

Navigating Pedagogical Shifts: Challenges Faced by Teachers in Implementing Inquiry-Based Learning in Rural Primary & Upper Primary Schools of Uttarakhand

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Abstract: This study investigates the multifaceted challenges faced by primary & upper primary school teachers in rural Uttarakhand, India, when implementing Inquiry-Based Learning (IBL), a pedagogical approach increasingly advocated for its potential to foster 21st-century skills. Drawing on the recommendations of national education policies like the National Education Policy (NEP) 2020 that emphasize experiential and student-centered learning, this research addresses a critical gap: the practical hurdles to IBL adoption in resource-constrained rural settings. Employing a qualitative research design, data was collected through semi-structured interviews with 120 primary & upper primary school teachers across various rural schools of Almora District in Uttarakhand. Thematic analysis revealed several interconnected challenges, broadly categorized into resource limitations (e.g., lack of materials, inadequate infrastructure), teacher-centric issues (e.g., insufficient training, ingrained traditional mindsets, heavy workload), curriculum and assessment misalignments (e.g., pressure for syllabus completion, disconnect with high-stakes exams), and student-related factors (e.g., low prior exposure to IBL, diverse learning readiness). These findings highlight a significant disconnect between policy aspirations and ground-level realities, underscoring the complex systemic barriers to pedagogical innovation in rural contexts. The study concludes by offering crucial implications for teacher professional development, policy formulation, and resource allocation, aiming to bridge this gap and support the effective implementation of student-centered pedagogies in underserved educational environments.

Keywords: Inquiry-Based Learning, experimental learning, discovery learning, pedagogical innovation.

1. INTRODUCTION

In an increasingly interconnected and rapidly evolving world, education systems globally face the imperative of equipping learners with 21st-century skills such as critical thinking, creativity, collaboration, and problem-solving. Traditional, didactic teaching methods, often characterized by rote memorization and passive learning, are increasingly recognized as insufficient for fostering these essential competencies. This recognition has spurred a global shift towards student-centered pedagogical approaches, with Inquiry-Based Learning (IBL) emerging as a prominent and highly effective strategy. IBL encourages students to explore, question, experiment, and construct their own understanding, moving them from passive recipients of information to active participants in their learning journey (Ajda, 2022).

India, with its vast and diverse educational landscape, is actively embracing this paradigm shift. The National Education Policy (NEP) 2020 stands as a landmark reform document, explicitly advocating for a move away from rote learning towards experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centered, discussion-based, flexible, and enjoyable learning. This policy vision underscores a commitment to fostering deeper understanding and developing critical skills that prepare students for real-world challenges. Consequently, IBL is not merely a pedagogical preference but a foundational element articulated in national educational reforms.

While the theoretical benefits of IBL are widely acknowledged and championed at the policy level, its successful implementation on the ground presents significant practical complexities. These challenges are particularly pronounced in rural educational settings, which often contend with unique systemic and resource limitations. Rural schools in India frequently face issues such as inadequate infrastructure, limited access to diverse learning materials, larger class sizes, and varying levels of teacher preparedness and support. Despite the enthusiastic promotion of IBL, there is a palpable gap in understanding the specific, granular challenges teachers encounter when attempting to integrate inquiry-based methodologies into their daily practice within these unique and often demanding environments.

This study, therefore, aims to explore these critical implementation barriers. Specifically, this research seeks to answer the primary question: **"What are the challenges primary & upper primary school teachers face when implementing Inquiry-Based Learning in rural Uttarakhand, India?"**

The findings of this research hold significant implications for various stakeholders. By shedding light on the real-world obstacles faced by teachers, this study can inform the design of more effective and contextually relevant **teacher professional development programs**. It can also guide **policymakers and educational administrators** in developing targeted interventions and allocating resources more efficiently to bridge the gap between educational policy and its practical application. Ultimately, a clearer understanding of these challenges is vital for fostering environments where student-centered pedagogies like IBL can truly thrive, thereby enhancing the quality of education for children in underserved rural communities across Uttarakhand and potentially similar regions.

