

Language of Instruction and Its Influence on Cognitive Development and Academic Success

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Abstract

This research explores the impact of the language of instruction (LOI) on students' cognitive development and academic achievement, with a specific focus on mother tongue instruction in early education. Drawing from empirical studies, cognitive theories, and international educational data, the paper investigates how language proficiency, comprehension, and emotional connectedness to the medium of instruction affect learning outcomes. The objective is to analyze whether instruction in a child's first language fosters better conceptual understanding and cognitive engagement, thus leading to improved academic performance in primary education. The findings affirm that mother tongue instruction, particularly in foundational years, significantly enhances cognitive processing, classroom participation, and academic outcomes, especially in multilingual and developing country contexts.

Keywords - *Language of Instruction, Mother Tongue Education, Cognitive Development, Academic Achievement, Bilingual Education, Educational Equity, Multilingual Classrooms, Second Language Learning, Primary Education, Language Policy*

1. Introduction

Language does not only serve a mere purpose in the progress of education; language is the very basis for and forms the underpinning of thought, understanding and learning. In classrooms, it is the vehicle of communication, the medium through which ideas are transmitted, through concepts are built, as well as the channel through which cognitive processes are nurtured. Hence, the language of instruction is very consequential in determining how much learners' engagement with educational content and teachers and peers and acquisition of higher order thinking skills.

The debate has been ongoing for as long as there is an academic debate and a subject of policy contention in multilingual and postcolonial societies, especially, over the choice of LOI. Generally, Indigenous languages around the Global South of Africa, Asia and Latin America experience loss or replacement of first languages or dialects when imposed or preferred over national or colonial languages (English, French, Portuguese) as the main language of teaching. The practice has created a large gap between acquisition of a new language and the absorption of complex academic content. Since dual cognitive burdens have negative impacts on comprehension, reduce participation in classroom discussion and hinder academic performance, they should be minimized where appropriate.

On the other hand, a great deal of research is now beginning to support mother tongue instruction, in particular, in the early years of schooling. It has been found that instruction in a learner's first language is correlated with clearer conceptual clarity, language transfer skills, emotional security and cognitive engagement in order to deliver better academic achievement. Educational theorists such as Vygotsky and Cummins maintain that in order to internalize abstract knowledge it is best to first learn in a familiar language and that this will serve to provide scaffolding of abstract concepts. In addition, global education agencies like UNESCO support the usage of mother tongues in early education from the linguistic human rights point of view and educational efficacy.

This study has a contribution to something of a discourse on the effects of mother tongue instruction on cognitive development and academic success, particularly on primary education. The study attempts to anchor the research in this single key parameter and so provide focused, evidence based insights into the impact of language on educational outcomes by linking at the policy level (language policy), and at a curriculum level (curriculum design), and various equity implications pertinent to learning. **2. Objective of the Study**

The principal objective of this research is:

To examine the influence of mother tongue as the language of instruction on students' cognitive development and academic achievement in primary education.

This objective reflects a commitment to understanding how instruction in a learner's native language affects their ability to comprehend, analyze, and apply knowledge, and how these cognitive processes contribute to measurable academic outcomes during the most formative years of schooling.

3. Research Question

To guide this investigation, the study is driven by the following research question:

How does the use of mother tongue as the language of instruction in early education influence students' cognitive development and academic success compared to instruction in a second or foreign language?

This research question is specifically designed to explore the comparative cognitive and academic effects of different instructional languages, focusing on how familiarity with the language of learning facilitates or hinders educational progress. It seeks to uncover both theoretical insights and practical implications that can inform educational policy, teacher training, and curriculum planning, especially in linguistically diverse settings.

4. Literature Review

Although a substantial body of interdisciplinary research (in education, developmental psychology, applied linguistics, and international development) has consistently pointed out the very important role that language of instruction (LOI) plays in the development and outcomes in cognition and academics, especially in the early years of formal education, it often fails to build and diffuse such knowledge to practitioners and reformers working in the classroom. The essence of this discussion is that language is not just a route of communication, but also a mental and cultural instrument for learning.

