Multidimensional Educational Disruption and Competency Decay Framework (MEDCDF): A Conceptual Model for Explaining Learning Loss among Marginalised and Out-of-School Children

[1]Shrutimala Gayan Bora* and [2]Dr. Prateeti Barman

[1]Research Scholar and [2]Associate professor
Department of Humanities and Social Sciences,
Assam Downtown University
*Email: gayanshruti@gmail.com

Abstract

The growing phenomenon of learning poverty among out-of-school children (OSC) in developing nations reflects persistent systemic inequities in access to quality education. While existing theoretical perspectives adequately explain structural and institutional barriers, they often overlook the cognitive consequences of prolonged educational disruption. This paper proposes the Multidimensional Educational Disruption–Competency Decay Framework (MEDCDF), a conceptual model that integrates structural, institutional, socio-cultural, pedagogical, and cognitive dimensions to explain accelerated learning loss among marginalised children. Drawing on empirical insights from Nagaon district, Assam, and interdisciplinary theoretical foundations, the framework conceptualises competency decay as a cumulative and nonlinear process driven by intersecting disadvantages. The study contributes to the literature by bridging sociological and cognitive perspectives, offering a comprehensive analytical lens for understanding both educational exclusion and its long-term developmental consequences. The framework provides valuable implications for policy formulation, pedagogical innovation, and future research on learning recovery strategies.

Keywords:

Learning poverty, competency decay, educational disruption, out-of-school children, MEDCDF, marginalisation

Article History:
Received on 26 September, 2025
Accepted on 30 April, 2026

Introduction

The global education landscape continues to face a critical challenge, with approximately 244 million children remaining outside formal schooling systems (UNESCO, 2022). In the Indian context, educational exclusion is particularly pronounced among children from socio-economically disadvantaged backgrounds. Although previous research has extensively examined factors such as poverty, inequality, and institutional inefficiencies, the cognitive implications of prolonged disengagement from schooling remain underexplored.

Existing theoretical approaches tend to operate in isolation. Structural perspectives emphasise socio-economic inequality (Bourdieu, 1986), institutional frameworks highlight deficiencies in schooling systems (Govinda & Bandyopadhyay, 2012), and cognitive theories primarily address learning progression rather than regression. Consequently, there is a lack of an integrative model that explains the rapid deterioration of foundational skills among children who experience extended educational disruption.

To address this gap, the present study introduces the Multidimensional Educational Disruption–Competency Decay Framework (MEDCDF). This model conceptualises learning loss as a nonlinear and cumulative process shaped by multiple overlapping disruptions, thereby offering a holistic understanding of educational marginalisation.

Review of Literature

Structural Inequality and Educational Exclusion

The theory of social reproduction posits that education systems often mirror existing societal inequalities (Bourdieu, 1986). Empirical studies in India indicate that factors such as caste, economic deprivation, and migration significantly influence access to education (Nambissan, 2016; PROBE Team, 1999). However, these perspectives primarily focus on access rather than cognitive outcomes.

Institutional Barriers in Schooling

Institutional analyses highlight issues such as inadequate infrastructure, teacher absenteeism, and ineffective pedagogical practices (ASER Centre, 2022). While these factors contribute to dropout rates, they do not sufficiently explain long-term learning decline.

Socio-Cultural Influences

Cultural capital plays a crucial role in shaping educational aspirations and participation (Bourdieu, 1986). In many marginalised communities, socio-cultural norms influence schooling decisions, often leading to discontinuity in formal education.

Pedagogical Perspectives

Constructivist theories, particularly those associated with Vygotsky, emphasise the importance of guided learning and scaffolding. The absence of structured instructional support can disrupt the progression of foundational skills, leading to stagnation in learning.

Cognitive Dimensions of Learning Loss

Cognitive psychology suggests that knowledge and skills deteriorate when not reinforced over time (Sweller, 1988). Despite this, the application of cognitive theories to out-of-school children remains limited in educational research.

