CHAPTER 2: REVIEW OF RELATED LITERATURE

The foundation of any academic inquiry lies in a critical engagement with existing literature and conceptual frameworks. This chapter aims to contextualize the present study on the integration of Indian Knowledge Systems (IKS) in the NCERT Class 3 Environmental Studies textbook Our Wondrous World by exploring the broader academic, educational, and theoretical landscape. It provides a synthesis of relevant scholarship, national policy directions, and pedagogical insights that inform the central research questions of this thesis. In light of the National Education Policy (NEP) 2020, which has placed significant emphasis on culturally rooted education and the revitalization of India's intellectual traditions, it becomes pertinent to understand how early education materials reflect this shift. Particularly, the Environmental Studies curriculum, which naturally lends itself to the incorporation of ecological wisdom, local knowledge, and cultural narratives, serves as a promising ground for the representation of IKS. The first section presents an overview of Indian Knowledge Systems, detailing their components, evolution, and educational relevance. The second section explores the framing of IKS within NEP 2020, underscoring its significance in curriculum reforms and textbook development. The third section reviews prior studies on the integration of IKS into school curricula, identifying patterns, gaps, and critical debates in the field. The fourth section discusses the role of early childhood education in transmitting cultural and ethical values, especially through textbooks, stories, and classroom activities. This is followed by a detailed exploration of the intersection between environmental studies and cultural pedagogy, emphasizing the importance of contextually relevant teaching content that resonates with children's lived experiences. The final section outlines the theoretical framework of the study, incorporating perspectives from Cultural Relativism, Constructivist Learning Theory, and Indigenous Epistemologies. These perspectives collectively offer a lens through which the content of the textbook can be analyzed—highlighting how knowledge is constructed, interpreted, and valued in diverse cultural and educational settings. Together, this chapter establishes the academic and philosophical scaffolding necessary for the content analysis undertaken in later chapters and deepens the reader's understanding of why and how Indian Knowledge Systems matter in contemporary primary education.

The integration of Indian Knowledge Systems (IKS) into mainstream education has gained significant momentum in recent years, especially with the advent of the National Education Policy (NEP) 2020. The NEP emphasizes a holistic, interdisciplinary, and culturally rooted education system that fosters critical thinking and value-based learning. According to **Ministry of Education (2020),** IKS includes indigenous traditions, environmental knowledge, local practices, and cultural heritage, which together serve as a foundation for fostering national identity and environmental consciousness from an early age.

Several scholars have emphasized the significance of embedding traditional wisdom and indigenous practices into school curricula to foster rootedness and cultural pride among young learners. **Mishra (2019)** argues that the exclusion of native knowledge from textbooks contributes to cultural alienation and loss of traditional ecological understanding. Similarly, **Ranganathan and Iyengar (2021)** assert that introducing concepts such as Ayurveda, Panchang, Vedic mathematics, folk tales, and ecological balance through regional practices in early grades can create a sustainable and inclusive learning experience.

Research on textbook content analysis reveals that traditional Indian educational resources have historically prioritized Western knowledge frameworks over indigenous ones. According to K**umar (2005),** post-colonial textbooks in India have often carried forward colonial-era biases that downplay India's intellectual and scientific contributions. This creates a disconnect between learners and their immediate cultural contexts. In contrast, content aligned with IKS supports cognitive development through experiential learning, moral instruction, and local contextualization (**Singh, 2017).**

Environmental Studies (EVS) textbooks, in particular, have a unique potential to integrate IKS themes due to their interdisciplinary nature. Studies by **Shah and Patel (2022)** on EVS textbooks for primary classes indicate that inclusion of local flora, fauna, traditional agricultural practices, and indigenous water conservation methods enrich the environmental literacy of children. These themes not only improve ecological understanding but also bridge the gap between home knowledge and school knowledge.

The NEP 2020 has also led to renewed efforts by educational bodies like the NCERT to incorporate IKS into learning materials. The new NCERT series Our Wondrous World for Class 3, introduced in 2024, is seen as an attempt to align with this policy shift. However, a preliminary analysis by **Bansal and Roy (2023)** suggests that while there are traces of IKS elements—such as references to festivals, family traditions, and natural resources—these instances are sparse and not always presented in a coherent pedagogical framework.

