
Learning Facilities: A Tools for Improving Learning Pedagogy and Students' Academic Performance in Basic Education schools in Kano State

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ABSTRACT

This position paper argues that appropriate, adequate, and contextually aligned instructional materials are not merely supplementary tools but fundamental determinants of academic performance in basic education. Drawing on empirical research, theoretical frameworks, and comparative policy analysis, the paper advances five interrelated arguments: that a robust body of evidence confirms a positive relationship between instructional material quality and student achievement; that different material types exert differential effects on learning outcomes; that teacher competence mediates the impact of materials; that inequitable access to materials drives educational disparities; and that systematic, policy-driven investment in instructional resources is both economically sound and morally imperative. The paper further acknowledges and rebuts major counterarguments, concluding with actionable recommendations for policymakers, school administrators, teachers, and researchers. The central position is that the provision of quality instructional materials must be elevated from a peripheral administrative concern to a central pillar of educational policy in basic education systems worldwide.

Keywords: instructional materials, academic performance, basic education, learning resources, pedagogical integration, educational equity, student outcomes

INTRODUCTION

Education systems around the world are under sustained pressure to demonstrate measurable improvements in student learning outcomes. Despite decades of reform initiatives, a significant proportion of children completing basic education still fail to attain foundational literacy and numeracy skills. The World Bank (2022) reported that approximately 70 percent of ten-year-old children in low- and middle-income countries could not read and understand a simple text, a condition it described as learning poverty. While this crisis is multifactorial, one persistent and often underappreciated contributor is the chronic

inadequacy of instructional materials in basic education classrooms.

Instructional materials encompass the full range of tools, media, and resources that teachers and students use to facilitate the teaching and learning process. These include print-based resources such as textbooks, workbooks, and charts; digital and ICT-based resources such as educational software and tablets; concrete manipulative and realia; audio-visual materials; and locally produced or culturally contextualized resources. UNESCO (2023) noted that the type, quality, and relevance of instructional materials fundamentally shape the

pedagogical possibilities available to teachers and the learning experiences accessible to students.

Notwithstanding this recognized importance, many basic education settings in developing and transitional economies continue to operate under severe material constraints. Schools function without sufficient textbooks, without functional laboratories, and without access to digital tools, while students are expected to meet the same cognitive benchmarks as their better-resourced peers. This structural inequity is not merely a logistical inconvenience; it is a systematic barrier to learning that reproduces cycles of educational underachievement across generations.

This paper takes the following position: appropriate, adequate, and contextually aligned instructional materials are not merely supplementary teaching aids but are fundamental determinants of academic performance in basic education and their systematic provision must be treated as an educational priority rather than an optional expenditure. This argument is developed through a review of theoretical frameworks, empirical evidence, equity considerations, and policy analysis. Counterarguments are acknowledged and addressed. The paper concludes with targeted recommendations for multiple stakeholder groups.

DEFINITION OF KEY TERMS

For the purposes of this paper, instructional materials refer to any deliberately designed or selected tools, objects, texts, or media used by teachers and students to facilitate learning and achieve stated curriculum objectives (Tomlinson, 2021). This definition is intentionally broad to encompass both traditional resources such as printed textbooks and emerging resources

such as tablets, educational apps, and teacher-produced materials.

Academic performance denotes measurable student achievement across the cognitive, affective, and psychomotor domains of learning, as assessed through standardized tests, classroom-based assessments, and other formal and informal measures of learning attainment.

Basic education refers to the foundational level of formal schooling, encompassing primary or elementary education and, in many national systems, junior secondary education, typically spanning grades one through nine or their equivalent.

Pedagogical integration denotes the deliberate, purposeful, and theoretically informed embedding of instructional materials into lesson planning and classroom instruction, as distinguished from their incidental or unsystematic use (Rosenberg & Koehler, 2021).

THEORETICAL FRAMEWORK

The position advanced in this paper is grounded in three complementary theoretical traditions that collectively illuminate how instructional materials function as active mediators of learning rather than passive carriers of content.

Vygotsky's Sociocultural Theory

Vygotsky's sociocultural theory posits that learning occurs through mediated interaction with cultural tools, symbols, and artefacts within social contexts. Instructional materials, within this framework, function as cultural tools that mediate the learner's cognitive engagement with new concepts and skills (Moll, 2020). When materials are appropriately calibrated to a student's Zone of Proximal Development, they scaffold

learning in ways that independent cognitive effort cannot achieve. Johnson et al. (2021) demonstrated that collaborative learning supported by structured material resources accelerates conceptual acquisition precisely because the materials serve as shared reference points for dialogue and joint problem-solving.

