



Perspectives on Integrating the Local Context for Environmental Literacy: An Exploratory Study with Middle-School Teachers in India

Girish Dalvi and Tanaya Vyas (Indian Institute of Technology, India)

Abstract

Environmental Education (EE) needs to stay pertinent to the needs of the community amidst the rapidly changing socio-technological landscape. There are several barriers to applying the theoretical concepts of EE into real life situations, and negotiating such complexities to support environmental literacy remains a challenge for school teachers. This study aims to explore teachers' views and challenges towards contextualization of the curricular concepts to link theory with practice, and how their motivations to address this gap affect their approaches towards contextualizing environmental topics for the students. The methodology includes the analysis of EE content in the national curriculum textbooks in India and corroborating the resultant findings through interviewing teachers (n=10) from middle-school grades in semi-urban government schools of Rajasthan, India. The discussion reflects upon the issues within current practices of contextualisation of environmental topics and the connections which get marginalized in the attempts to bridge the theory-practice gap.

Keywords: Environmental education, India, teacher perception, local context, learner engagement, theory-practice gap

Introduction

There is growing acknowledgement towards the role of education in addressing contemporary challenges. Efforts for mobilizing educational resources for a sustainable future have been internationally encouraged by the UN Decade of Education for Sustainable Development (ESD) (UNESCO, 2005a). The current study corresponds with the UN Sustainable Development Goal 4 (SDG 4) of quality education, specifically Target 4.7 Education for Sustainable Development and Global Citizenship. Quality education can empower communities to achieve sustainable lifestyles through awareness and conscious transformation of knowledge into action. Environmental Education (EE) pedagogy forms a crucial part of ESD. EE encompasses integrated pedagogical approaches for, about and through the environment. Barriers towards achieving sustainable living practices, equitable access to natural resources, climate change awareness and allied issues are increasingly discussed as part of school EE curricula. Successful teaching-learning opportunities within EE rely on strategies for contextualisation of the curricula.

Environmental Education in Formal Curriculum

Environmental Education for Sustainability (EES) is “a learning process that increases people’s knowledge and awareness about the environment and its associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action” (Declaration of the Tbilisi Intergovernmental Conference on Environmental Education, 1978). Environmental Education works towards building environmental literacy. Globally several steps have been taken to improve EES teaching-learning resources, materials and practices. Efforts have been made to improve EE through inquiry experiences and skill development (Steele et al., 2016). Yet there remains a gap between students’ environmental beliefs and their willingness to take pro-environmental action (Kollmuss and Agyeman, 2002).

In India, following the EES goals, one of the central concerns of the National Curriculum Framework (NCF) 2005 is to contextualise the curriculum to the learners’ world, through blurring the boundaries between the school and its natural and social environment (NCERT, 2005). In the middle-grade school curriculum, EE is incorporated through an infusion approach which means that EE topics are blended into the science and social-science subjects.

Contextualizing the Curriculum

Context based approaches are processes and methods which help students to make connections between curricular concepts and real-world applications (Yamauchi, 2003). When the students engage with the larger debates along with the facts, they are able to transfer their learning from one context to another more effectively. Contextualized learning is important for environmental knowledge comprehension. When teachers relate textbook concepts to the local environment and students’ personal experiences, it enhances curricular knowledge acquisition (Taylor and Mulhall, 2001). Contextual curriculum enhances community focused, learner focused and knowledge focused learning; incorporating local knowledge, language, and skills. While the multidisciplinary nature of EE promotes examination of contextual information (Song, 2012), there is limited research into analyzing the features of EE curricula from this perspective.

Teacher Perception Studies Regarding Contextualisation for EE

Previous studies have investigated teacher perceptions and practices of concepts such as issues within Education for Sustainable Development (ESD) (Anyolo et al., 2018), socio-scientific learning and environmental citizenship (Georgiou, 2021), environmental topics in science education (Ko and Lee, 2003) and so on. In India, there have been studies analysing environmental philosophies underlying teacher practices and narratives (Haydock and Srivastava, 2017); environmental awareness of middle-school teachers (Singh, 2012); among others. Although teachers’ role and knowledge in facilitating environmental literacy among students is considered crucial, scholarly research on teacher perceptions and practices regarding contextualisation of the curricular content remain underexplored in India.