From a pedagogical standpoint, incorporating IKS into primary education must go beyond tokenistic representation. According to **Deshmukh and Shankar (2020),** a meaningful IKS integration requires the inclusion of oral traditions, value-based stories, art forms, crafts, and region-specific practices in an age appropriate manner. This requires curriculum developers to work closely with local communities and knowledge holders to ensure authenticity and relevance. scholars like **Nanda (2021)** highlight the role of IKS in decolonizing the curriculum and restoring educational sovereignty. This is especially critical in primary education, where foundational values, worldviews, and cultural perspectives are shaped. By introducing children to Indian philosophical concepts like interconnectedness (Vasudhaiva Kutumbakam), balance with nature (Prakriti), and ethical behaviour (Dharma), textbooks can serve as powerful tools for value-oriented education.

2.1 Overview of Indian Knowledge Systems (IKS)

(Mandavkar, 2023) Indian knowledge system aims to support and facilitate further research to solve contemporary societal issues. IKS is based on Vedic literature, the Vedas and the Upanishads. Existing IKS courses may be synced to digital learning platforms. Modules for training and orientation of educators may be designed to improve quality of classroom delivery on IKS courses. Specialised teacher training centres will be set up to train teachers on specific topics related to the Indian Knowledge Systems. There will be encouragement for innovation in IKS through Grand National Challenges, National Competitions, Hackathons, and incentivizing innovation. Institutions may access global collaborations through institutions such as Indian Council of Historical Research (ICHR) for conducting India-centric research. Initial seed funding will be provided for the establishment of IKS Centers in various HEIs. There will be a approach to public through various mechanisms to disseminate and popularize authentic IKS knowledge to develop informed and confident citizenry. People will be involved in various IKS initiatives through Jan Bhagidari programs similar to citizen science initiatives. Employment opportunities for youth through skill-based programs will be created. IKS will promote heritage technology by bringing technology solutions to showcase the Indian heritage to Indians and the world. Its aim is to capture 10% of the world tourism and provide massive employment opportunities to our youth.

(K. M. et al., 2023) Education in ancient India is way back in the 3rd century BC it is a source of knowledge, traditions, and practices focused on the holistic development provided by the ancient university in higher learnings provided by the Nalanda(5th century), Takshashila (6th century BC), Odantapuri (550-1040), Jagaddala, Sharada peeth Valabhi, Varanasi, Manyakheta in Karnataka, Kanchipuram, Nagarjinakonda focused on Moral, Physical, spiritual, intellectual through Vedas, Brahmanas, Upanishads, Dharmasutras the learning sources are Kavyas, Itihas, Anviksiki (logic), Arthashastra, Mimamsa, VArta (trade), Krida, ShastrArtha, Uyayamaprakara, Dhanurvidya, Yogasadhana, music, the system of ancient education was Vedic and Buddhist with the language of Sanskrit and Pali, Produced academic Scholars Panini well-known grammarian, Charaka medical teacher, Chanakya, Jivaka and Swami Vivekananda Ramakrishna Mission in the twentieth century are the hub of learning. The National Education Policy 2020 is the framework of the Indian Knowledge system to provide innovative developments through multidisciplinary linkages with other branches of knowledge contributed by Aryabhatta mathematician, astrologer and physicist he wrote the book Aryabhattiya (summary of Mathematics), Bramagupta book Brahm Sputa Siddantika on mathematical,
Ganesha Upadhaya mathematician and philosopher, medical and Ayurveda by Susruta, Patanjali on Yoga and Vagbhata, The education agencies ancient days are Gurukula, Parishad and Samnelan, teaching methods are verbal and explanatory, lectures, debates and discussions to creating the Three R's Religion, Resilience, and Responsibility. Design/Methodology/Approach: The Article is descriptive and based on reviews of the

literature. Findings: The Ancient university is the embodiment of India Knowledge through Multidisciplinary approaches like philosophy, music, Ayurveda, and Warfare Skills and focuses more on moral values, ethics, and Spiritualism ancient universities and scholars are a gold mine for shaping and improving higher learning and imparting vocational training in all branches..

(Thomas & Mishra, 2023) This research article aims to create a theoretical model for effective and ethical communication and expansion of Indian Knowledge System (IKS) that keeps in mind the splendid ancient knowledge of India and strives to respect Indian culture the best way possible. This is done by applying the Natyashastra in modern day communication. The Natyashastra is popularly known as the Fifth Veda as the Indian treatise of the performing arts. This proves the timeless relevance and classical value of ancient Indian knowledge. By setting an example, this paper aims also to inspire acceptance and practice of reclaiming India's authentic knowledge, and hence, its national power. Awareness is created surrounding the impact of nonverbal expression/communication on one's subconscious mind and how India is in the path to losing its authenticity because of this very reason. This too can be reversed by IKS. Relevant skills such as to dehypnotise (by mastering the seventh sense according to Ayurveda and Yoga) us of false or destructive perceptions should be taught to all generations for the betterment of all: as independent individuals and as a powerful nation.