Taken together, the reviewed literature demonstrates that educational disruption cannot be adequately understood through isolated perspectives. Structural inequalities restrict access to education (Bourdieu, 1986; Nambissan, 2016; PROBE Team, 1999), institutional barriers weaken the quality of learning environments (ASER Centre, 2022), and socio-cultural factors shape educational participation and aspirations (Bourdieu, 1986). At the same time, pedagogical limitations hinder the progression of foundational skills, particularly in the absence of guided instruction as emphasised in constructivist theory, while cognitive processes contribute to the gradual erosion of knowledge when learning is not reinforced (Sweller, 1988). However, existing studies largely examine these dimensions independently, resulting in a fragmented understanding of learning loss. There remains a significant gap in explaining how these interconnected forces collectively produce long-term competency decay, particularly among marginalised and out-of-school children. Therefore, there is a compelling need for an integrated and multidimensional framework that captures the complexity of educational exclusion and explains its cumulative and nonlinear impact on learning outcomes, thereby providing a more holistic basis for research, policy, and intervention.

Significance of the Study

The present study holds substantial theoretical, empirical, and practical significance as it attempts to bridge a critical gap in existing educational research by integrating fragmented perspectives into a unified analytical framework. While earlier studies have independently examined structural inequality, institutional barriers, socio-cultural influences, pedagogical limitations, and cognitive processes, they have largely failed to provide a comprehensive explanation of how these factors collectively contribute to competency decay among Out-of-School Children (OSC).

Firstly, from a theoretical perspective, the study contributes to the enrichment of educational discourse by synthesizing diverse scholarly traditions into a cohesive framework. The theory of social reproduction highlights how educational systems perpetuate inequality (Bourdieu, 1986), while Indian studies emphasize the role of socio-economic and cultural disadvantages in shaping access to education (Nambissan, 2016; PROBE, 1999). However, these perspectives do not adequately address the cognitive consequences of exclusion. By incorporating insights from cognitive psychology—particularly the concept of skill atrophy due to lack of reinforcement (Sweller, 1988)—the present study advances a more holistic understanding of learning as both a social and cognitive process.

Secondly, the study is significant from an empirical standpoint, as it shifts the focus from mere school access and dropout rates to the long-term learning trajectories and regression of skills among OSC. Institutional studies have documented infrastructural deficiencies and pedagogical inefficiencies (ASER, 2022), yet they rarely explore how these deficiencies lead to sustained cognitive decline. By examining learning regression, this study provides a deeper insight into the hidden dimensions of educational exclusion, thereby expanding the scope of existing research.

Thirdly, in terms of pedagogical relevance, the study underscores the importance of continuous instructional support and scaffolding in learning progression. Constructivist theories, particularly Vygotsky's concept of the Zone of Proximal Development, emphasize that learning occurs through guided interaction. When such support is absent, foundational skills remain fragile and higher-order competencies fail to develop. This study highlights the often-overlooked phenomenon of reverse learning progression, thereby offering new directions for remedial and inclusive pedagogical strategies.

Fourthly, the study carries important policy implications. Existing policy frameworks primarily address issues of enrolment, retention, and dropout (ASER, 2022), but they do not sufficiently account for the cognitive deterioration that occurs after school discontinuation. By conceptualizing educational exclusion as a multidimensional and cascading disruption, the proposed MEDCDF framework can inform policymakers in designing interventions that not only bring children back to school but also restore lost competencies and ensure sustainable learning outcomes.

Finally, the study is socially significant as it brings attention to the invisible crisis of learning loss among marginalized populations. Socio-cultural norms and economic compulsions often push children out of formal schooling, and existing research tends to treat this as an endpoint

rather than a process (Nambissan, 2016). By focusing on post-dropout learning decay, the study advocates for a more inclusive and equity-driven approach to education that addresses both access and quality.

In sum, the significance of this study lies in its attempt to move beyond isolated explanations and offer an integrated, multidimensional understanding of educational exclusion and competency decay, thereby contributing meaningfully to theory, research, pedagogy, and policy (Bourdieu, 1986; Sweller, 1988; ASER, 2022; Nambissan, 2016; PROBE, 1999).

Methodology

Although conceptual in nature, the development of MEDCDF is grounded in empirical observations and theoretical synthesis. The framework draws upon:

- Field data from children aged 7–14 years in Nagaon district, Assam
- Analysis of literacy and numeracy competencies
- Comparative narratives of school dropout experiences
- Interdisciplinary theoretical integration

The model was developed through a combination of inductive reasoning based on field observations and deductive reasoning grounded in existing theories.