Rationale for the Study

We situate the current study with teachers in semi-urban government schools of Rajasthan, north-western India. Land degradation, deforestation, water scarcity and depletion of common resources reflect the range of environmental issues prevalent in Rajasthan (Gagné, 2013). While several campaigns to promote environmental conservation have been active in the region, very few studies attempt systematic analysis into concerns around environmental education in the schools. Previous research with school and university students in Rajasthan has highlighted students' inability to comprehend the socio-ecological challenges associated with access to water (Chauhan, 2003), and lack of knowledge of and involvement in waste management practices (Arora and Agarwal, 2011). Such studies indicate the need for investigating the EE pedagogy practices present within the school curricula. Teachers' active engagement with curricular transformation has been acknowledged by researchers as an important catalyst in enabling students to connect curricular knowledge with life outside school (Batra, 2005).

Through our study, we aim to analyse the curricular content for the opportunities it provides with respect to contextualisation, as well teacher perceptions of the socio-cultural, political, economic, and curricular contexts within which learning takes place. We present a detailed analysis of the textbook content from science textbooks of Class 6 (NCERT 2018, p. 155-156) and 7 (NCERT 2018, p. 220-230) published by the National Council of Educational Research and Training (NCERT), along with findings based on teachers' interviews in the Discussion section of this paper. In order to understand how the curricular content gets translated into practice, we propose the following questions to understand teacher perspectives on contextualizing the curriculum for environmental literacy in middle-school:

What are teacher beliefs and perceived challenges towards contextualisation of environmental topics for enabling student learning and engagement?

How do teachers facilitate connections between curricular and contextual knowledge in environmental topics?

Research Methodology

The data collection for the study involved ten semi-structured telephonic interviews, which lasted approximately 40 minutes each. Purposive sampling was utilised in this study to ensure that participants would be able to provide the information required to answer the research questions. The teachers from the Science and Social Science background were selected as the environmental topics are infused in these subjects in middle-grade school curricula. The interviews were conducted primarily in the Hindi language. The nature of this qualitative study is exploratory and we do not intend to draw statistically significant conclusions from our findings.

The sample consisted of seven female and three male teachers, out of which six teachers were Science teachers and four were Social Science teachers. Their teaching experience ranged between 12 to 31 yrs. The participation in the study was completely voluntary and prior consent

was taken for recording interviews. Participants were asked questions on their views, experiences and methods regarding contextualising environmental topics from the curricula. However, conversations were often woven around and guided by what the principal-researcher interpreted to be significant to the interviewees while they responded. This helped in revealing unintended categories and themes during data analysis.

Reflexive Thematic Analysis or RTA (Braun and Clarke, 2019) was considered most appropriate in the context of our theoretical underpinnings for the study. The method of RTA suggests that data is collected and analysed in a way that respects the participants' stories, while acknowledging researcher reflexivity when interpreting the data. Thematic Analysis involves finding repeated meanings across a data set, which is crucial to the interpretation of phenomena. The analysis is recursive and iterative, and the phases of analysis include: familiarisation with the data, generating initial codes, generating themes, reviewing potential themes, defining and naming themes and producing the report.

After each of the interviews was conducted, the researchers created a transcript of the interview. The teachers' own accounts of their opinions and experiences have been expressed by the researchers as truly as possible, while also embracing their own interpretations as researchers. Themes from the data were produced by organizing codes around a central organizing concept interpreted from the data.

The paradigmatic framework of interpretivism and constructivism (Schwandt, 1994) guided our study. These frameworks allowed us to incorporate a combination of both deductive and inductive analysis approaches. A primarily inductive approach was used in our study, as we conducted open coding of the data, giving importance to data-based meanings. However, deductive analysis was used to a certain extent to make sure that the data-based meanings and the themes we generate stay relevant to our research questions. While performing open-coding we gave equal importance to both semantic and latent level codes. We intended to code the semantic meaning communicated by the participants, and the latent meanings that we interpreted as researchers.

Findings

Four major themes were identified (Fig.1 Thematic map): school context; framing the concepts within activities; stepping beyond the classroom and; diversity of learner experiences and backgrounds. In the subsequent paragraphs, we detail each theme along with respective subthemes.



Fig. 1 Thematic map

School Context

This theme relates to the factors seen as important by the teachers to frame the concepts in environmental education topics considering the place where teaching-learning occurs, and its relationship with the surrounding community.