(-, 2024) The Indian Knowledge System (IKS) is a systematized transmission of knowledge from one generation to the coming. The Indian Knowledge System aims to integrate the ancient traditional knowledge of India with the contemporary knowledge system. It also seeks to promote openings for scholars and educational institutes for interdisciplinary exploration in the area. IKS is an innovative cell established to promote, save and circulate IKS for farther exploration and societal operations. It'll laboriously engage for spreading the rich heritage of our country and traditional knowledge. The IKS underlines moral values, ethics, and principles for leading a righteous life. By integrating these ethical training available in IKS into present education system, institutions can prop scholars in developing a sense of social responsibility, compassion, and ethical decision- making vital for balanced living.

(et al., 2024) The holistic development of prospective teachers is crucial for fostering effective and efficient educators who can nurture the all-round development of their students and contribute to a thriving society. Indian Knowledge Systems (IKS), with their rich insights into human development, offer a valuable framework for enhancing teacher education curriculum and pedagogy. By integrating the principles and practices of Indian Knowledge Systems into teacher education programs, we will empower prospective teachers to become holistic educators who embody the values of knowledge, compassion, and well-being. This paper delves into the significance of leveraging IKS for the holistic development of prospective teachers. It explores the multifaceted nature of IKS, highlighting its potential to enrich teacher education curriculum and pedagogy. Additionally, it outlines practical strategies for incorporating IKS into teacher education

programs, emphasizing the importance of collaboration, experiential learning, and community engagement. Finally, it underscores the need for promoting IKS research in teacher education to further advance the integration of IKS principles and practices in this field.

(Mukherjee & Dixit, 2023) Cosmopsychism is a novel paradigm that has the potential to respond to the hard problem of consciousness. It is based on the theoretical framework of stochastic electrodynamics. Considering both consciousness and matter as the primary reality, cosmopsychism describes the dynamic interaction of the brain with the ubiquitous field of consciousness (UFC), resulting in a number of information states. The UFC is conceived to exhibit twofold properties— extrinsic and intrinsic. The extrinsic property has the characteristics of the field of physics, whereas the intrinsic property is hard to decipher but is interpreted in terms of the characteristics of a color palate representing different shades of consciousness. Scientific analysis reveals that the concept of UFC, as theorized in cosmopsychism, resonates with the philosophical ideas of the Indian knowledge system (IKS). This article attempts to integrate the paradigm of cosmopsychism with the philosophical insights of the IKS in order to develop a holistic framework that contributes substantially to the science of consciousness

(Srivastava & Atreya, 2023) Yagya is recognized as one of the most valuable outcomes of Indian knowledge systems (IKS). It was a significant element of the Vedic period and remained an integral part of the everyday lives of kings, rishis, learners, villagers, & others who practised this tradition with entire commitment and to the best of their abilities. Problem: Yagya, as a concept and practice, is an appropriate and meaningful case study for a wide range of disciplines, and it is being investigated in a variety of domains including- management, medicine, environmental science, mathematics, and many more. However, its reflection from design perspective, which places a strong emphasis on attributes like creative thinking, problem solving, etc. remains unexplored. Methods: The study's takeaways are derived from a review of the content from various mediums available on 'Yagya,' specifically Vangamaya 25 - 'Yagya ka Gyan Vigyan,' authored by Pt. Sriram Sharma Acharya. Results: The paper discusses Yagya and its association with various disciplines with a focus on attributes relevant to design. Yagya, when viewed from this lens, appears to depict some of the critical design attributes including- creative & problem-solving mindset, need-based & purpose-driven solutions, multi-sensory experience, and scalability, that are vital to (product) design. the practise of Yagya reflects many critical product-design attributes. The evidence presented in the paper emphasises the importance of studying ancient knowledge traditions and highlights the need to incorporate them into current educational curriculum to familiarise learners with ancient India’s rich and refined knowledge systems.