2. LITERATURE REVIEW

2.1 Theoretical Foundations of Inquiry Based Learning (IBL)

2.1.1 **Inquiry Based Learning (IBL)** - Inquiry-Based Learning (IBL) represents a significant paradigm shift in education, moving from a traditional, teacher-centric model of knowledge transmission to a dynamic, student-centered approach of active knowledge construction (Bruner, 1961; Dewey, 1938; Prince & Felder, 2007). At its core, IBL is a pedagogical philosophy where learning is driven by questions, problems, or phenomena, encouraging learners to engage deeply with content through an iterative process of investigation, exploration, and discovery (Hmelo-Silver et al., 2007). Unlike didactic instruction that prioritizes rote memorization and passive reception of information, IBL positions students as active agents in their own learning journey (www.frontiersin.org). Key characteristics of IBL include the generation of authentic questions by students, hands-on investigation and experimentation, collaborative problem-solving and critical reflection on findings (Bruder & Prescott, 2013). This methodology emphasizes the development of processes and skills necessary for independent learning, enabling students to construct their own understanding rather than merely receiving pre-digested facts (Ajda, 2022).

2.1.2 **Philosophical and Theoretical Underpinnings of IBL** - The robust theoretical foundations of IBL are primarily rooted in constructivist epistemologies and the progressive educational philosophies of the 20th century. These theories collectively advocate for active learning where meaning is personally constructed, often through social interaction and experience.

2.1.2.1 **Constructivism: Individual and Social Knowledge Construction** - At the heart of IBL lies Constructivism, an epistemological stance asserting that knowledge is not passively received but actively built by the learner. This perspective encompasses both individual and social dimensions:

Jean Piaget's Cognitive Constructivism posits that individuals actively construct their understanding of the world by integrating new experiences with existing mental structures, or schemas (Piaget, 1964). Learning, from a Piagetian perspective, often occurs when individuals encounter situations that create cognitive disequilibrium, prompting them to assimilate new information into existing schemas or accommodate (reorganize) their schemas to incorporate novel concepts. IBL environments, which inherently present problems and questions that challenge existing understanding, provide ideal conditions for this process of equilibration and cognitive growth (Piaget, 1964).

Lev Vygotsky's Sociocultural Theory expands on constructivism by emphasizing the profound role of social interaction and cultural contexts in knowledge construction (Vygotsky, 1978). Vygotsky argued that learning is initially a social process, where knowledge is co-constructed through interactions with more knowledgeable others (MKO) – such as teachers or skilled peers – and then internalized by the individual. IBL environments, with their inherent emphasis on collaboration, discussion, and guided facilitation (scaffolding) by the teacher, are uniquely positioned to operate within the ZPD, enabling students to achieve learning outcomes that would be beyond their solitary reach. The use of language and other cultural tools as mediators of thought and learning further reinforces the social dimension critical to IBL (Vygotsky, 1978).

2.1.2.2 **John Dewey and Experiential Learning** - John Dewey, a seminal figure in progressive education, is arguably the most direct philosophical precursor to modern IBL. His pragmatic philosophy fundamentally believed that education is not merely preparation for life but "life itself"—a continuous process of reconstructing experience. Dewey advocated for learning rooted in authentic, real-world problems and active engagement, where students collaboratively inquire, test hypotheses, and reflect on the consequences of their actions. This aligns perfectly with the cyclical nature of inquiry-based processes (Dewey, 1938).

2.1.3 Benefits and Outcomes Associated with IBL

The theoretical underpinnings of IBL are strongly supported by empirical research demonstrating a wide array of educational benefits, particularly crucial for equipping students with skills necessary for the 21st century.

Development of 21st-Century Skills: IBL is highly effective in fostering higher-order cognitive skills, including advanced critical thinking, complex problem-solving, creativity, and effective collaboration and communication (Bruder & Prescott, 2013).