4.1 Foundational Theories Supporting Mother Tongue Instruction

Jim Cummins (1979) Linguistic Interdependence Hypothesis is one of the most influential contributions to this discourse; it states that a child's proficiency in his or her first language lays a strong base for proficiency in a child's second language. Cummins argues that children learn cognitive and academic skills in the first language that they can also apply to the second language, thus leading to bilingual academic success. The distinction between Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP) highlights the requirement of healthful language skills in the mother tongue for participation in all the other more learned linguistic skills involved in intensive scholarship in the additional language.

Lev Vygotsky's sociocultural theory of cognitive development complements this linguistic perspective by conceptualizing language as the primary, cultural and cognitive tool that facilitates a process of internalization in putting greater higher order thought. Vigotsky (1978) has also focused on the necessity of social interaction and language use in the learner's cultural-linguistic environment for people to learn meaningfully. This is why instruction in the mother tongue, since the child uses lemmas familiar in culture and language to understand abstract concepts.

4.2 Empirical Evidence from International Agencies

These theoretical claims are further supported empirically. According to UNESCO (2003), it has been a vocal supporter of mother tongue based multilingual education (MTB MLE) because they found out that children who are already schooling in their first language outperform significantly in reading fluency, comprehension, mathematical reasoning and critical thinking. It underscored that early instruction in a language in which one is comfortable makes retention of learning much easier, fosters self confidence and being a part of classroom participation thereby enhancing education output and contributing to the reduction of dropout rate, especially among marginalized communities.

Language mismatch between school and home becomes a barrier to learning in the multilingual societies, where the dominant language in school is different from home language. Studies in the Philippines, Ethiopia, and India for instance, have found that children taught in their mother tongue in early education carried out better in assessments than children taught in unfamiliar official or colonial languages (Ball, 2011; Heugh, 2006).

4.3 Challenges of Second or Foreign Language Instruction

Whereas, instruction in the second or foreign language, especially without sufficient language support, tends to give rise to a surface level learning, in which students more largely attend to decoding of linguistic elements instead of conceptual content understanding. Benson (2005) notes as well that when learners are taught (now) in a language that they cannot yet speak, their cognitive load increases, and comprehension suffers. Of particular harm is this at the beginning of the grades when young students are struggling to acquire foundational literacy and numeracy skills. For that reason, these students usually do not catch up, they lose interest, but they become considerably stressed out in these academic settings.

In addition, the linguistic disadvantage adds extra for students from socioeconomically marginalized or rural communities who may be unaware of ample language exposure in the official school language and/or have less access to home support in the official school language. Such cases impede academic growth and at the same time perpetuate the existing educational inequality (Mohanty, 2006).

4.4 Summary of the Literature

Overall, the literature affirms that instruction in the mother tongue:

- Enhances cognitive engagement by building on prior linguistic and cultural knowledge,
- Improves learning outcomes across core academic areas,
- Facilitates smoother second-language acquisition later in schooling, and
- Contributes to greater educational inclusion and equity.

Conversely, instruction in an unfamiliar language in early education often acts as a barrier to learning, particularly for children from non-dominant linguistic groups. These findings provide a strong conceptual and empirical foundation for the present study's focus on the cognitive and academic implications of mother tongue instruction in early schooling.

5. Methodology

This study adopts a qualitative research design, grounded in a descriptive and interpretive analytical framework. The aim is to explore how the language of instruction—specifically mother tongue—affects students' cognitive development and academic performance in multilingual educational contexts. Rather than conducting primary field research, this paper relies on secondary data sources, critically synthesized to form a comprehensive understanding of the phenomenon.

5.1 Data Sources

The following sources form the empirical foundation of the study:

- Comparative Case Studies: Educational outcomes from countries such as the Philippines, Ethiopia, India, and South Africa are analyzed to assess the impact of mother tongue-based instruction. These countries were selected due to their linguistic diversity and existing policy experiments in bilingual and multilingual education.
- Reports from International Agencies: Global organizations such as UNESCO, the World Bank, and UNICEF have published policy briefs, large-scale assessment reports, and program evaluations concerning language of instruction and learning outcomes. These provide a macro-level perspective on trends, challenges, and impacts across varied contexts.
- Peer-Reviewed Academic Literature: Journal articles in educational psychology, language acquisition, and multilingual education contribute theoretical insights and empirical findings that strengthen the study's analytical depth. Key contributors include Cummins, Benson, Heugh, and Ball.