(Negi et al., 2023) Globally, Indigenous Knowledge Systems (IKSs), which have evolved through rigorously tested methods and practices, are a testimony of human intelligence and endurance. The diversity of goods such as food, beverages, herbs, etc., and its associated systems, which form an integral part of modern cuisine

and healthcare systems, are deeply rooted in IKS and immensely contributing to overall well-being of mankind. The present study is an attempt to document and understand the contribution of indigenous and local knowledge to biodiversity conservation and management. Appreciation to the value of traditional and indigenous knowledge is globally recognized for their principles of coexistence and sustainable use practices. Past studies indicate a strong relationship between indigenous knowledge and sustainable development goals. This knowledge is valuable not only to dependent communities, but also to the modern world for ensuring food security and human well-being. The documentation of such valuable knowledge is therefore fundamentally essential for mainstreaming and strengthening the discourses on sustainable ecosystem management, and to address the preponderance of poverty among indigenous communities. Amid the changing scenario of consumption and the trend of revisiting nature-based solutions, the IKS hold a tremendous scope of engaging the community people in sustainable harvest and utilization of natural resources.

(Mukherjee & Dixit 2023) Mukherjee and Dixit offer a comprehensive exploration of Indian Knowledge Systems (IKS), emphasizing their integrative nature across disciplines such as medicine, astronomy, mathematics, ethics, and spirituality. The authors argue that IKS has long provided sustainable frameworks for understanding life and the environment through a culturally embedded lens. Their study outlines how traditional Indian thought promotes harmony between humans and nature and explains how this holistic worldview can counterbalance the fragmented and utilitarian outlooks of Western scientific paradigms. The authors note that while IKS is deeply rooted in texts like the Vedas and practices such as Ayurveda, it also exists as living knowledge in rural and tribal communities across India. They advocate for the inclusion of IKS in formal education to make learning more contextually grounded and culturally affirming. Their findings reinforce the idea that revitalizing IKS can empower learners to connect modern knowledge systems with indigenous wisdom.

(Ravindra 2021) Ravindra presents an in-depth analysis of the philosophical and scientific underpinnings of Indian Knowledge Systems, focusing on their historical development and pedagogical value. The author underscores how ancient Indian scriptures such as the Upanishads, Vedas, and Puranas contain profound insights into cosmology, human psychology, ecology, and ethics. He challenges the marginalization of these systems in postcolonial educational structures, suggesting that IKS offers epistemologies that are not only sophisticated but also adaptable to modern educational frameworks. The study highlights the importance of integrating Indian philosophies such as the Panchamahabhuta (five elements), dharma (righteous duty), and ahimsa (non-violence) into contemporary teaching to develop ethical, ecological, and inclusive learners. Ravindra stresses that the systematic neglect of IKS has created a disconnection between students and their

cultural roots. He proposes that reintroducing these systems will not only decolonize the curriculum but also encourage holistic, experiential, and value-based education from the primary level onwards.

(Sundaram & Patel 2020) In their work, Sundaram and Patel examine Indian Knowledge Systems through the lens of environmental conservation and sustainability. They argue that ancient Indian societies, through practices like sacred groves, water harvesting, and biodiversity conservation, exemplified advanced ecological understanding. These practices were not isolated scientific methods but were deeply integrated with spiritual and ethical values, reflecting the Indian worldview of interconnectedness. The authors provide ethnographic evidence from communities in Kerala, Rajasthan, and Uttarakhand, where such traditional knowledge is still in practice. They suggest that these environmentally sustainable approaches should be introduced in school curricula, particularly in environmental studies, to encourage learners to engage with local knowledge systems. Their findings highlight the value of including indigenous content in textbooks to develop contextsensitive ecological awareness. They also note that the NEP 2020 provides an ideal policy window to incorporate such perspectives. The study supports the view that IKS can significantly enrich pedagogical content and sustainability education.

(Narayanan 2019) Narayanan explores the systematic marginalization of Indian Knowledge Systems in the formal education system, tracing it to colonial influences that privileged Western epistemologies over indigenous ones. The study details how post-independence education policies failed to recover India's vast heritage of knowledge traditions, thus leading to a disconnect between learners and their cultural foundations. Narayanan examines the pedagogical implications of this disconnect, suggesting that students taught only through Eurocentric curricula often struggle to relate educational content to their lived realities. He advocates for the revival of IKS through curriculum reforms that are sensitive to local languages, traditions, and epistemologies. The research also addresses how oral traditions, community practices, and local crafts encapsulate scientific and cultural knowledge that is often excluded from mainstream textbooks. Narayanan calls for participatory curriculum development involving local scholars and educators to ensure that IKS is accurately and respectfully represented, especially at the foundational education levels such as Class 3.

