

cultural ideas and practices. Ultimately, I explore the potential and complexity of engaging in a critical pedagogy of place within the context of formal, urban science education and consider the intended outcomes of critical pedagogy of place in light of the case study.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 INTRODUCTION

Research methodology serves as the backbone of any scholarly investigation, outlining the systematic approach and tools utilized to explore research questions and achieve the study's objectives. In the context of this study, which examines the representation of Indian Knowledge Systems (IKS) within the NCERT Class 3 Environmental Studies textbook *Our Wondrous World*, a rigorous and methodical framework is essential to ensure the validity, reliability, and depth of the analysis.

The purpose of this chapter is to elucidate the research design, sampling strategy, data collection methods, and data analysis procedures employed to critically assess the integration of IKS elements in the textbook's content. Given the qualitative nature of this inquiry, the methodology is primarily interpretive and exploratory, focusing on the systematic content analysis of textual and visual materials within the textbook. This chapter begins by explaining the qualitative research design adopted for the study, followed by a description of the purposive sampling method used to select the textbook and its units as the primary data source. The chapter further details the tools and techniques employed for data collection, including thematic content analysis grounded in Indian Knowledge Systems frameworks. Ethical considerations pertinent to this research, such as the use of NCERT-approved materials and proper referencing, are also discussed to uphold academic integrity throughout the study. By clearly defining the research methodology, this chapter establishes the foundation upon which the subsequent analysis and findings rest, ensuring a transparent and replicable process for examining the textbook's alignment with the goals of decolonizing education and culturally rooted learning as envisioned by the National Education Policy (NEP) 2020.

3.1 Research Design

The research design forms the blueprint for systematically investigating the representation of Indian Knowledge Systems (IKS) in the NCERT Class 3 Environmental Studies textbook *Our Wondrous World*. Given the nature and objectives of this study, a qualitative research design has been adopted, which is best suited for exploring complex, context-specific phenomena such as cultural content integration in educational materials.

Qualitative research allows for an in-depth, interpretive examination of both textual and visual content, focusing on meaning-making, contextual understanding, and critical reflection rather than numerical

measurement. This approach is particularly appropriate for analyzing how indigenous knowledge, cultural values, and traditional wisdom are embedded or omitted in the textbook, as it emphasizes rich, descriptive insights over quantification.

The study employs content analysis as the primary qualitative method, which involves systematically identifying, coding, and categorizing specific elements related to Indian Knowledge Systems within the textbook. This includes textual stories, activities, illustrations, and themes that reflect traditional ecological knowledge, cultural heritage, folklore, and indigenous scientific concepts. Content analysis facilitates an organized and objective examination of large volumes of text and images, helping to reveal patterns, themes, and gaps in the representation of IKS.

An interpretive lens grounded in indigenous epistemologies and the principles of decolonizing education informs the analysis. This perspective enables the researcher to critically evaluate how the textbook aligns with or diverges from the goals of the National Education Policy (NEP) 2020, which emphasizes the integration of India's rich intellectual and cultural heritage into early education.

By combining qualitative content analysis with an interpretive framework, the research design ensures a comprehensive and culturally sensitive assessment of the textbook, providing meaningful insights into how Indian Knowledge Systems are communicated to young learners.

3.2 Sampling and Sampling Procedure

This study employs purposive sampling, a non-probability sampling technique widely used in qualitative research, to select the primary data source for analysis. Purposive sampling is appropriate for this research as it allows for the deliberate selection of material that is most relevant to the research objectives—in this case, the NCERT Class 3 Environmental Studies textbook *Our Wondrous World*.

The textbook was chosen because it serves as a foundational educational resource for young learners across India and has recently been updated to reflect current pedagogical standards and curricular reforms under the National Education Policy (NEP) 2020. The choice of Class 3 is significant as children at this stage begin to develop a broader understanding of their environment, culture, and society, making it a critical point for integrating Indian Knowledge Systems (IKS) into their learning experience.

Within the textbook, each of the four thematic units—Our Families and Communities, Life Around Us, Gifts of Nature, and Things Around Us—functions as a distinct sampling unit. All lessons, stories, illustrations, and activities within these units were systematically reviewed to identify content reflecting environmental wisdom, cultural values, indigenous traditions, and traditional sciences. This comprehensive inclusion ensures that the analysis covers the entire scope of the textbook rather than isolated sections.