Constructivist Learning Theory

Constructivist frameworks, derived from the work of Piaget and elaborated by Bruner, posit that learners actively construct knowledge through interaction with their environment. Instructional materials provide the experiential substrates through which this construction occurs. Mascolo and Fischer (2021) argued that concrete, manipulable materials are particularly powerful for younger learners because they bridge the gap between abstract symbolic representations and embodied sensory experience. Bada and Olusegun (2021) further contended that constructivist pedagogy without adequate material resources is largely theoretical, as the active knowledge construction it envisions requires objects and media through which engagement can occur.

Multimedia Learning Theory

Mayer's (2021) cognitive theory of multimedia learning provides a neurocognitive basis for the effectiveness of varied instructional materials. The theory holds that learning is deeper and more durable when information is presented through complementary verbal and visual channels, activating dual coding pathways that reduce cognitive overload and enhance retention. This has direct implications for the design and selection of instructional materials: resources that integrate text, image, and sound are not merely engaging but cognitively advantageous. Schunk

(2020) extended this argument to note that multi-sensory material environments consistently produce higher retention rates than single-medium instruction across grade levels.

ARGUMENTS

Argument One: Empirical Evidence Confirms the Positive Relationship between Instructional Materials and Academic Achievement

The most direct justification for the position advanced in this paper is the substantial and growing body of empirical research demonstrating that the availability, quality, and relevance of instructional materials are positively and significantly associated with student academic performance. This evidence spans multiple geographic contexts, educational levels, and research methodologies, lending it considerable robustness.

Conn (2021) conducted a systematic review of educational interventions in sub-Saharan Africa and found that provision of quality learning materials ranked among the most consistently effective interventions for improving literacy and numeracy outcomes. Similarly, Glewwe and Muralidharan (2022) synthesized evidence from across the developing world and concluded that textbook availability and material quality are among the strongest school-level predictors of student achievement, particularly at the primary level. Popova et al. (2022) found in a large-scale cross-national analysis that structured pedagogy programs combining well-designed instructional materials with teacher guides produced learning gains significantly above comparison groups, with effect sizes ranging from 0.15 to 0.40 standard deviations.

OECD (2023) data from the Programme for International Student Assessment further corroborated these findings at the system level, revealing that schools in the highest resource quartile consistently outperformed schools in the lowest resource quartile across reading, mathematics, and science domains, even after controlling for socioeconomic status. Sabarini et al. (2020) demonstrated in a quasi-experimental study involving Indonesian primary schools that students in classrooms with full textbook provision achieved significantly higher scores in mathematics and Bahasa Indonesia compared to students in material-deficient classrooms. Hattie and Hamilton (2020) placed resource-enriched instruction among the high-influence variables in the visible learning synthesis, reinforcing the claim that materials are not peripheral but central to educational effectiveness.

The weight of this evidence compels a straightforward conclusion: academic performance in basic education is systematically and meaningfully influenced by the instructional materials to which students have access. Treating material provision as a secondary concern in educational planning is therefore not merely a logistical oversight but an empirically indefensible position.

Argument Two: The Type and Quality of Instructional Materials Differentially Influence Learning Outcomes

The relationship between instructional materials and academic performance is not undifferentiated. Different categories of materials exert distinct effects depending on the subject matter, the age of learners, the instructional context, and the quality of the materials themselves. Understanding these differential impacts is essential for evidence-

based material selection and curriculum alignment.

Print-based materials, particularly textbooks, remain the most extensively studied category. Westbrook et al. (2020) found that textbook quality, measured in terms of curriculum alignment, language accessibility, and pedagogical scaffolding, was a stronger predictor of student outcomes than mere textbook availability. A poorly designed textbook may be present in the classroom while contributing little to learning. Okonkwo and Chukwu (2021) documented this phenomenon in Nigerian primary schools, where officially distributed textbooks were found to contain content that was developmentally misaligned with learners' prior knowledge, limiting their instructional value.

Digital and ICT-based instructional materials demonstrate strong positive effects in mathematics and science when they are purposefully integrated into instruction. Tamur et al. (2021) reported in a meta-analysis of technology-enhanced mathematics instruction that digital tools produced average effect sizes of 0.67 compared to conventional instruction, a substantial and practically significant difference. Sung et al. (2021) similarly found that mobile-computer-supported collaborative learning environments improved both academic performance and learner engagement among primary school students. However, Muralidharan et al. (2022) established through a large randomized controlled trial in India that the effects of technology-based instruction were maximized when the software was adaptive and aligned to individual learner ability levels, underscoring the importance of quality alongside type.