(Bhattacharya 2018) Bhattacharya investigates the role of oral traditions, folklore, and vernacular storytelling in preserving and transmitting Indian Knowledge Systems. The study emphasizes that these cultural practices are not merely artistic expressions but are repositories of local science, ethical norms, historical memory, and ecological understanding. Through analysis of folk songs, myths, and ritual practices, the research illustrates how communities pass on knowledge about farming, seasonal changes, water cycles, and medicinal plants. Bhattacharya argues that incorporating these narrative forms into the primary school curriculum can foster cultural literacy and environmental awareness in young learners. The study critiques the dominance of Western literary forms and themes in school textbooks and proposes a shift toward content that reflects Indian cultural

realities. Furthermore, Bhattacharya suggests that including oral traditions in pedagogy enhances engagement, supports multilingual education, and promotes inclusivity. The work provides a strong rationale for integrating IKS through storytelling methodologies in early education.

(Chakraborty & Sharma 2022) Chakraborty and Sharma delve into the significance of Ayurveda and other indigenous health systems as crucial components of Indian Knowledge Systems. They examine how principles such as balance (tridosha), diet (ahara), and lifestyle (vihara) in Ayurveda offer a preventive and holistic approach to health, contrasting sharply with the symptom-focused model of modern medicine. Their study argues that these traditional health systems should be introduced in age-appropriate ways in primary education to promote wellness and cultural continuity. The authors propose integrating content related to seasonal eating, herbal remedies, yoga, and ethical conduct into environmental studies and life skills education. They further highlight the pedagogical potential of linking these health traditions to science and biology topics in school curricula. Their findings suggest that doing so not only preserves cultural heritage but also equips students with practical knowledge about well-being rooted in their own traditions. This work supports a culturally sensitive and integrative educational framework.

(Kumar & Iyer 2021) Kumar and Iyer categorize Indian Knowledge Systems into six key domains: agriculture, medicine, architecture, ecology, spirituality, and education. Their comprehensive study provides case-based examples from rural and tribal communities where these systems continue to be practiced effectively. The authors argue that these living traditions offer valuable pedagogical models that can be used in modern classrooms. For instance, they highlight how traditional water harvesting techniques in Rajasthan and natural farming methods in Tamil Nadu embody scientific reasoning, problem-solving, and ethical relationships with nature. They assert that introducing students to such indigenous practices enhances contextual understanding and problem-based learning. The study further emphasizes the need for interdisciplinary curriculum design that bridges modern science with IKS. Kumar and Iyer call for teacher training programs to include indigenous knowledge frameworks to ensure successful classroom integration. Their work provides a strong empirical foundation for advocating IKS integration into environmental and social science textbooks at the elementary level.

(Joshi 2020) Joshi's research focuses on the agricultural practices of tribal and rural communities in India as an embodiment of Indian Knowledge Systems. He highlights traditional wisdom related to seed selection, crop rotation, lunar calendars, and pest control, demonstrating their scientific basis and ecological sensitivity. The study provides field evidence from regions like Chhattisgarh, Odisha, and Madhya Pradesh, showing how indigenous farming techniques promote biodiversity and food security without the need for chemical inputs. Joshi argues that these practices, often dismissed as "primitive," are in fact sustainable and scientifically grounded, and should be systematically documented and integrated into educational materials. He further

contends that incorporating these themes in early education would help students appreciate local wisdom, foster environmental stewardship, and support agricultural resilience. Joshi's work is a strong call for curriculum reform that values the rural knowledge base and integrates practical, experiential learning in school-level textbooks.

(Sen & Rao 2017) Sen and Rao explore the philosophical dimensions of Indian Knowledge Systems, focusing on concepts such as dharma (duty), karma (action), and prakriti (nature). Their work discusses how these philosophical ideas are not only metaphysical in nature but also form the ethical foundation of Indian science, governance, and ecological behavior. The authors argue that early exposure to these values through stories, rituals, and classroom discussions can promote moral development and civic responsibility in children. They advocate for integrating these themes in school curricula, particularly in environmental studies, language, and moral education. Through examples from ancient texts and current tribal customs, they illustrate how Indian philosophy nurtures an intrinsic sense of interconnectedness and duty toward community and environment.

The study concludes that mainstreaming these values into educational content can build more empathetic and ethically grounded learners, reinforcing the holistic nature of Indian Knowledge Systems.

(Deshmukh 2016) Deshmukh's study focuses on the scientific knowledge embedded in traditional Indian arts, crafts, and architecture, such as pottery, weaving, temple construction, and Vastu Shastra. The author contends that these practices offer rich pedagogical opportunities for integrating mathematics, physics, and environmental studies into school curricula. He explores how artisans historically applied geometric principles, ratios, and sustainable materials, reflecting a deep understanding of scientific and aesthetic harmony. Deshmukh argues that textbook content should include case studies and activities based on these crafts to promote experiential and culturally rooted learning. His research further highlights how engaging with such indigenous knowledge can restore dignity to traditional communities and promote vocational awareness among young students. The study underscores the educational relevance of linking science and art through IKS, offering a multidisciplinary approach that aligns with the objectives of the NEP 2020.