5.2 Analytical Approach

A thematic analysis is used to identify patterns across the literature, focusing on three key dimensions:

- i. Cognitive outcomes associated with mother tongue instruction,
- ii. Academic performance in literacy and numeracy,
- iii. Effectiveness of bilingual or transitional language models.

This approach allows for a nuanced understanding of both immediate classroom-level impacts and broader educational implications.

6. Literature Review

Numerous research pieces from education and developmental psychology and applied linguistics and international development sectors have sustained that language of instruction (LOI) shapes cognitive development and academic performance mostly during the early stages of formal learning. The essence of this discussion is that language is not just a route of communication, but also a mental and cultural instrument for learning.

6.1 Foundational Theories Supporting Mother Tongue Instruction

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6.2 Empirical Evidence from International Agencies

These theoretical claims are further supported empirically. The United Nations Educational Scientific and Cultural Organization (UNESCO) (2003) promotes mother tongue-based multilingual education (MTB-MLE) after documenting strong research showing that first language instruction produces better comprehension and critical thinking alongside reading fluency and mathematical reasoning results in children. The report stated that early education through familiar languages leads to better learning performance while building students' self-assurance and classroom involvement that ultimately enhances academic results and minimizes school dropouts mainly in vulnerable groups.

Language mismatch between school and home becomes a barrier to learning in the multilingual societies, where the dominant language in school is different from home language. Studies in the Philippines, Ethiopia, and India for instance, have found that children taught in their mother tongue in early education carried out better in assessments than children taught in unfamiliar official or colonial languages (Ball, 2011; Heugh, 2006).

6.3 Challenges of Second or Foreign Language Instruction

Abstraction of language concepts happens more frequently when students learn through second or foreign language instruction without adequate language support because students spend most effort on understanding linguistic structure rather than conceptual understanding. Benson (2005) notes as well that when learners are taught (now) in a language that they cannot yet speak, their cognitive load increases, and comprehension suffers. Of particular harm is this at the beginning of the grades when young students are struggling to acquire foundational literacy and numeracy skills. For that reason, these students usually do not catch up, they lose interest, but they become considerably stressed out in these academic settings.

The disadvantaged position in language becomes worse for students from economically challenged backgrounds along with rural communities who often do not have enough opportunities to learn from or receive support in the official school language. Such cases impede academic growth and at the same time perpetuate the existing educational inequality (Mohanty, 2006).

7. Implications for Policy and Practice

Implications of the results of this research support decision making that relates to educational policies, teacher education, curriculum planning, and assessment design in multilingual and linguistically diverse nations. Yet, stakeholders must do away with the old policies and adopt those that are more conducive to Linguistic Inclusivity and Equity, which recognises the cognitive and academic benefits of mother tongue instruction at the early level of education. Some ways in which more such transformation is not only necessary, but can also be achieved, are as follows:

7.1 Curriculum Development: Prioritizing Local Languages in Early Education

The linguistic realities of learners must be reflected in educational curricula especially in early childhood and primary schooling. Current trends in many countries, particularly in the Global South, favor the use of dominant national or foreign languages—often at the expense of students' comprehension and cognitive development. To address this disconnect:

- The curricula should be localized so as to incorporate the indigenous knowledge systems and cultural references, and be taught through the learners' first language.

Therefore, early grade reading materials, instructional content and learning activities should be developed in mother tongues to ensure comprehension, emotional engagement, and relevance to the community.

- As such, those national education policies will need to promote the fortification and use of regional language textbooks and learning resources in order to foster deeper engagement in foundational years.

Learners taught in a language they understand learn from and can access education in a meaningful way.

7.2 Teacher Training and Professional Development

For the mother tongue-based education to be successfully implemented, there is need for a well prepared and linguistically competent teaching workforce. In many regions, teachers usually do not have adequate training in the local languages spoken by their students and, subsequently, provide poor instructional quality and lead to frustration among students.