Deeper Conceptual Understanding and Retention: Unlike rote memorization, active engagement in the inquiry process leads to a more profound and lasting conceptual understanding (Sprenger, 2018).

Enhanced Motivation and Engagement: IBL leverages students' natural curiosity and intrinsic motivation. When learners pursue questions that genuinely interest them, their engagement increases, making the learning process more enjoyable and personally relevant (Lee, E., & Hannafin, M. J., 2016).

Increased Student Autonomy and Self-Regulation: Through inquiry, students learn to manage their own learning processes, set goals, monitor their progress, and reflect on their strategies. This fosters crucial self-regulation and metacognitive skills, preparing them to be independent learners (Pedaste, 2012).

Preparation for Lifelong Learning: The iterative nature of inquiry cultivates a disposition for continuous questioning, critical evaluation of information, and adaptability to new challenges. These are fundamental attributes for lifelong learning in a world characterized by rapid change and evolving knowledge.

2.2 Global and National Landscape of IBL Implementation

While the theoretical foundations and documented benefits of Inquiry-Based Learning (IBL) underscore its pedagogical value, its successful and widespread implementation across diverse educational systems presents a complex array of challenges. The transition from traditional, didactic teaching methods to student-centered inquiry demands significant shifts in teacher roles, curriculum design, assessment practices, and resource allocation. This section explores the common hurdles encountered globally, before contextualizing IBL's adoption within the broader Indian educational framework, particularly in light of recent policy initiatives.

2.2.1 Common Challenges in IBL Implementation: A Global Perspective - Implementing IBL, even in well-resourced and technologically advanced educational systems, is rarely without obstacles. Research from various international contexts consistently highlights several recurring challenges:

Teacher Preparedness and Professional Development: A pervasive challenge lies in equipping teachers with the necessary pedagogical content knowledge (PCK) and the confidence to facilitate IBL (Dunne, 2013). Many teachers, having been educated through traditional methods, may lack practical experience in designing open-ended inquiries, scaffolding student learning without providing direct answers, or managing dynamic classroom environments inherent to IBL. This often leads to teachers feeling unprepared, hesitant to relinquish control, or reverting to more familiar, didactic approaches.

Curriculum Constraints and Content Pressure: The structured and often rigid nature of national or state curricula can clash with the flexible, time-consuming, and emergent nature of IBL. Teachers frequently report feeling immense pressure to "cover the syllabus" within a stipulated timeframe, which discourages the deeper, but slower, exploration characteristic of inquiry-based methods.

Misalignment with Assessment Practices: One of the most significant disincentives for IBL adoption is the persistent reliance on traditional, high-stakes standardized assessments that primarily measure factual recall and rote memorization. These assessments often fail to capture the complex skills fostered by IBL, such as critical thinking, problem-solving, collaboration, and creativity. Consequently, teachers may feel compelled to teach to the test, prioritizing methods that align with existing assessment formats over pedagogies that promote deeper learning but are not adequately measured. This non-synchronization between curriculum, pedagogy, and assessment fundamentally impedes IBL implementation.

Resource Availability and Infrastructure: IBL often necessitates diverse learning materials, access to technology (e.g., internet, digital tools, research databases), and flexible classroom spaces that facilitate collaborative group work, experimentation, and movement. Many schools, even in developed nations, may lack these essential resources, thereby limiting teachers' capacity to design and execute rich inquiry experiences.

Student Readiness and Parental Expectations: Students accustomed to passive learning environments may initially resist the demands of self-direction and critical thinking inherent in IBL, preferring explicit instruction. Similarly, parental expectations, often shaped by their own traditional schooling experiences, might lead them to perceive IBL as less rigorous or less effective than conventional methods focused on direct content delivery.