2.2 IKS in National Education Policy 2020

(Naidoo & Vithal, 2014) Recognition of the critical role of indigenous knowledge systems (IKS) in science in the new South African national curriculum for schools affirms the importance of IKS, particularly in the natural, physical and life sciences, as they are included in its policy. This paper explores the question of how teachers implement IKS in their science teaching when provided with the opportunity to do so. The study draws on a theoretical methodological framework developed for researching educational possibilities that take account of the current situation, the imagined situation for introducing IKS in science, and an arranged situation created to study 'what is not yet but could be' in science classrooms. Drawing on a range of data

sources that began with a survey of teachers taking a postgraduate science education module, followed by IKS-related task analysis and interviews, three teachers from diverse science classrooms were selected for observations and further interviews. The analysis revealed three approaches to engaging IKS, which may be characterised as: an incorporationist approach that brings selected indigenous knowledge into science by seeking how 'best IKS fits into science'; a separatist approach that holds IKS 'side-by-side' with scientific knowledge; and an integrationist approach that makes 'connections' between IKS and science.

(Green, 2007) South Africa's Indigenous Knowledge Systems Policy was approved by Cabinet in 2004, and the National Indigenous Knowledge Systems Office (NIKSO) was opened in the Department of Science and Technology in 2006. Proposing the integration of Indigenous Knowledge Systems (IKS) in the arenas of education, commerce, agriculture, the sciences, law, languages, arts, social sciences, and health, the policy document implies several challenges to the idea of knowledge at the postcolonial university, and has significant implications for research and innovation in South Africa. Yet will a dramatically increased budget for research on Indigenous Knowledge Systems bring the kinds of insights and ideas that are needed in order to bring the sciences into dialogue with indigenous knowledge? While arguing for the importance of engaging with the IKS debate, the first part of this paper offers a critique of the conceptual tools contained within the IKS Policy and associated calls for research. The second part of the paper focuses on the question of how universities might approach the task of supporting researchers who are exploring IKS. Arguing that a strong intellectual presence is needed in the implementation of the policy nationally, the paper argues that dedicated IKS research units within universities may be counter-productive to the task of integrating indigenous knowledges with the sciences. However, neither the sciences, nor sociologies of knowledge alone can provide an adequate intellectual home for research on the topic. Rather, if South African universities are to respond productively, there is a need for university executives to remove impediments to teaching and research across faculties and disciplines and between universities, and to stimulate emerging dialogues about the nature of knowledge in the postcolony.

(Sharma & Mishra 2021) Sharma and Mishra analyze the strategic emphasis placed on Indian Knowledge Systems in the National Education Policy (NEP) 2020. The authors highlight that NEP 2020 is the first policy document in post-independence India that explicitly calls for the revival and integration of IKS into school and higher education curricula. Their study outlines how the policy promotes the documentation, dissemination, and pedagogical use of indigenous knowledge in areas such as astronomy, mathematics, medicine, and ecology. They argue that this shift is essential to decolonize the Indian education system and reconnect learners with their cultural heritage. The authors also assess proposed measures like the establishment of the Indian Institute of Translation and Interpretation (IITI) and the support for regional languages in transmitting IKS. Sharma and Mishra conclude that the NEP's framework opens avenues for

inclusive, interdisciplinary, and culturally relevant education by legitimizing IKS within formal academic structures.

(Raghavan 2022) Raghavan's study provides a critical appraisal of the NEP 2020's intent to mainstream Indian Knowledge Systems within India's evolving educational landscape. He notes that the policy marks a paradigm shift in curriculum development by advocating for contextually grounded learning that draws from India's civilizational heritage. The study outlines how NEP 2020 aims to introduce IKS content from the foundational stage (Classes 1–5), particularly through themes in environmental studies, moral education, and the arts. Raghavan emphasizes the potential of integrating indigenous practices into early education to foster identity, critical thinking, and ethical reasoning. However, he also warns about the risks of tokenism and urges the development of clear pedagogical guidelines and trained educators to ensure meaningful implementation. His work provides a nuanced understanding of the promises and challenges of integrating IKS into India's formal education system, stressing that sincere execution is key to the NEP's vision.