Interactions with the School Landscape

Teachers' ideas of building connections between the students and their immediate surroundings seemed to be based on possibilities generated by the school infrastructure and landscape.

'There were only two dustbins in our school earlier. The children had gotten into the habit of dumping food wrappers and pencil shavings in between each other's chairs so that teachers would not notice. We teach them to remember to put trash into dustbins, but it is difficult to make students put it into practice. Recently our school received more dustbins.'

With reference to the textbook activity of inspecting drains in one's locality or neighbourhood, the teachers mentioned using the school premises as it is safer and the teachers could ensure that the students performed the task under the teachers' supervision. The teachers prepared an

extended exercise wherein the students learnt about the water supply system by connecting with the school personnel.

'We cannot ask the students to trace the drains in their area to look for contaminants. This task would require adult supervision. Instead, we ask them to observe how wastewater is generated in the school itself. We ask them to click photos or make drawings of the activities which result in wastewater.'

Teachers perceived gaps between the curricular objectives and the prevalent school culture.

'Our premises has huge trees of eucalyptus, bamboo and all sorts of ornamental plants. The school authority restricts children from walking in the garden. How will the child ever know the names and importance of indigenous plants?'

Explorations Beyond Formal Learning

Self-directed learning was acknowledged as important as one teacher narrated about how a student started making informative videos about local birds with his neighbour and posted them online. The teacher was 'very happy and encouraged other students to make similar videos in the school yard'. Instances of incidental learning and the role of non-academic activities for promoting it were appreciated by teachers. Academic pressures were seen as disrupting the scope for such opportunities though.

'There is a small break between the assembly time and the first class. During that time the students can either have some snacks, read the newspaper in the library, play in the grounds, or just take a short nap. But I have seen most students quite tense during this time, busy finishing their homework. How does one expect students to grow aware of their surroundings, and think besides the defined academic requirements?'

Teachers seemed to reflect upon the strengthening of teacher-student relationship through such experiences.

'It was lunchtime and the students were playing in the school ground, when they noticed an injured squirrel. They called me and we brought the squirrel to the classroom. Children learn through such incidents. We made a feeder and a shelter for the squirrel, all of us together!'

School-community Relationship

Teachers shared the need for involving parents of the students in the activities of the school. They felt that the role of parental support in the child's learning was important for the child to bring their learning into practice.

'Parents of the students should also be involved in the tree plantation events at the school. But usually, the children gather and then we click some pictures and that's it.'

The teachers highlighted the school agenda behind organizing environmental awareness campaigns, and suggested extending such activities for wider community participation.

'Hosting a cleanliness drive in the school is not enough. It should extend to the students' home and the neighbourhood. But we just did a small event when the inspectors came for evaluation.'

Framing the Concepts within Activities

Teachers' preferences and methods for conducting the activities for environmental learning and awareness are discussed under this theme.

Teaching-learning Conceptions Regarding EE Pedagogy

Teachers referred to socio-cultural practices related to sustainability and intergenerational sharing of knowledge in their descriptions of activities. Health and well-being were also perceived as a neglected aspect in the content of textbook activities.

'Our culture already teaches us to avoid wastage. I bring examples from our own culture and community practices. People in villages of Rajasthan keep a wide wok-like container below while taking a bath on a cot, so that all the dirty water gets collected in the container which can be later reused for other purposes. That is how our ancestors have taught us to conserve water in the desert.'

'The problem of sanitation is acute in many rural areas. They dump waste in the open. The students see this everyday around them, so I ask them to make detailed projects on this issue. Such activities need to be promoted, rather than just making posters.'

Sense of Ownership

Using found materials was considered as a typical activity in lessons on waste management. Teachers associated the 'best-out-of-waste' activity as a way to connect student learning with their home environment. When narrating instances of supporting student interest through hands-on activities for environmental action, upcycling was considered as a more 'convenient' activity as compared to activities which demand more effort and patience such as composting, planting seeds and segregating waste. The activity also brought instant results, which the teachers saw as important for developing a sense of ownership in the students.

'We always conduct the Christmas tree decorations session. It is convenient, as children bring waste material from their home and they feel a sense of achievement after making something new from trash.'

'We had a compost pit in the school once. But nobody takes care of it, nobody has the patience. The most loved activity is where students get creative like in best-out-of-waste. They enjoy owning the responsibility of collecting trash from their home and making something useful from it.'