To address this gap:

- Multilingual pedagogy, sociolinguistics, and child language acquisition should be incorporated in modules of pre-service teacher education programs.
- What in-service training should be is on instructors being equipped with the skill set to instruct in and across many languages, particularly in linguistically multilingual classrooms.
- Moreover, teachers should be trained on language diversity and school climate towards inclusion, such that all languages are treated with respect in the classroom.

Yet, countries that chose to invest in communitybased teacher recruitment of educators who are locals from the same linguistic background have reported major improvements in instructional quality and learner outcomes.

7.3 Language-Aligned Assessment Design

Educational progress depends on the administration of assessments, however, when administered in a language unknown to the learner, the test could not be representative of how much a student truly understands or their capabilities.

Linguistically fair and educationally meaningful assessments require input data about the students who will perform them.

Also, examinations and classroom assessments should be carried out in the same language as instruction.

Formative assessment, that guide learning rather than grading it, should be used more extensively in mother tongue contexts to facilitate growth of the learner.

- Language based disaggregation of results in national learning assessments should be done, which in turn will allow policy makers to be able to identify and address the inequities associated with LOI.

Data produced when assessment tools align with the instructional language is more valid, more reliable, and more actionable.

7.4 Lessons from Multilingual Policy Implementation

Nepal, Papua New Guinea and Namibia provide experiences of the feasibility and benefits of mother tongue based multilingual education (MTB-MLE) policies.

- Community schools implementing MTB-MLE programs in Nepal have registered increased enrolment, attendance, and academic performance of the marginalized ethnic groups (Ball, 2011).
- Pupils in Papua New Guinea where more than 800 languages are spoken have been taught in a decentralised way about 40 of the local languages up to the early years, with a gradual switch to English once they reach the later stages.
- Putting local languages in the place of instruments to be overcome, and not as an asset has been proved to reduce education inequality and increase cognitive development particularly for rural and indigenous learners in these countries.

This kind of case study contradicts the idea that language responsive education is impossible by offering examples that actually illustrate how it is possible and necessary in order to deal with the global learning crisis.

8. Expected Outcomes

The study will provide essential learning that strengthens both academic literature and practical applications for research about education and multilingual societies. The analysis concentrates on mother tongue education effects on mental progression and academic success in order to provide both theoretical evidence and practical suggestions for forthcoming curriculum and instructor training and classroom methodology transformations.

8.1 Enhanced Understanding of Cognitive Benefits of Mother Tongue Instruction -

The investigation will strengthen the already established concept that teaching through a student's mother language during crucial early educational stages produces the most favorable mental capabilities. Research analysis and case studies provide data that shows mother-tongue approaches result in these academic outcomes: The understanding of new information improves because students use their already developed linguistic and cognitive frameworks. Cognitive engagement becomes stronger because students experience better focus on content material because their familiar language simplifies extraneous cognitive load. Students remember more information better while solving problems more effectively since they can better understand and think about instruction they receive in everyday languages. The research findings would confirm vital educational theories like Vygotsky's sociocultural model and Cummins' interdependence hypothesis mainly because language functions as a cultural tool for cognitive mediation yet first language proficiency serves as a fundamental basis for academic achievement.

8.2 Clear Link Between Instructional Language and Academic Achievement -

The research aims to validate through empirical results that academic achievement correlates positively to the instructional language used by learners. The study anticipates that: The educational outcomes of students learning through their native language produce stable better results in essential fundamental subjects including reading and mathematics along with beginner science. Additional comprehension and increased engagement with classroom content along with greater student confidence aids students to achieve better academic outcomes. Students who learn through an unfamiliar language usually demonstrate delayed development and diminished classroom engagement which leads to worse assessment results during their first schooling years. Instructional language proficiency directly determines educational success together with the fact that educational outcomes directly correlate with the students' linguistic accessibility level.