Manipulative and concrete realia are particularly effective for foundational concept formation in early and lower primary grades. Carbonneau et al. (2020) conducted a meta-analysis confirming that instruction incorporating physical manipulative produced significantly better outcomes in mathematics than symbolic instruction alone, with stronger effects for younger learners. Laski et al. (2021) elaborated that the benefit of manipulative depends on the degree to which teachers guide students to make explicit connections between the concrete object and the abstract concept it represents. Audio-visual materials, including educational videos and illustrated charts, have been shown to enhance reading comprehension and science concept acquisition, particularly for learners with limited background knowledge (Mayer, 2021).

Finally, locally produced and culturally contextualized materials demonstrate consistent advantages in multilingual and multicultural educational settings. Benson (2021) documented that culturally responsive materials in mother tongue-based multilingual education significantly improved reading fluency and comprehension among primary school children in multilingual communities in Africa and Asia. Abubakar et al. (2022) found comparable results in Northern Nigerian primary schools, where locally produced supplementary readers in community languages improved student engagement and performance in literacy assessments.

Argument Three: Teacher Competence Mediates the Impact of Instructional Materials and Must Be Developed Concurrently

Acknowledging that instructional materials alone do not automatically translate into improved student outcomes is not a concession that weakens the position of this paper; rather, it enriches and complicates it in productive ways. The evidence consistently shows that the effectiveness of instructional materials is mediated by teacher competence, making the case not merely for material provision but for a systems-level approach that couples material investment with professional development.

Darling-Hammond et al. (2020) argued compellingly that the science of learning and development requires educational systems to ensure that teachers understand how to use materials in developmentally appropriate and cognitively engaging ways. Without this understanding, even high-quality materials are likely to be deployed mechanically, failing to activate their pedagogical potential. Piper et al. (2020) provided direct evidence of this mediation effect in an evaluation of structured pedagogy programs across Kenya, Uganda, and Zambia. Programs that paired scripted teacher guides with reading materials produced dramatically larger learning gains than material provision alone, demonstrating that the material-teacher dyad is the operative unit of instructional effectiveness.

Jukes et al. (2021) extended this argument to culturally diverse classroom contexts, finding that teachers who received contextual pedagogical training alongside new materials were significantly more effective than those who received materials without accompanying professional development. The Technological Pedagogical Content Knowledge framework described by Rosenberg and Koehler (2021) provides the conceptual architecture for understanding this relationship: effective use of instructional materials requires that

teachers possess simultaneously a command of the subject matter, knowledge of appropriate pedagogy, and familiarity with the specific material tools at their disposal. Bulman and Fairlie (2021) demonstrated the negative case forcefully, showing that technology-based instructional materials distributed without teacher training yielded no statistically significant gains in student performance across a large sample of American schools.

The implication is clear: investment in instructional materials must be accompanied by investment in teacher education and ongoing professional development. This does not diminish the necessity of materials; it amplifies it by establishing that materials and teacher capacity are mutually reinforcing inputs in the learning system.

Argument Four: Inequitable Access to Instructional Materials Reproduces Educational Disparities

The influence of instructional materials on academic performance takes on a distinctly social justice dimension when viewed through the lens of access and distribution. The evidence is unambiguous: students from disadvantaged socioeconomic backgrounds, rural communities, and marginalized demographic groups are disproportionately likely to study in material-poor environments, and this material deprivation is a primary mechanism through which educational inequality is reproduced across generations.

Spaull and Taylor (2022) analyzed educational data from eleven African countries and found that the gap in material resource availability between schools in the wealthiest and poorest quintiles was among the strongest structural predictors of the learning achievement gap. Students in

under-resourced schools were not merely performing slightly below their peers; they were operating in educational environments where the basic prerequisites for effective instruction were absent. Akyeampong et al. (2021) documented comparable disparities in West African educational systems, where rural primary schools frequently lacked basic teaching and learning materials while urban schools in the same national system had reasonably adequate provision.

Baker et al. (2021) analyzed the structural mechanisms driving these disparities in the United States, demonstrating that school funding formulas that tie resource allocation to local property values systematically produce material resource inequities that mirror socioeconomic segregation. UNESCO (2022) reported gender-differentiated access to STEM materials in low-income country contexts, with girls in rural areas being significantly less likely than boys to have access to laboratory equipment, mathematics manipulative, and science kits, contributing to persistent gender gaps in STEM performance.