The craft activities were preferred as they were perceived as requiring minimal teacher involvement. It was assumed that the activity would increase the students' creative skills and their engagement in environmentally-responsible behaviour.

'Children can be left on their own with craft or art activities. I am able to complete my evaluations during that time. And the children develop good behaviour towards the environment by making new things out of old.'

Communicating Moral Values

Valuing nature was seen as an important step in exploring and documenting the past and relating it to the present. Teachers emphasised the role of developing the wisdom to distinguish between right and wrong and applying it to nurturing the human-environment relationship.

'I ask my students to find out about the *Khejri* trees and how they were protected by the local communities. Children need to realize and value the efforts put in by our ancestors in conserving them.'

'I think it is important to talk about values. Just yesterday I saw some children get into a fight on the bus to school. I cite these examples to my students in class, and make them prepare a do's and don'ts chart. Cutting trees and hitting people should be on the same don'ts list. Planting trees and helping people should be on the same do's list.'

Teachers spoke of instances wherein they became role models and wanted children to be inspired to see through the issue of social stratification, by engaging in work which was seen as inferior.

'When I come to the class, I clean the desk and dust the shelves. One day the cleaning staff came on duty and saw the students dusting the class furniture. This sparked a conversation between the students and the staff. Students spoke to the staff about their work, their life. Students need to understand that cleaning is not someone else's job, it is not lowly.'

Sharing Multiple Perspectives

Sharing various dimensions around popular places and events was considered relevant by the teachers in terms of exposing the lesser-known stories of environmental 'damage'.

'I show contrasting images of the Udaipur lakes, those in which the local organizations can be seen cleaning the lakes and then those in which the huge lavish events can be seen catering to thousands of tourists. I also ask students to bring such photos from newspapers and make videos of their surroundings.'

'When I teach concepts on pollution, I ask students to walk into the schoolyard and the lanes near our school and notice the types of pollution. The obvious answers they give are noise and smoke from cars. Then I remind them of Diwali, the festival time when firecrackers burst on the road. The discussion does not end there. I tell them about the condition of the workers who make those firecrackers. That is how students can link social aspects with ecological issues.'

There were instances where teachers used videos to include news of natural disasters such as tsunamis, floods, and droughts while explaining about the water cycle. Collecting news reports on the issues was a popular activity given to students, especially to bring out an emotional response from the students, mostly that of 'shock'.

'Rajasthan experiences severe water scarcity. These days we have rainfall at random intervals, which is all due to the environmental disturbance. I show students the weather statistics and the destruction of crops, so they feel the shock.'

'I recently captured photos of dead cows in our locality. The heaps of plastic waste in the garbage are the problem. The students made faces upon seeing the photos. But photos like these should be shown. I asked them to click pictures of plastic products in their homes, and count them.'

Stepping Beyond the Classroom

This theme corresponds with the teachers' views on including the outdoors and engaging with the community.

Indirect Inclusion of Environmental Issues

Teachers tried to find ways to bring students closer to thinking about environmental issues while playing or going for site visits.

'We took our students to visit a solar panel project because the government has been making efforts to motivate children into taking up sustainable agriculture as a career. Through this tour we explained to them about environmental issues prevalent in their community.'

'When students go out to play in the school grounds, I ask them to pick up the trash lying around. It becomes a kind of competition to see who picks the most trash! This way they enjoy and don't even realise that they have cleaned the ground. When they come back to class, I talk to them about the various types of waste present around us and its hazards.'

Purpose of Field Trips

The teachers acknowledge the value of field trips, but the purpose of such trips was not linked with academic goals.

'When we take students out on nature camps, we just want them to have a good time. We don't get them to do any activities or put them under stress. The camp is a mandatory activity, so we have to do it. We can include learning-activities, but then that is another task to plan for.'

The teachers preferred keeping the trips 'stress-free' for the students, and avoided putting in efforts to plan any activities to be included in such trips. Perceived barriers include time-crunch, excessive involvement with planning travel logistics and so on.

'Exploring the nearby zoo is a fun trip. It increases recall for children, they are able to recognise different species of animals, and observe them. They are happy as it is like a picnic for them. We have to put in our time to ensure the safety and transport arrangements. That itself is quite a lot.'