The MEDCDF Framework

The Multidimensional Educational Disruption–Competency Decay Framework (MEDCDF) conceptualises learning loss as a cumulative outcome of multiple, interrelated disruptions operating across structural, institutional, socio-cultural, pedagogical, and cognitive domains. Unlike linear explanations of dropout or underachievement, the framework posits that these disruptions interact dynamically, producing a cascading effect that progressively weakens learners' competencies over time.

Structural Disruptions

Structural disruptions refer to macro-level conditions such as poverty, migration, economic precarity, and unstable family livelihoods. These factors create irregular patterns of school participation and inconsistent exposure to learning opportunities. Empirical research in the Indian context indicates that socio-economic inequalities significantly shape educational access and continuity (Bourdieu, 1986; Nambissan, 2016; PROBE Team, 1999). Within the MEDCDF framework, such conditions are understood as the foundational layer that destabilises the learning trajectory from the outset.

Institutional Disruptions

Institutional disruptions arise from deficiencies within the schooling system, including inadequate infrastructure, high pupil–teacher ratios, teacher absenteeism, and ineffective pedagogical practices. These factors undermine the quality of instruction and limit the development of foundational skills in literacy and numeracy (ASER Centre, 2022). Even when children remain enrolled, such institutional constraints hinder meaningful learning, thereby contributing to early-stage competency gaps.

Socio-Cultural Disruptions

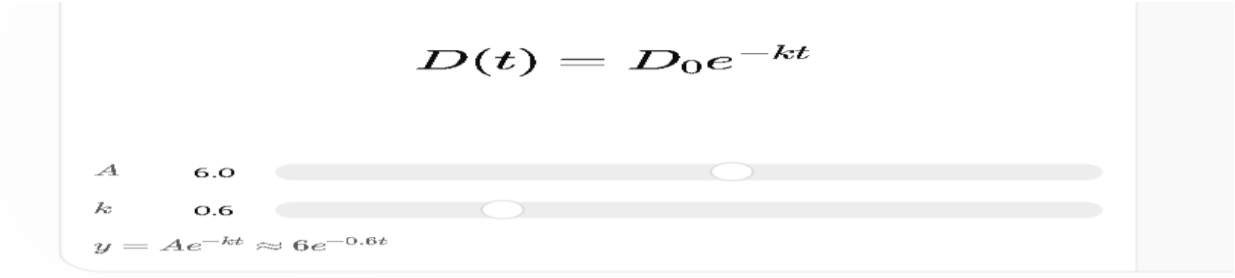
Socio-cultural disruptions encompass factors such as parental illiteracy, gender norms, cultural expectations, and community attitudes toward formal education. These elements influence both educational aspirations and participation, often leading to irregular attendance or early withdrawal from school. Drawing on the concept of cultural capital (Bourdieu, 1986), the framework highlights how socio-cultural contexts can either facilitate or constrain engagement with formal learning systems.

Pedagogical Misalignment

Pedagogical misalignment refers to the mismatch between instructional practices and learners' actual competency levels. Rigid curricula, lack of differentiated instruction, absence of remedial support, and reliance on rote-based teaching contribute to this misalignment. Constructivist perspectives, particularly those associated with Vygotskian theory, emphasise the importance of scaffolding and level-appropriate instruction for effective learning progression. In the absence of such support, learners are unable to bridge foundational gaps, resulting in disengagement and eventual dropout.

Cognitive Disruption and Competency Decay

At the core of the MEDCDF framework lies the concept of cognitive disruption, which explains the deterioration of previously acquired skills due to prolonged disengagement from learning activities. Cognitive psychology suggests that knowledge and skills weaken when not regularly reinforced (Sweller, 1988). In the context of out-of-school children, this process manifests as regression in literacy, numeracy, and higher-order cognitive functions. The framework conceptualises competency decay as an exponential process, represented as follows:



where *D(t)* represents the level of competency at time *t*, D_0 denotes the initial level of competency, and *k* represents the rate of decay. This formulation illustrates that learning loss accelerates over time, particularly in the absence of sustained cognitive engagement.