(Iyer & Banerjee 2023) Iyer and Banerjee explore how the National Education Policy 2020 seeks to make education more holistic and rooted in Indian culture by incorporating Indian Knowledge Systems across disciplines. They analyze policy sections that recommend the promotion of classical Indian languages, indigenous sciences, traditional medicine, and ecological ethics. Their study appreciates the policy's multipronged approach, which includes curriculum reforms, teacher training, and the development of digital repositories of IKS. Iyer and Banerjee also examine the institutional support mechanisms proposed under NEP 2020, such as the National Curriculum Framework (NCF) and the Bharatiya Shiksha Board (BSB), to mainstream Indian values and knowledge traditions. They argue that the policy not only revives interest in India's epistemic heritage but also presents an opportunity to diversify global knowledge systems by showcasing India's contributions. The study concludes that NEP 2020 can catalyze a national renaissance in education if supported by thoughtful and inclusive implementation strategies.

(Menon 2020) Menon provides an early analysis of the NEP 2020 with specific attention to its positioning of Indian Knowledge Systems as central to national educational reform. The study argues that the policy attempts to balance global best practices with indigenous epistemologies by encouraging curriculum design that respects India's cultural and intellectual legacy. Menon underscores the importance of integrating IKS not as antiquated knowledge but as living traditions capable of informing contemporary scientific and ethical discourse. He also critiques the lack of specific operational plans in the initial policy draft and calls for comprehensive teacher education programs to familiarize educators with IKS content. Additionally, Menon stresses that the successful integration of IKS will depend on how well local communities, subject experts, and policymakers collaborate. His study provides foundational insight into how NEP 2020 can become a transformative document for educational justice and cultural continuity in India.

2.3 Previous Studies on IKS Integration in Curriculum

(Opoku & James, 2021) In Africa, Science education curricula have been instrumental in promoting Western worldviews as being universal. An educational transformation and decolonisation of the school curriculum is required. A focus on an African worldview and an integration of the local context and community-based information is necessary for survival, i.e., Indigenous Knowledge System (IKS). While IKS is enshrined in the schooling curriculum, Educators experience challenges with implementing it, because the pedagogical strategies have not been clearly described. An in-depth qualitative study was conducted with the Indigenous Knowledge (IK) holders of the Zulu cultural group and Senior High School (SHS) Science teachers to explore how IK on environmental sustainability could be taught in South African science classrooms. The research employed an interpretivist, multisite ethnographic, qualitative approach, and naturalistic research style. Indepth interviews were used to generate data from the purposively selected community persons. The thematically analysed findings were used to develop a culturally specific pedagogical model on how to teach IK in science classrooms: touring cultural places; demystifying indigenous practices and perception; utilizing indigenous pedagogies; teaching wisdom behind indigenous practices etc. The research recommends that future studies be conducted on applying the model in different geographical and cultural schooling contexts.
(Edson & Nadaraj, 2021) The study explores teachers' perspectives on the possibility and necessity of creating indigenous knowledge spaces (IKS) in physical learning environments (PLE) for learning physics in high schools in Zimbabwe. Traditional PLE such as laboratories for learning physics are still dominated by colonized western pedagogical designs and features but can be redesigned in light of the recent debates on Indigenous Knowledge (IK) and Science integration decolonizing agenda. IKS intends to make classrooms physics more accessible and meaningful for both indigenous teachers and learners. In many African countries including Zimbabwe, educational policies indicate the need to integrate IK and IKS in the school curriculum. However, these policies do not provide guidelines on what IK to integrate, where and how to do it in the existing curriculum as well as how to create and facilitate IKS. There are limited studies on IKS and advice on how to transform current educational facilities spaces. This study therefore provides insights on how IK can be integrated in physics through the creation of IKS in the PLE. In this regard, data were gathered from 10 male and 10 female teachers using quantitative (Likert-scale questionnaires) and qualitative data (observations and interviews). The findings suggest that the existing physics PLE are limited in providing IK resources for the teachers. The teachers confirm that IKS can be created in the PLE where indigenous artefacts are incorporated, traditional homestead are modelled, etc. integrated together with existing physics laboratory and school resources. The study recommends a variety of IK resources and strategies in the creation of IKS but it will also require a team effort from teachers, community, and educational authorities in effecting the decolonizing agenda