Content that does not pertain to Indian Knowledge Systems was excluded to maintain a focused examination aligned with the study's aims. The purposive sampling thus supports a thorough and nuanced exploration of how IKS themes are represented, facilitating an interpretive and contextual understanding.

By focusing exclusively on this specific textbook and its units, the study provides a detailed and contextually grounded analysis relevant to early childhood education in India, offering insights that can inform future curriculum development and pedagogical strategies.

3.3 Data Collection Tools and Techniques

The data collection for this study primarily involves a systematic and detailed content review of the NCERT Class 3 Environmental Studies textbook *Our Wondrous World*. Since the research focuses on examining the representation of Indian Knowledge Systems (IKS) within the textbook, the data collection process centers on extracting relevant textual and visual content that aligns with IKS themes.

The main data collection tool is a content analysis framework developed specifically for this study, guided by the key elements of Indian Knowledge Systems such as indigenous scientific knowledge, environmental ethics, cultural heritage, folklore, and traditional practices. This framework serves as a coding instrument to systematically identify, categorize, and record instances where IKS-related content appears within the textbook.

Data collection involves the following techniques:

- **Textual Analysis:** All written materials, including stories, lessons, exercises, and narratives within each of the four thematic units, are reviewed. Texts are examined for references to indigenous knowledge, traditional ecological practices, cultural values, and Indian philosophical concepts.
- **Visual Analysis:** Illustrations, diagrams, photographs, and other graphical elements are analyzed to identify depictions of Indian cultural symbols, environmental contexts, traditional lifestyles, and native flora and fauna that correspond with IKS.
- **Activity Review:** Student activities and assignments are scrutinized to assess whether they encourage engagement with Indian traditions, environmental stewardship, or culturally rooted knowledge.

The collected data are documented using coding sheets where instances of IKS are logged under thematic categories developed during the research design phase. This structured approach ensures consistency and rigor in data collection.

No direct interaction with human participants is involved, as the data source is solely the textbook. This approach ensures objectivity and focuses on textual and visual content within the educational material.

3.4 Procedure of Data Collection

The data collection process for this study was conducted in a systematic and organized manner to ensure a comprehensive examination of the NCERT Class 3 textbook *Our Wondrous World* from the perspective of Indian Knowledge Systems (IKS). The following steps outline the procedure followed:

- **Acquisition of the Textbook:** The latest edition of the NCERT Class 3 Environmental Studies textbook *Our Wondrous World* was procured from an authorized NCERT source to ensure the authenticity and reliability of the material under review.
- **Preliminary Familiarization:** An initial reading of the entire textbook was undertaken to gain a broad understanding of the content structure, thematic units, and the scope of topics covered. This overview helped to identify the key sections relevant for in-depth analysis.
- **Development of a Coding Framework:** Based on a thorough review of literature on Indian Knowledge Systems and the research objectives, a detailed coding framework was created. This framework included categories such as indigenous scientific knowledge, environmental ethics, cultural traditions, folklore, and philosophical perspectives, which were used as criteria for identifying relevant content within the textbook.
- **Systematic Chapter-wise Review:** The textbook was reviewed chapter by chapter within each of the four thematic units—Our Families and Communities, Life Around Us, Gifts of Nature, and Things Around Us. Each lesson, story, illustration, and activity was carefully examined to identify elements that reflect or relate to IKS.
- **Coding and Documentation:** Instances of IKS-related content were marked and coded according to the developed framework. Both textual data (stories, descriptions, exercises) and visual elements (illustrations, diagrams) were recorded in organized coding sheets to facilitate detailed thematic analysis later.
- **Exclusion of Non-Relevant Content:** Any content that did not align with the IKS framework, such as general knowledge or unrelated scientific facts without indigenous or cultural context, was excluded from the analysis to maintain a focused approach.

- **Verification and Cross-Checking:** To ensure accuracy and consistency, the coded data were reviewed multiple times. Ambiguous or unclear items were re-examined to confirm their relevance to Indian Knowledge Systems.

This structured and transparent data collection procedure provided a solid foundation for the qualitative content analysis, enabling an insightful exploration of how IKS is represented in early childhood education through the textbook.

3.5 Data Analysis Techniques (Thematic and Content Analysis)

The data collected from the NCERT Class 3 textbook *Our Wondrous World* were analyzed using qualitative content analysis and thematic analysis techniques. These methods are well-suited for exploring textual and visual data to uncover patterns, themes, and meanings related to Indian Knowledge Systems (IKS) within the educational material.