Integrated Interpretation

The MEDCDF framework emphasises that these five dimensions do not operate in isolation; rather, they interact in a mutually reinforcing manner. Structural vulnerabilities often lead to institutional exclusion, which is further compounded by socio-cultural constraints and pedagogical inefficiencies. Over time, these disruptions culminate in cognitive decline, resulting in significant and often irreversible competency loss. By conceptualising learning loss as a multidimensional and cascading process, MEDCDF provides a comprehensive analytical lens for understanding educational marginalisation and its long-term consequences.

In sum, the MEDCDF framework advances the discourse on learning loss by integrating diverse theoretical perspectives into a unified model. It highlights the necessity of addressing not only access to education but also the quality, continuity, and cognitive sustainability of learning experiences. This multidimensional understanding is essential for developing effective interventions aimed at mitigating competency decay among marginalised and out-of-school children.

Discussion

The Multidimensional Educational Disruption–Competency Decay Framework (MEDCDF) provides a comprehensive understanding of educational marginalisation by integrating multiple dimensions of disruption, including structural, institutional, socio-cultural, pedagogical, and cognitive factors. By situating learning loss within a multidimensional and interactive context, the framework advances existing literature, which has traditionally examined educational exclusion primarily through socio-economic or institutional lenses (Bourdieu, 1986; Nambissan, 2016; ASER Centre, 2022). Importantly, MEDCDF extends these perspectives by incorporating the dimension of cognitive decline, thereby addressing the often-overlooked processes of skill

deterioration and learning regression associated with prolonged educational disengagement (Sweller, 1988). As such, the model is particularly relevant for understanding patterns of learning loss among out-of-school children, migrant populations, and learners affected by systemic crises, where multiple layers of disruption intersect to produce cumulative and accelerated competency decay (UNESCO, 2022).

Implications

Theoretical Implications

The MEDCDF framework contributes to theoretical advancement by bridging disciplinary gaps between sociology, education, and cognitive science. While sociological theories explain structural inequalities (Bourdieu, 1986) and educational research highlights institutional constraints (ASER Centre, 2022), cognitive perspectives account for learning processes and skill decay (Sweller, 1988). By integrating these domains, MEDCDF offers a holistic conceptual model that captures both external conditions of exclusion and internal processes of competency decline, thereby extending existing theoretical discourse on educational marginalisation.

Policy Implications

From a policy perspective, the framework underscores the need for comprehensive and multi-dimensional interventions. Traditional policy approaches that focus solely on improving access to schooling are insufficient, as they overlook institutional inefficiencies and cognitive consequences of prolonged disengagement (UNESCO, 2022). MEDCDF suggests that effective policies must simultaneously address structural barriers such as poverty, strengthen institutional capacity, and incorporate learning recovery mechanisms to mitigate competency decay.

Pedagogical Implications

The framework highlights the importance of adopting flexible and learner-centred pedagogical strategies. Given the diverse learning levels among marginalised and out-of-school children, there is a critical need for level-based instruction, differentiated teaching approaches, and targeted remedial programmes. These strategies align with constructivist principles that emphasise scaffolding and guided learning for effective skill development, particularly among learners who have experienced disruptions in their educational trajectories.

Research Implications

The MEDCDF framework opens new avenues for empirical research by providing a structured basis for operationalising the concept of competency decay. Future studies can develop measurable indicators across its five dimensions—structural, institutional, socio-cultural,

pedagogical, and cognitive—and test the framework through quantitative and mixed-method approaches. Such empirical validation would strengthen the applicability of MEDCDF as a diagnostic and analytical tool in educational research.

Conclusion

The MEDCDF framework offers a novel and integrative perspective on learning loss among marginalised children. By highlighting the cumulative impact of multiple disruptions, it provides a robust foundation for designing effective educational interventions and policies aimed at reducing learning poverty.

References (APA 7th with DOI format)

References (APA 7th Edition)

ASER Centre. (2022). *Annual status of education report 2022*. ASER Centre.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.

Govinda, R., & Bandyopadhyay, M. (2012). *Access to elementary education in India: Country analytical review*. Oxford University Press.

Nambissan, G. B. (2016). *Sociology of education in India: Changing contours and emerging concerns*. Oxford University Press.

PROBE Team. (1999). *Public report on basic education in India*. Oxford University Press.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*(2), 257–285. https://doi.org/10.1207/s15516709cog1202_4

UNESCO. (2022). *Global education monitoring report 2022: Non-state actors in education*. UNESCO Publishing.