2.2.2 IBL in the Indian Context: Policy Aspirations and Implementation Realities

India, with its vast and complex educational system, has long recognized the limitations of rote learning and has made policy strides toward more student-centered and activity-based pedagogies. Historical educational commissions and policies have periodically advocated for reforms that align with inquiry-based principles.

The National Education Policy (NEP) 2020 marks a pivotal moment, providing a robust top-down mandate for transformative pedagogical shifts. The NEP 2020 explicitly advocates for a move towards "experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centered, discussion-based, flexible, and enjoyable learning" (NEP 2020 Document). This policy vision underscores a strong commitment to fostering deeper understanding, critical thinking, and 21st-century skills, placing IBL and similar approaches at the forefront of national educational reforms aimed at bridging the gap between urban and rural educational quality. The policy emphasizes the need for comprehensive curriculum redesign, innovative pedagogies, and a shift in assessment methods to support these goals.

However, the implementation of such ambitious policies in a geographically vast and socio-economically diverse nation like India presents unique challenges. While the policy provides a clear direction, its translation into effective classroom practice across all educational settings, particularly in rural areas, remains a significant hurdle. Existing research on IBL implementation within India, though less extensive than global studies, has often highlighted challenges congruent with international findings, such as:

Teacher Training Deficiencies: Studies on Indian science education, for instance, have indicated that pre-service and in-service teachers often lack adequate pedagogical content knowledge and practical training specifically for facilitating inquiry-oriented lessons. Newly inducted teachers, in particular, may struggle to integrate IBL due to insufficient exposure and institutional constraints.

Persistent Influence of Traditional Mindsets: Despite policy pushes, a strong inclination towards lecture-based methods and accountability pressures tied to standardized exams often recedes inquiry-based teaching-learning practices in Indian classrooms. Teachers' personal beliefs and comfort with familiar methods can act as an intrinsic barrier to adopting new pedagogies (Somekh, 2008).

Resource Scarcity and Infrastructure Gaps: Even in some non-rural Indian contexts, the lack of appropriate teaching-learning materials, laboratory facilities, and adequate classroom infrastructure has been identified as a challenge to activity-based learning.

This national landscape sets the stage for a more focused examination of how these broader implementation issues manifest and are compounded in the specific, unique environment of rural primary & upper primary schools in Uttarakhand.

2.3 The Unique Context of Primary Education in Rural Uttarakhand, India

The successful implementation of any educational reform, including the adoption of Inquiry-Based Learning (IBL), is inextricably linked to the specific context in which it occurs. In India, the challenges are particularly pronounced in rural settings, which often exhibit distinct socio-economic and infrastructural characteristics compared to urban or even semi-urban areas. Uttarakhand, a state predominantly characterized by its mountainous terrain and dispersed rural communities, presents a unique set of circumstances that profoundly influence the educational ecosystem, particularly at the primary.

2.3.1 Geographical and Socio-Economic Realities

Uttarakhand's mountainous topography significantly impacts its educational infrastructure and accessibility. Remote and hilly regions often mean schools are geographically isolated, difficult to access, and face challenges in receiving consistent resources and administrative oversight (Study on Uttarakhand education).

The socio-economic profile of rural Uttarakhand also plays a critical role. Communities are often dependent on agriculture, daily wage labor, or remittances, leading to varying levels of economic stability. Poverty can result in families struggling to provide basic educational materials for their children, or may necessitate children contributing to household income or chores, leading to irregular school attendance or even early dropouts. Parental literacy levels in these areas can be lower, which may limit the academic support children receive at home and, at times, influence parental understanding or appreciation of progressive pedagogies that deviate from their own traditional schooling experiences (Kala, 2018). This limited parental education and awareness can translate into less community support for innovative teaching approaches like IBL, which might be perceived as less rigorous than conventional methods of instruction.

2.3.2 Infrastructure and Resource Deficits in Rural Primary Schools

Rural primary schools in Uttarakhand frequently contend with significant infrastructural and resource limitations that directly impede the effective implementation of IBL.