'Trips are good and are part of the syllabus, but we mostly take them to visit nearby forts only. We don't do discussions or any such thinking task, we just do sightseeing.'

Planning for Community Engagement

Teachers described arranging the community-engagement activities in the beginning of the lesson, irrespective of the activity's placement in the textbook chapter. They felt that it allowed students to explore prior knowledge through discussions with family members before diving into the textbook concepts.

'I tell my students to speak to their grandparents about how they lived without electricity. We then have a discussion in class the next day. All children may not have done the task, starting the lesson with such discussions can be helpful. This was an activity I thought of, based on another activity given in the textbook exercises at the end of the lesson.'

'I asked the students to collect packaging of products used by their family members, and discuss the types of materials used in the packaging. We did this exercise after watching a short film on waste. They can quickly relate the two together.'

Diverse Student Experiences and Backgrounds

This theme relates to teacher perceptions of how student backgrounds, attitude and experiences affect the way they understand environmental concepts and develop pro-environmental competencies.

Fragmented Narratives

The students' inability to relate the curricular knowledge with contextual knowledge was noticed by teachers, and the teachers felt that such situations led to misconceptions.

'A student asked me why people in his neighbourhood did not follow the habit of disposing garbage in the dustbin. I find it difficult to handle the differences between what needs to be taught and what the students actually notice in their surroundings.'

'I ask students to grow a vegetable in their vicinity and take care of it without using pesticides. Those students whose parents are farmers, see that pesticides are being used in the field. So, they get confused. How can they apply their learnings in real life then?'

Broad Range of Students

Students from various socio-economic backgrounds possess contrasting experiences and attitudes, which are perceived as affecting the students' ability to learn and understand ideas around sustainable living.

'Students come from different backgrounds. Some of their parents are farmers, so they are close to nature. They even bring vegetables from their farms and share with their friends. The students who reside in more semi-urban areas are not very close to nature spaces. Students learn a lot from each other's diverse experiences.'

'Students from urban areas are more relaxed about using water and electricity, and need to be told about resource conservation. But students from rural areas are very conscious of wastage. The difficulty is that the same examples may not be appealing to everyone.'

'Access to water is an issue in Rajasthan, especially in rural communities. Women walk long distances to fetch water. But these discussions are difficult for urban children to understand.'

Drawing from the Language of the Students

Teachers regard language barriers as a key issue while teaching the environmental topics. They regard the use of poems, role-play and stories to 'ease' the students into the scientific aspects of the content.

'There are local poems in the Marwari language with reference to water, rain and seasons which I collect and keep in the library. When I read it out to the students and ask them to recite it, and then begin with the textbook lesson... that way they become comfortable with the lesson.'

'Some students from rural communities do not understand some scientific terms in the textbook. So, they may not understand the concepts easily. In such cases, I have to ask them the local language terms, or draw pictures.'

'I often ask my students to go out into the school grounds and bring dry branches or leaves and make crowns out of them. Then they have to enact the tree and talk about its uses in any language they are comfortable in. This way it is easier for them to learn and express.'

Discussion

The themes in our findings reflect the approaches regarded as important by teachers to contextualize EE for students. These approaches correspond with the focus areas of place, student, pedagogical practice, attention to diversity and disciplinary content; as identified in previous research (Fernandes et al., 2012). Teacher's perceptions revealed that teachers view the process of contextualisation as having structural and affective aspects. As the bridge between the curriculum and the students, teachers see themselves negotiating their ideas around EE pedagogy and the multiplicity resting within the narratives of the students' lived realities.

Place is believed to have strong cultural features, and curriculum design and teaching-learning methods need to take into account the daily routines, habits and social interactions that unfold in the school scenario (Kemp, 2006). The community's needs and the economic context are seen by teachers as essential while conceptualising the pedagogy for localisation. The meaning of local knowledge needs to be seen through a dynamic lens, to allow the inclusion of characteristics of the place.

The teacher responses prominently include the role of the school context, and activities that encourage beyond-classroom experiences in shaping the students' connections with their home, neighbourhood and city. While teachers' intent towards encouraging outdoor engagement is visible, their motivation to transform such opportunities into tools for contextualisation is lacking. Teacher's role in planning, implementing and reflection impacts the success of field trips in becoming effective educational tools (Behrendt and Franklin, 2014). But training and support are crucial to empower teachers to learn methods for conducting such trips and aligning the experiences to EE learning objectives.

