced the highest knowledge gains across study sites, reinforcing a growing global evidence base: learner-centred approaches improve not only how students learn, engage and share knowledge, but also their

academic standing though impact can vary by region and learning environment. Through these approaches, learners become active participants and knowledge creators rather than passive recipients.

POLICY IMPLICATION

Traditional, facilitator-based teaching is insufficient for building 21st-century teaching competence. Teacher-training institutions and national policy should prioritise active, collaborative, problem-solving pedagogy across the curriculum.

3. Pre-service education is a high-leverage entry point for reform

Improving teacher quality at the pre-service stage is more efficient and sustainable than relying on repeated in-service remediation. The most effective route to better student learning outcomes is equipping teachers with the skills to design and deliver instruction before they ever enter the classroom, reducing the need for costly remedial in-service courses down the line.

POLICY IMPLICATION

In-service training offers faster, more visible wins for government and donors, but pre-service investment is the more efficient long-term pathway. The Federal Ministry of Education and education donors should prioritise pre-service institutions to generate durable, compounding gains in classroom effectiveness.

4. Technology integration requires enabling conditions first

TPACK results were only moderately successful: pre-service teachers entered with widely varying ICT skills, and a significant share lacked even basic computer literacy. Colleges with stronger ICT infrastructure recorded larger knowledge gains than those without, indicating the constraint is infrastructural and foundational, not pedagogical.

POLICY IMPLICATION

Technology-integration policy must go beyond curriculum revision. Government must close infrastructure and device/internet-access gaps in teacher-training institutions and ensure lecturers themselves are equipped to deliver technology-enabled instruction.

5. The model supports equitable outcomes

No major disparities in learning outcomes emerged across gender, socio-economic status or location, suggesting the model is inherently inclusive and can be scaled without reinforcing existing inequalities, a priority for national education policy.

POLICY IMPLICATION

Programmes should move from gender-blind to gender-responsive pedagogy that accounts for intersecting barriers to learning. Future implementation should deliberately track outcomes for female trainees, trainees with disabilities, and those from underserved communities.

Table 1. Evidence Summary

Finding	Evidence	Policy Implication
30–40% knowledge gain	5 of 6 Colleges of Education	Scale the model nationally
Jigsaw & PBL strongest	Highest learning gains of the four components	Prioritise learner-centred pedagogy
Weak TPACK outcomes	Driven by infrastructure deficits	Invest in ICT infrastructure & lecturer capacity

Finding	Evidence	Policy Implication
No major equity gaps	Similar outcomes across gender, SES, location	Suitable for national scale-up

Risks of Inaction

Without reform to pre-service teacher education:

1. Colleges may continue producing graduates with weak pedagogical competencies.
2. Investments in basic education may yield limited learning gains.
3. Nigeria may struggle to meet SDG 4 targets.
4. The learning crisis may deepen despite rising school enrolment.

Actionable Recommendations

Recommendations are addressed to two audiences: national policymakers, and Colleges of Education themselves.

FOR POLICYMAKERS

- ✓ Institutionalise and scale the 4-in-1 model across all teacher-education programmes.
- ✓ Integrate the model into national curriculum standards for Colleges of Education.
- ✓ Work with the NCCE to update training guidelines so every pre-service teacher is exposed to Jigsaw, PBL and TPACK.
- ✓ Allocate funding to close the ICT and infrastructure gaps needed for the TPACK component to succeed.

FOR COLLEGES OF EDUCATION

- ✓ Incorporate the 4-in-1 model into regular teaching practice and curriculum.
- ✓ Emphasise hands-on Jigsaw and PBL techniques over lecture-based theory; redesign coursework around microteaching and technology integration.
- ✓ **Reinforce** subject-matter content alongside pedagogy; mentor trainees through observed teaching practicums.
- ✓ Embed these practices to sustain gains — so graduates know modern pedagogy and feel confident applying it in real classrooms.

Conclusion

Structured, practice-based, learner-centred approaches can significantly strengthen pre-service teacher education in Nigeria. The 4-in-1 model shows strong potential to improve teacher knowledge, instructional practice and classroom readiness, addressing longstanding weaknesses in traditional, theory-heavy training.

Future teachers learn best when trained using the same methods they will be expected to apply in the classroom. Through active participation, collaboration, problem-solving, guided practice and meaningful technology use, pre-service teachers in this study developed competencies essential for effective, contemporary teaching.

Pre-service teacher education is a critical, cost-effective entry point for system-wide reform. Embedding integrated, learner-centred, technology-enabled approaches within national frameworks while closing infrastructure and capacity gaps — is essential to preparing a new generation of teachers able to improve learning outcomes across Nigeria.

Data Availability

The dataset underpinning this brief is available via Mendeley Data: [Dataset on the Effectiveness of a 4-in-1 Pedagogical Model for Strengthening Pre-Service Teacher Education in Nigeria](#).

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