Inadequate School Infrastructure: Many schools lack basic amenities crucial for an active learning environment. This includes insufficient and often dilapidated classroom spaces, a scarcity of proper furniture, and a dearth of essential facilities such as functional laboratories for science inquiry, well-stocked libraries for research, and dedicated spaces for collaborative group work or outdoor investigations (government reports on school infrastructure).

Limited Access to Learning Materials: The diverse and often hands-on nature of IBL demands a variety of learning materials, manipulatives, and realia. Rural schools often face severe shortages of these materials, making it difficult for teachers to design engaging inquiry activities beyond textbook-driven instruction.

Digital Divide: Access to technology, including reliable internet connectivity, computers, or tablets, is often extremely limited or non-existent in remote rural schools. This severely restricts access to online resources, educational videos, and digital tools that could significantly enhance inquiry-based learning. While national policies advocate for digital integration, the ground reality in rural areas lags considerably.

Electricity and Water Supply: Basic utilities like consistent electricity and clean drinking water, while seemingly fundamental, are not always reliably available, further hindering the creation of conducive learning environments and the use of any limited technological resources

2.3.3 Teacher-Related Challenges in Rural Settings

Teachers in rural Uttarakhand face a distinct set of professional challenges that impact their capacity to implement IBL, even with willingness or policy mandates.

Teacher Shortage and Quality: There is a persistent challenge of teacher shortages, particularly of qualified and adequately trained teachers, in remote rural areas. This often results in larger class sizes and multi-grade teaching, where one teacher is responsible for instructing multiple grade levels simultaneously. Managing inquiry-based activities and providing individualized scaffolding becomes exceptionally difficult in such contexts.

Limited Access to Professional Development: While national policies like NEP 2020 emphasize continuous professional development (CPD) for teachers, access to high-quality, sustained, and context-specific training programs for IBL remains a significant hurdle for rural teachers. Trainings are often centralized, infrequent, or not tailored to the unique realities of rural classrooms (e.g., lack of resources, large classes), leading to a disconnect between theoretical training and practical application.

Teacher Motivation and Retention: Issues of teacher absenteeism, transfers, and sometimes a lack of strong motivation or commitment to teaching in remote rural areas can disrupt the continuity required for long-term pedagogical shifts like IBL.

Isolation and Lack of Support Networks: Rural teachers may experience professional isolation, lacking regular opportunities for peer collaboration, mentoring, or access to subject-matter experts, all of which are vital for adapting and sustaining new pedagogical practices like IBL.

2.3.4 Student Factors and Prevailing Educational Culture

Students in rural primary schools, often from first-generation learner families, may have limited prior exposure to inquiry-based learning. They are typically accustomed to and prepared for traditional, rote-learning-focused instruction and assessment systems. This background can lead to an initial lack of readiness or even resistance towards self-directed learning, critical questioning, and collaborative activities inherent in IBL. The prevailing educational culture, often driven by the perceived need to pass traditional examinations, reinforces a focus on content delivery rather than skill development, further entrenching conventional teaching practices among both teachers and students. The declining enrollment trends in government primary schools in Uttarakhand, with a noticeable shift towards private schools (state education statistics/reports), may also reflect a perceived quality gap or a preference for certain teaching styles, inadvertently impacting the push for innovative pedagogies.

2.4 The Specific Research Gap and Study's Contribution

The preceding review has established several key points: the robust theoretical grounding and documented benefits of Inquiry-Based Learning (IBL) in fostering 21st-century skills [refer to Section 1]; the common global and national challenges associated with its implementation, particularly concerning teacher preparedness, curriculum constraints, and assessment misalignments [refer to Section 2]; and the unique, compounding socio-

economic, geographical, and infrastructural realities that characterize primary education in rural Uttarakhand, India [refer to Section 3].