The textbooks suggest certain out-of-classroom activities, but offer minimal guidance towards their implementation. For example, exploring the sewage route in one's locality. This activity and other similar ones are meant for students to understand wastewater management through physically exploring the localities. However, the textbook does not mention appropriate safety guidelines to consider during such tasks. The teachers while referring to this activity were found to be adapting it for the school campus instead of nearby localities. There is yet another textbook activity which prompts the students to interact with waste collectors or 'rag-picking' children and think of ways to help them 'read and write'. The activity is meant to promote socio-scientific inquiry among students. However, the lack of direction towards planning and facilitating direct experiences within outdoor spaces and social interactions with communities, may overshadow the opportunities for students and teachers to realise such an inquiry. Moreover, field trip goals are treated as detached from EE objectives, and such trips are perceived as an escape from the usual coursework and assignments.

While the textbook content attempts to make the environmental topics more accessible and interactive through the questions and illustrated characters, the depth of the message seems to get compromised, and communication of ideas remains didactic and oversimplified. The teachers too seemed to believe that EE is 'simple' to teach in comparison to 'heavier' science subjects.

Consequently, the framing of environmental and sustainability issues becomes skewed, succumbing to a fragmented narrative. With reference to their motivation towards the need to contextualize the content, the teachers seem to have tautological answers such as 'the importance of the environment is significant to life' and 'we need to learn from the environment because it is everywhere and all-around us'. The teachers seem to be caught in the middle of having to adhere to the curricular content and wanting to discuss alternate examples and realities surrounding an environmental concept.

In order to develop equality within education processes, contextualised practices are seen as imperative. Research into contextualisation highlights the need to take care of student interest, nature, experience and background to support meaningful learning (Doyle, 2009). Opportunities for inclusion of diverse learner backgrounds could be created through context-aware teaching-learning methodologies (Kalbach and Forester, 2006). Still, teachers' responses reflect that they are not able to devote much time towards discussions on issues that stem from the contrasts of everyday lives of students living in the rural and urban areas. Previous research indicates that focusing on local history, identity and value systems can help in developing contextualised learning situations (Goodson and Deakin Crick, 2009). Teachers attempt to highlight local histories, but mostly tend to touch upon common examples devoid of intricacies, and quickly skip to global environmental-crisis examples.

Textbooks seem to contain minimum guidance towards planning of resources to conduct the activities, and this could prevent translation of knowledge into practice. For example, in the textbook, hands-on activities such as vermicomposting and paper recycling would require certain materials which may not be readily available. Also, the process of composting needs to be tracked across a month's time and requires the school premises availability and suitable conditions for conducting such an activity. Hence these tasks are not completely student-led and their execution might differ according to the facilitation and resources provided. We find that teachers also believe that composting may not be feasible in their schools, and the best-from-waste activity seems to be the preferred one instead. Use of words in the textbook such as 'chicken mesh' and 'gunny bag' may be obscure for learners, especially without the presence of any visual depiction. So, the application of the concept of compost would remain a challenge even if the concept is explained in great detail in the textbook. The teacher interviews also reflect the teachers' practices to make sure that language does not become a barrier for students' learning.

Teacher responses seem to indicate that their practice of contextualisation remains constrained within the didactic mould of instruction. Opportunities for incidental learning which means everyday learning that happens either incidentally or by seeking information individually (Marsick, 2016) may not always be supported in the formal school scenario. Reasons for this may include the hidden curriculum in the form of restrictions imposed by the school authorities and the design of school landscapes, as observed in the teacher interviews. Contrasting priorities of school authorities, teachers and curriculum developers are evident in these observations.

In spite of the efforts made by the curriculum developers and the teachers' attempts at contextualising EE, critical thinking around issues seems minimal. The value and significance

ascribed to a concept may push other facets of an issue to the periphery, thus making it difficult for students to parse through the systemic linkages which connect the various elements of a complex phenomenon to the student's personal experiences. For example, activities such as best-from-waste are chosen by teachers because they are feasible and associated with bringing a sense of personal agency and empowerment to the students. These activities however do not get extended into meaningful teacher-student interactions to uncover deeper questions around the notion of waste or the difference between upcycling and recycling and so on. Similarly, news reports were referred to for generating a sense of 'shock', rather than careful dissection of the underlying issue. Consequently, students may not express their ideas, experiences, opinions, misconceptions, and questions. In the absence of such opportunities, applying the knowledge in new contexts might become a challenge.