The COVID-19 pandemic sharply amplified these pre-existing disparities. Azevedo et al. (2021) estimated that school closures combined with unequal access to digital instructional materials would result in significant learning losses, with the most severe impacts concentrated among children from low-income households who lacked devices, internet connectivity, and printed learning resources at home. Kaffenberger (2021) projected that without targeted remediation, the learning losses attributable to material-access inequities during and after the pandemic could reduce lifetime earnings for affected cohorts by economically significant margins. Ankomah et al. (2022) documented similar dynamics in Ghanaian basic education, where the digital divide

rendered remote learning essentially inaccessible for students in rural and peri-urban communities.

These findings collectively establish that equitable distribution of instructional materials is not a technocratic concern but a matter of educational justice. Systems that fail to address material access disparities are not merely inefficient; they are actively reproducing social stratification through the mechanism of unequal educational opportunity.

Argument Five: Systematic Policy Investment in Instructional Materials Yields High Educational and Economic Returns

The final argument in support of this paper's position is economic and policy-oriented: evidence-based investment in instructional materials is among the most cost-effective strategies available to educational systems seeking to improve learning outcomes at scale. The cost-effectiveness argument is particularly significant in resource-constrained contexts, where policymakers must make difficult trade-offs between competing educational priorities.

Evans and Yuan (2022) synthesized evidence from experimental and quasi-experimental studies across multiple educational interventions and found that material provision, particularly structured reading and mathematics materials, consistently ranked among the interventions with the highest learning gains per dollar spent. Kremer et al. (2021) reached similar conclusions in a review of education economics research, identifying textbook provision and structured material programs as high-return investments, particularly in settings where baseline material availability is low. The economic logic is

straightforward: in material-deficient environments, the marginal impact of adding quality instructional resources is large because the counterfactual is near-zero material support for learning.

At the policy level, international frameworks including the United Nations Sustainable Development Goal Four and the Global Partnership for Education have established minimum material standards as benchmarks for quality education, recognizing that learning cannot be expected to occur at scale without adequate instructional resources. Rogan and Grayson (2021) argued that national curriculum reforms without corresponding material investment are systematically doomed to underperform, as even the most elegantly designed curriculum remains inaccessible to students and teachers who lack the materials through which it can be actualized.

Tomlinson and Masuhara (2021) advocated for a sustainable model of instructional material development that combines centrally procured core materials with locally developed supplementary resources, reducing costs while enhancing cultural relevance. Spier et al. (2022) demonstrated in a systematic review that literacy programs anchored in well-designed materials and supported by technology delivered substantial and durable learning gains across diverse low- and middle-income country contexts. The evidence base therefore supports not only the educational case for material investment but also the economic case, making systematic policy commitment to instructional resource provision a rational and defensible choice for governments at all income levels.

COUNTERARGUMENTS AND REBUTTALS

Several objections to the position advanced in this paper merit direct engagement. The first and most common counterargument is that teacher quality matters more than instructional materials, and that investment should therefore be concentrated in teacher development rather than material provision. This objection rests on a false dichotomy. Chetty et al. (2021) demonstrated powerfully that teacher quality exerts lasting effects on student outcomes, but this finding does not negate the independent contribution of instructional materials. As Argument Three above established, the two inputs are complementary rather than competitive. Directing all resources toward teacher development while ignoring material deficits leaves teachers without the tools they need to translate their pedagogical skills into student learning.

A second counterargument holds that technology can replace traditional instructional materials cheaply and at scale, rendering investment in print and physical materials obsolete. This position underestimates the infrastructural prerequisites for technology-based instruction: reliable electricity, internet connectivity, device maintenance, and technical training. Escueta et al. (2020) documented that these prerequisites are absent in a significant proportion of basic education settings in low-income countries, making technology-centric material strategies neither universally feasible nor equitable. Technology is a complement to, not a replacement for, a broader ecosystem of instructional materials.

A third objection asserts that exceptional teachers have historically produced learning

in the most material-deprived environments, implying that materials are unnecessary. While individual examples of exceptional instructional outcomes under material deprivation exist, they are statistically exceptional rather than representative and cannot form the basis of scalable educational policy. Glewwe and Muralidharan (2022) made this point forcefully: systemic improvements in educational outcomes require systemic inputs, and anecdotal evidence of success under deprivation does not constitute grounds for maintaining deprivation as a policy stance.