While the literature widely acknowledges the pedagogical efficacy of IBL and national policies like NEP 2020 advocate for its widespread adoption in India, there exists a significant void in empirical research that specifically explores the **granular, lived experiences and practical challenges faced by primary school teachers** when attempting to implement IBL within the distinct and often demanding conditions of **rural schools in Uttarakhand**. Existing studies tend to focus either on IBL implementation in more resourced, often urban or semi-urban, settings, or broadly discuss challenges in rural Indian education without a specific focus on the nuanced difficulties of pedagogical innovation like IBL. Moreover, while policy documents outline aspirations, they rarely detail the specific ground-level hurdles that impede their translation into classroom reality, especially in underserved areas.

This study directly addresses this critical lacuna in the existing literature. By focusing exclusively on the primary school teachers in rural Uttarakhand, this research aims to provide:

Context-Specific Insights: A detailed, qualitative understanding of how the unique challenges of rural infrastructure, resource scarcity, teacher workload, and community dynamics specifically impact the daily efforts to implement IBL.

Teacher-Centric Perspective: An in-depth exploration of teachers' perceptions, difficulties, coping strategies, and needs, offering a crucial "voice from the field" that is often overlooked in broader policy discussions.

Identification of Micro-Level Barriers: A nuanced understanding of the practical, day-to-day obstacles that may not be apparent in macro-level policy analyses or studies conducted in different educational contexts.

Therefore, this research makes a unique and timely contribution by offering empirical evidence that illuminates the practical implementation barriers of IBL from the perspective of primary school teachers in rural Uttarakhand. The findings are anticipated to bridge the gap between policy aspirations and ground realities, providing invaluable insights for designing targeted and contextually relevant interventions. This includes informing more effective teacher professional development programs, guiding policymakers in resource allocation and curriculum adaptation, and ultimately contributing to the successful integration of student-centered pedagogies in underserved educational environments across India and potentially other developing nations facing similar challenges.

3. METHODOLOGY

This study adopted a qualitative research design to gain an in-depth understanding of the multifaceted challenges faced by primary & upper primary school teachers in rural Uttarakhand when implementing Inquiry-Based Learning. The participants for this study consisted of 120 primary & upper primary school teachers actively teaching in rural schools across Almora district of Uttarakhand, India. A purposive sampling strategy was employed to select participants who could provide rich and relevant insights into the challenges of IBL implementation. Inclusion criteria for participants included: being a full-time primary school teacher (Grades 1-8); having at least 05 years of teaching experience, having received some exposure or training related to student-centered or inquiry-based pedagogies. The primary data collection instrument for this study was semi-structured interviews. Interview data were analyzed using thematic analysis, followed the systematic six-phase approach outlined by Braun and Clarke (Braun and Clarke, 2006). This method allows for the identification, analysis, and reporting of patterns (themes) within the qualitative data, providing a rich understanding of the participants' experiences.

4. FINDINGS

The key findings derived from the thematic analysis of semi-structured interviews conducted with 120 primary & upper primary school teachers of Almora District in rural Uttarakhand, India. The analysis revealed several interconnected challenges that teachers face when attempting to implement Inquiry-Based Learning (IBL). These challenges have been categorized into five overarching themes, each with specific sub-themes, reflecting the multifaceted barriers to pedagogical innovation in this unique context.

4.1 Resource and Infrastructure Limitations

This theme encapsulates the challenges arising from the scarcity of essential physical and digital resources, and inadequate school infrastructure, which are fundamental for facilitating active and hands-on inquiry.

- Teachers frequently reported a severe lack of basic teaching aids, manipulative, laboratory equipment (even for primary science), and diverse reading materials beyond prescribed textbooks.
- Many classrooms were described as crowded, lacking flexible seating arrangements, and without dedicated spaces for group work, project displays, or practical activities that IBL demands.

- Despite policy pushes for digital learning, teachers highlighted the almost complete absence of computers, projectors, or reliable internet connectivity in their schools, severely restricting access to online resources vital for modern inquiry.