Content Analysis: Content analysis involved a systematic examination and coding of the textbook's textual and graphical material. Using the pre-established coding framework developed from key IKS components, each relevant piece of content was categorized according to themes such as indigenous scientific knowledge, environmental ethics, cultural traditions, folklore, and philosophical ideas. This process facilitated the identification of frequency and distribution of IKS elements across different units and chapters. The coding enabled an objective quantification of how much and in what ways IKS content is integrated into the textbook.

Thematic Analysis: Following the initial content coding, thematic analysis was employed to interpret and make sense of the data by identifying, analyzing, and reporting patterns or themes within the content. This interpretive approach helped reveal deeper insights into how Indian heritage and traditional knowledge are embedded in the learning material. Themes were developed both deductively, based on the research questions and the IKS framework, and inductively, through emerging ideas found during the data review.

Thematic analysis proceeded in several phases:

- **Familiarization:** Repeated reading and review of the coded data to gain a comprehensive understanding.
- **Generating Initial Codes:** Applying codes to meaningful segments of text and visuals according to the IKS framework.
- **Searching for Themes:** Grouping similar codes to form broader themes representing core aspects of Indian Knowledge Systems.
- **Reviewing Themes:** Refining and validating themes to ensure they accurately represent the data and the research objective
- **Defining and Naming Themes:** Articulating the essence of each theme and its relevance to the study's focus on IKS.
- **Reporting:** Presenting the themes with supporting excerpts and illustrations from the textbook.

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This combined approach of content and thematic analysis ensured a thorough and nuanced exploration of how IKS elements are represented, providing both a broad quantitative overview and an in-depth qualitative understanding.

3.6 Ethical Considerations

Ethical integrity is an essential aspect of any academic research, ensuring that the study is conducted responsibly, transparently, and with academic honesty. Since this study is based on textbook analysis and does not involve human participants, ethical concerns are minimal. However, certain principles were strictly followed to uphold the ethical standards expected in educational research:

- **Use of Authentic and Approved Educational Material:** The research is based solely on the NCERT Class 3 Environmental Studies textbook *Our Wondrous World*, which is officially prescribed by the National Council of Educational Research and Training (NCERT). Using an officially approved and publicly accessible text ensures transparency and academic reliability.
- **No Alteration of Source Material:** The content of the textbook was not altered, misrepresented, or manipulated in any form. The study strictly adhered to analyzing the text in its original form. The analysis was interpretive, and all findings were drawn directly from the content as it appears in the book.
- **Proper Referencing and Acknowledgment:** All references to the textbook and any frameworks related to Indian Knowledge Systems (IKS) are appropriately cited in accordance with academic standards. The ideas, frameworks, or theories adapted from other scholars are duly acknowledged to avoid any form of intellectual dishonesty or plagiarism.
- **Confidentiality and Privacy:** As no personal data or human subjects were involved, there were no privacy concerns. However, the study still maintains a high level of confidentiality by restricting the scope solely to the textbook content and avoiding any potentially sensitive or politicized interpretations.
- **Objectivity and Academic Neutrality:** The research aims to provide an unbiased, scholarly critique of the integration of IKS in primary education. Personal or cultural biases have been consciously avoided, and the interpretations are grounded in educational theory and qualitative research methodologies.

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Compliance with Institutional Guidelines: The study was conducted in compliance with the ethical guidelines set by academic and research institutions. If this research is part of a university program, all institutional protocols regarding research ethics were followed.

By maintaining these ethical standards, the study ensures academic integrity, transparency, and contributes constructively to the discourse on curriculum development and the integration of Indian Knowledge Systems in early education.

3.7 Delimitation of the Study

1. The study is confined to the analysis of the NCERT Class 3 Environmental Studies (EVS) textbook, titled “Our Wondrous World.”
2. English version of the NCERT Class 3 EVS book has been considered.
3. The scope is limited to the pedagogical, thematic, and conceptual analysis of content related Indian Knowledge System with reference to environmental awareness, human-nature relationships, and moral values as presented in the “Our Wondrous World” chapter.
4. The study limits to students’ understanding of nature, interdependence in ecosystems, and the importance of biodiversity is presented in the Textbook.
5. Study includes textbook narratives, activities, and illustrations.