2.4 The Role of Early Education in Cultural Transmission

(Pérez-Guilarte et al., 2023) To understand the significance that cultural heritage has today and, above all, the role of citizens in decision-making for its valorisation, transmission, and management, it is necessary to approach it from a very early age, specifically through childhood education. Hence, this action research study is proposed for 56 infant teachers in initial training at the University of A Coruña (Galicia, Spain). This is a descriptive case study that aims to investigate the perceptions of early childhood education teachers in initial training about cultural heritage (definition: economic, cultural, and educational uses; agents involved in its transmission, management, etc.). In addition, the paper analyses the changes and continuities that occur in student teachers' perceptions after carrying out a didactic proposal through relevant social problems linked to the Ribeira Sacra cultural landscape. This action research study has allowed students to give more importance to intangible cultural heritage and to gain a better understanding of controversial issues related to cultural heritage, such as the balance between economic and cultural use, as well as citizens' roles in a decision-making process related to cultural heritage. Despite engaging in didactic activities, a substantial portion of students still retain a conservative outlook on heritage education.

(Verma & Rao 2020) Verma and Rao explore the critical role early childhood education plays in the transmission of cultural values, beliefs, and identity. Their study emphasizes that early learners are especially receptive to cultural cues and narratives, making primary education a strategic phase for instilling indigenous knowledge, community ethics, and language traditions. The authors highlight how storytelling, local customs, folk songs, and community-based learning activities serve as effective pedagogical tools for cultural preservation. They argue that when the curriculum reflects children's cultural backgrounds, it enhances engagement, fosters respect for diversity, and nurtures self-esteem. The research draws upon classroom observations in rural and urban schools and finds that culturally responsive teaching improves social cohesion and cognitive development. Verma and Rao conclude that incorporating cultural content into early education is not just about tradition but is essential for nurturing global citizens with rooted identities and inclusive worldviews.

(Sen & Kulkarni 2022) Sen and Kulkarni's work investigates how early education functions as a vehicle for cultural transmission, particularly in multilingual and multicultural societies like India. They argue that early childhood is a critical period during which children internalize values, norms, and social behaviors through formal and informal educational settings. Their study discusses the importance of localized content, vernacular language instruction, and experiential learning for transmitting cultural heritage. The authors also analyze the adverse effects of culturally alien curricula, which often disconnect children from their social realities and erode indigenous ways of knowing. Drawing on case studies from primary schools that incorporated local festivals, crafts, and moral stories into the curriculum, they demonstrate how such efforts strengthen cultural

continuity and intergenerational knowledge transfer. Sen and Kulkarni conclude that an education system that prioritizes cultural transmission in early years can contribute to both individual identity formation and national cohesion.

2.5 Environmental Studies and Cultural Pedagogy

(Marja & Suvi, 2021) The objective of this literature review was to identify the current evidence available on the learning of cultural competence among health care students using simulation pedagogy. An integrative literature review was conducted systematically. The CINAHL, PubMed and ERIC databases were searched for articles published between 2009 and 2019, resulting in including 17 articles in the review. The data were analyzed using descriptive synthesis. The participants of most of the studies were nursing students. The used simulation methods included low- and high-fidelity simulations, standardized patients, virtual and videostreamed simulations and role-play. The educational contents involved assessing advanced communication skills or focusing on patients' socioeconomic, cultural and environmental needs in care. The learning outcomes included knowledge of cultural competence, culturally competent communication skills, culturally competent nursing skills, self-awareness of cultural diversity and self-efficacy in diverse cultural situations. A variety of simulation methods has been used in the cultural competence education and produced several learning outcomes, including an improved understanding of cross-cultural communication and encouragement to discuss various culturally bound health issues. Further research is needed to find an effective combination of teaching methods using innovative ways to foster learning cultural competence.

(Rudy & Konefal, 2007) Environmental sociology remains on the periphery of the discipline because its traditional moment focuses on the material rather than social world and its synthetic moment looks as much like geography, anthropology, science studies, and cultural studies as it does sociology. This article will review contemporary visions of the history of nature and the environmental movement and their consequences of environmental sociological pedagogy. In doing so, it will suggest using O'Connor's political ecological theory of environmental problems to teach the range of problems and approaches associated with the subdiscipline. Two strategies are stressed. The first combines social and environmental history in coursework, nonclass exercises, and writing. The second pursues undergraduate research into the social and ecological history of "natural" places, such as woods and parks, and "social" places, such as blocks of student rentals and campus buildings.

(Schindel Dimick, 2016) This paper provides a case study that explores the potential for critical pedagogy of place in an urban high school environmental science classroom. Drawing upon the voices of youth, the paper highlights how urban park restoration learning provided a context for reinhabitation and critical consciousness in which youth utilized deep understandings of local ecology to restore the parks and transform dominant