4.2 Teacher-Centric Challenges- This theme focuses on the internal and professional struggles teachers face, including gaps in training, entrenched mindsets, and overwhelming workload.

- Teachers consistently reported a lack of specialized, practical, and ongoing training in IBL methodologies. Existing training programs were often described as theoretical, short-lived, or not adapted to the rural context.
- Many teachers, having been trained and teaching in didactic methods for years, expressed discomfort with the facilitator role required by IBL, a fear of losing control, or a lack of confidence in their ability to manage student-led activities.
- Teachers in rural schools often handle multiple grades and subjects, along with significant administrative duties (e.g., mid-day meal supervision, census duties), leaving minimal time for lesson planning, material preparation, or individualized attention crucial for IBL.

4.3 Curriculum and Assessment Misalignments- This theme highlights the structural barriers related to rigid curriculum demands and assessment systems that do not align with the philosophy of IBL.

- Teachers feel immense pressure from school administration and the education department to complete the vast syllabus within strict timelines, which is often perceived as incompatible with the time-intensive and open-ended nature of IBL.
- The prevalent high-stakes examinations primarily test factual recall and content memorization, creating a strong disincentive for teachers to adopt IBL, which emphasizes process skills and deeper understanding not easily measured by current tests.
- Teachers reported limited autonomy or flexibility to adapt the prescribed curriculum to integrate inquiry-based projects or to respond to students' emergent questions.

4.4 Student and Parental Factors- This theme addresses challenges stemming from students' prior learning experiences and parental expectations.

- Many students, having been exposed primarily to traditional teaching, initially struggle with the demands of self-direction, asking questions, and independent inquiry. They may prefer direct instruction.
- Parents, often with limited formal education themselves, may not understand the value of IBL if it looks different from the schooling they experienced. They might prioritize memorization and exam results, leading to less support for innovative methods at home.

4.5 Administrative and Systemic Support Deficiencies- This theme encompasses the lack of support from the broader educational administration and systemic issues that hinder IBL.

- Teachers felt a lack of understanding or consistent support for IBL from school heads or block/district education officials. There was often no specific monitoring or encouragement for implementing such pedagogies.
- While NEP 2020 promotes IBL, the ground-level mechanisms for its effective implementation, including sustained resource provision and tailored support systems for rural teachers, are often absent or inadequate.

5. DISCUSSION

This study aimed to investigate the multifaceted challenges faced by primary & upper primary school teachers in rural Uttarakhand, India, when implementing Inquiry-Based Learning (IBL). The findings, derived from the rich qualitative data obtained through interviews with 120 teachers, shed critical light on the complex interplay of resource deficits, teacher preparedness issues, systemic misalignments, and socio-cultural factors that impede the effective adoption of this progressive pedagogy.

5.1 Interpretation of Key Findings: The thematic analysis revealed a formidable array of interconnected challenges that significantly impede the implementation of IBL in rural primary & upper primary schools of Uttarakhand. These barriers are not isolated but rather form a complex web where limited resources exacerbate teacher workload, insufficient training perpetuates traditional mindsets, and a misaligned assessment system disincentivizes pedagogical innovation. Our findings underscore a palpable disconnect

between the aspirational goals of national education policies, particularly NEP 2020, and the practical realities experienced by teachers on the ground.

However, our research uniquely illuminates how these general challenges are profoundly exacerbated by the specific socio-economic and geographical realities of rural Uttarakhand [refer to Lit Review Section 3]. The pervasive lack of basic infrastructure (e.g., electricity, digital access, physical space), coupled with the unique challenges of multi-grade teaching and limited parental literacy, presents an amplified set of hurdles not fully captured by broader national or urban-centric studies. For instance, the sheer physical isolation of many rural schools limits opportunities for teacher collaboration and continuous professional development in ways not typically seen in more accessible regions.