A fourth objection notes that material provision without accompanying system-level support produces minimal achievement gains, and this is factually accurate. However, this observation supports the systems-level approach advocated throughout this paper rather than undermining the case for material investment. The appropriate response to evidence that materials alone are insufficient is to invest in the full system, including materials, teacher development, and administrative support, not to conclude that materials are unnecessary.

POSITION SYNTHESIS

The arguments presented in this paper converge on a coherent and empirically grounded position: instructional materials function as the infrastructure of learning in basic education. Just as physical infrastructure such as roads and electricity networks enables economic activity, instructional materials enable the translation of curriculum intentions into actual student learning. Their absence or inadequacy does not merely create inconvenience; it structurally impedes the educational process.

The evidence reviewed spans high-, middle-, and low-income country contexts, diverse

subject domains, and multiple research methodologies, lending the core claim considerable generalizability. Whether examined through the lens of cognitive science, educational economics, or social justice theory, the conclusion is consistent: quality instructional materials are not optional enhancements to basic education but foundational prerequisites for it. Their differential effects across types and contexts call for informed, evidence-based selection rather than blanket provision; their dependence on teacher competence calls for systems-level investment rather than piecemeal distribution; their inequitable distribution calls for equity-focused policy rather than market-driven allocation.

The opportunity cost of inaction is substantial. Every cohort of students that passes through material-poor classrooms exits basic education with deficits in foundational skills that compound over subsequent educational levels and across the life course. The societal cost of this cumulative learning loss, measured in reduced productivity, constrained social mobility, and diminished civic participation, far exceeds the investment required to provision basic education classrooms with quality instructional materials. The position of this paper is therefore not merely academically defensible but morally and economically urgent.

SUGGESTIONS

For Policymakers and Government

Governments must establish legally binding minimum material standards per grade level within national basic education policy frameworks, backed by transparent and auditable procurement and distribution systems. Dedicated budget lines for instructional material renewal cycles should be institutionalized to prevent material

obsolescence. Equity-weighted funding formulas that direct proportionally greater material resources to underserved communities should replace uniform per-pupil allocations. Ratification of and alignment with international benchmarks, including those established under SDG 4 and the Global Partnership for Education, should be used as accountability mechanisms for material provision.

For School Administrators

School administrators should conduct systematic annual material needs assessments aligned to curriculum objectives and learner profiles, using findings to prioritize procurement and local adaptation. Administrators should actively foster teacher-led material development and adaptation initiatives, creating institutional recognition and time allowances for teachers who produce supplementary materials. Partnerships with community organizations, university departments, and non-governmental organizations to supplement centrally provided materials should be pursued proactively.

For Teachers

Teachers should engage in continuous professional development focused not only on subject matter knowledge but also on the pedagogical integration of diverse instructional materials, including digital, manipulative, print, and locally produced resources. Where gaps in centrally provided materials exist, teachers should develop supplementary locally contextualized materials, drawing on community knowledge systems and mother tongue resources. Collaborative material development and peer review among teachers within schools and across schools

in the same district can improve material quality while reducing individual workload.

For Researchers

Researchers should prioritize longitudinal studies that examine the relationship between instructional material quality, as distinct from quantity, and sustained academic outcomes over multiple school years. Culturally responsive material design in multilingual basic education contexts is a particularly understudied area warranting dedicated research attention. Cost-effectiveness analyses of different material modalities across diverse country contexts would provide policymakers with the comparative evidence base needed for rational allocation decisions.

CONCLUSION

The influence of instructional materials on students' academic performance in basic education is not a matter of academic conjecture but of documented empirical fact. This paper has argued, through five interrelated and mutually reinforcing arguments, that instructional materials are fundamental determinants of learning outcomes; that their effects are type-specific and quality-dependent; that their impact is mediated by teacher competence; that their inequitable distribution is a primary driver of educational disparities; and that systematic policy investment in their provision is both educationally effective and economically rational. Major counterarguments have been examined and addressed without undermining the central position.

The challenge confronting educational systems in the twenty-first century is not whether to invest in instructional materials but how to do so strategically, equitably, and sustainably. The quality of instructional

materials that students encounter today in basic education classrooms is not merely a pedagogical detail; it is an investment in the intellectual capacity, economic productivity, and democratic participation of future generations. Educational systems that treat material provision as a peripheral concern consign their students to a structurally disadvantaged starting position in an increasingly knowledge-intensive world. The evidence demands a different course: one in which every child in basic education, regardless of geography, income, or background, has access to the quality instructional materials that make genuine learning possible.

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