8.3 Validation of Multilingual and Transitional Education Models -

Research findings will assist bilingual and transitional education models by demonstrating an inclusive language use method that advances through different stages. Key validations include: Academic achievement remains high and bilingual proficiency strengthens when mothers choose to start teaching their children in their own language before introducing the additional language with adequate support. The research proves that transitional bilingual education (TBE) enhances student academic development in their native language before adding a second language as educational instruction medium. The educational systems showing these characteristics lead students to achieve better adaptability and display enhanced long-term outcomes as well as promote increased social inclusion. Research data can support the implementation of education systems which unite the benefits of local language preservation together with national and global educational standards.

8.4 Recommendations for Educational Policy and Practice -

The research findings lead to evidence-based stakeholder recommendations which education sector professionals need to implement. These may include: The curriculum development process should support educational content writers to create learning materials and textbooks while developing pedagogical resources which recognize native cultures and cognitive learning needs. The author recommends that policymakers should push for policies which establish fair funding mechanisms to support the use of local languages in early educational institutions where rural and marginalized communities reside. Teacher education programs must receive direction from educational leaders and instructor trainers about providing multilingual teaching methods to deliver effective instruction between different languages. The assessment bodies should work with evaluation tools that match both the taught language and learning outcomes for fair assessment quality. These recommendations combine forces to drive educational system improvements that create fair and productive learning areas particularly within nations which use multiple languages.

8.5 Contribution to Global Educational Equity Discourse -

The research makes a scholarly contribution towards worldwide educational equity discussions focusing on Sustainable Development Goal 4 which works to obtain quality education for all and provide inclusive education to every student. The research will: This research shows instruction language capabilities in both restricting access to academic success and in simultaneously functioning as a learning-gap-closing mechanism. Mother tongue teaching represents a potential solution for these issues. Language features prominently as a factor which decreases educational inequalities by benefiting minorities who speak different languages and rural inhabitants and other underprivileged communities.

The research stands in favor of linguistic diversity because it points out diversity functions as pedagogical support instead of being regarded as a barrier—it opposes premature English-medium education trends worldwide for non-native contexts.

9. Conclusion

- The choice of the **language of instruction (LOI)** is far more than a logistical or administrative decision—it is a **deeply consequential educational strategy** that shapes learners' academic trajectories, cognitive growth, and long-term success. As this study has shown, LOI is fundamentally tied to how students process information, internalize knowledge, and participate meaningfully in classroom learning. It carries **pedagogical, psychological, sociocultural, and policy-level implications**, particularly in linguistically diverse and multilingual societies.
- Drawing from theoretical frameworks, empirical research, and comparative case studies, this study has demonstrated that **mother tongue instruction in early education provides clear and measurable advantages** in terms of cognitive development and academic performance. Students who begin their learning journey in a language they understand not only perform better in foundational subjects such as literacy and numeracy, but also develop stronger conceptual clarity, critical thinking skills, and emotional confidence in the classroom. This educational grounding lays the foundation for lifelong learning and smoother transitions into additional languages and higher-order academic skills.
- Furthermore, the research underscores the **inequities produced by early instruction in second or foreign languages**—particularly for students from marginalized linguistic and socio-economic backgrounds. When children are forced to learn in an unfamiliar language, they face dual burdens: acquiring the language and mastering content simultaneously. This hinders learning, reduces classroom engagement, and contributes to higher dropout rates and educational inequality.
- Therefore, the evidence strongly supports **educational policies and practices that prioritize mother tongue instruction during the foundational years of schooling**. Such an approach not only enhances cognitive and academic outcomes but also promotes **cultural relevance, identity affirmation, and social inclusion** in education. However, in our globalized world, there is also a legitimate need for learners to acquire proficiency in widely spoken national or international languages.
- To this end, the study advocates for the adoption of **balanced multilingual education models**. These should begin with robust mother tongue instruction in early grades and then **gradually introduce second languages** (e.g., English, Hindi, French) as subjects of study, followed by a phased transition to partial or full medium of instruction in later years. This staged approach respects the cognitive development of learners while preparing them for broader academic and career opportunities.
- In conclusion, embracing **linguistic diversity as an educational asset** rather than a challenge is key to creating inclusive, equitable, and effective learning environments. For countries seeking to improve learning outcomes and close the achievement gap, **investing in mother tongue-based education** is not only a pedagogically sound choice—it is a moral and strategic imperative.

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