5.2 Implications of the Study

The findings contribute to the theoretical understanding of educational innovation diffusion, particularly demonstrating that while constructivist pedagogies like IBL are theoretically sound; their adoption is fundamentally constrained by contextual factors, reinforcing the ecological perspective on educational change. It underscores that policy mandates alone are insufficient without parallel attention to micro-level implementation environments.

Practically, this study underscores an urgent need for re-envisioning teacher professional development. Training programs for rural teachers must shift from generic, theoretical workshops to highly contextualized, sustained, and hands-on modules that address the realities of resource scarcity and large class sizes. Furthermore, providing teachers with access to localized IBL exemplars and fostering peer learning communities can significantly boost confidence and skill development.

At the policy level, our findings call for a critical re-evaluation of how NEP 2020's progressive visions are operationalised in rural contexts. Policymakers must move beyond top-down mandates by dedicating specific budgets for infrastructural upgrades and educational material provision in remote areas. Crucially, aligning assessment systems with IBL objectives is paramount; until exams reward critical thinking over rote memorization, teachers will remain disincentivized from adopting inquiry-based methods. There is also a need for more flexible curriculum frameworks that allow teachers the autonomy to integrate IBL activities without fear of falling behind on syllabus coverage.

6. CONCLUSION

This study embarked on a critical investigation into the challenges faced by primary & upper primary school teachers in rural Uttarakhand, India, during their efforts to implement Inquiry-Based Learning (IBL). Driven by the imperative to foster 21st-century skills and aligned with national educational reforms such as the National Education Policy (NEP) 2020, this research aimed to bridge the significant gap between policy aspirations for student-centered pedagogies and the intricate realities of ground-level implementation in underserved rural contexts.

The comprehensive qualitative inquiry, drawing insights from 120 primary & upper primary school teachers across rural Uttarakhand, unequivocally revealed that the implementation of IBL is fraught with formidable, interconnected challenges. These barriers are predominantly rooted in pervasive resource and infrastructural deficits, including acute shortages of learning materials, inadequate classroom spaces, and a profound digital divide. Furthermore, teacher-centric issues, such as insufficient and contextually irrelevant professional development, ingrained traditional mindsets, and the overwhelming burden of multi-grade teaching and excessive workload, emerged as critical impediments. The findings also highlighted significant curriculum and assessment misalignments, where the pressure for syllabus completion and the dominance of rote-learning-focused examinations actively disincentivize inquiry-based approaches. Finally, challenges stemming from students' limited prior exposure to IBL and parents' traditional expectations, coupled with insufficient administrative and systemic support, collectively create an environment resistant to sustained pedagogical innovation.

These findings carry profound implications for various stakeholders committed to enhancing educational quality in rural India. Practically, they underscore the urgent need for a radical rethinking of teacher professional development, moving towards sustained, hands-on, and context-specific training that directly addresses the unique challenges of rural classrooms. Policymakers are urged to bridge the current policy-practice disconnect by investing substantially in rural school infrastructure and resources, and critically, by reforming assessment systems to genuinely value and measure the higher-order skills cultivated by IBL, rather than merely factual recall. Theoretically, this study reinforces the ecological perspective of educational change, demonstrating that pedagogical shifts are deeply contingent on the interplay of macro-level policies with micro-level contextual realities, and cannot be achieved through mandates alone.

In conclusion, while Inquiry-Based Learning holds immense promise for transforming education and equipping children with vital skills for the future, its successful realization in rural contexts like Uttarakhand demands a holistic and multi-pronged approach. Overcoming these deeply entrenched challenges requires not just policy intent, but concerted, localized efforts in resource provision, tailored professional development, and a fundamental realignment of the assessment system to truly foster a culture of inquiry. By addressing these foundational barriers, educational systems can move closer to ensuring that the transformative potential of IBL benefits all learners, especially those in the most challenging and underserved environments, thereby contributing to a more equitable and effective educational landscape. The journey towards inquiry-driven learning in rural India is arduous, but understanding these challenges is the indispensable first step towards crafting sustainable and impactful solutions.

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