Limitations

The findings of the study are to be viewed amidst certain limitations. We may not know whether the teachers' comments reflect their actual classroom practice and circumstances as the data for this study was drawn from telephonic interviews only. Also, we are not aware how frequently certain pedagogical practices are used by the teachers and exactly what type of activity structure is being referred to by the teachers. Being an exploratory study, the sample size is limited. Class observation and in-person interactions could not be conducted owing to Covid-19 pandemic restrictions. The teachers' responses may also have been affected by the non-classroom location they might be present within while responding. Regardless, our study attempts to reveal the diversity of teacher perspectives pertaining to local context integration for environmental literacy, particularly in the Indian region of Rajasthan where such studies have been scarce.

Implications and Further Scope

Our analysis reveals the preferences, challenges and choices present in pedagogical practices of teachers and their relationship with the EE curriculum goals. These insights are relevant for curriculum developers and environmental education experts in understanding the deterrents and opportunities in realising the EE objectives. The current study guides us into thinking about questions such as, who may be defining the context for EE, what comprises the context and how might the framing of it evolve over time?

The findings from this study provide a base for exploring the design and delivery of EE modules. Further research can analyse how teachers contextualise for specific environmental sustainability issues. Empirical studies can be planned to understand the role of school culture and its impact on student's environmental interactions. Local issues and community values could be studied in relation to the curricular activities.

Conclusion

Current attempts to facilitate EE objectives present moments which enable connection of content knowledge to the students' real-world context, but there are lesser opportunities that allow

students to apply the content knowledge to a new real-world setting. Thus, the process of contextualisation ceases to be iterative, and instead becomes static disparate interludes. The plurality of contexts presents a web of interconnected subsystems which are difficult to permeate through in absence of flexibility from established pedagogical frameworks. Consequently, the students' experiences wind down to linear explorations rather than flourishing into active attempts to apply their learnings to new imaginations.

In preparation to explore the full potential of EE, the curriculum material needs to allow students to immerse in the issues through critical questioning, develop solutions, support ideas and present their data while exploring the local context. To this end, the educators and curriculum designers must work towards planning and assessing the accessibility of the knowledge components and the activities. A major challenge lies in re-shaping the school curriculum in order for it to include not only the content but also the teaching practices and informal instruction; for the transmission of a holistic model of EE.

The SDG 4 supports the role of education in advancing knowledge, skills and attitudes necessary for learners to develop the ability to make informed decisions. To strengthen the contribution of education for accomplishing responsible citizenship in resolving local and global challenges, contextualised learning opportunities are vital. Contextualisation improves the relevance of education, thereby improving the quality of education. Hence, research on approaches for contextualizing formal EE curricula across students' home, community and school is required to systematically analyse efforts and monitor progress towards achievement of quality education for sustainable development.

References

- Anyolo, E.O., Kärkkäinen, S. and Keinonen, T. (2018), "Implementing Education for Sustainable Development in Namibia: School Teachers' Perceptions and Teaching Practices", *Journal of Teacher Education for Sustainability*, Vol. 20 No. 2, pp. 64-81.
- Arora, L. and Agarwal, S. (2011), "Knowledge, Attitude and Practices Regarding Waste Management in Selected Hostel Students of University of Rajasthan, Jaipur", *International Journal of Chemical, Environmental and Pharmaceutical Research*, Vol. 2, pp. 40-43.
- Batra, P. (2005), "Voice and Agency of Teachers", *Economic and Political Weekly*, Vol. 40 No. 40, viewed 2 February 2022, <<https://www.epw.in/journal/2005/40/special-articles/voice-and-agency-teachers.html>>.
- Behrendt, M. and Franklin, T. (2014), "A Review of Research on School Field Trips and Their Value in Education", *International Journal of Environmental and Science Education*. Vol. 9 No. 3, pp. 235-245.

- Braun, V. and Clarke, V. (2019), "Reflecting on reflexive thematic analysis", *Qualitative Research in Sport, Exercise and Health*, Vol. 11 No. 4, pp. 589-597, viewed 12 November 2021, <<https://www.tandfonline.com/doi/abs/10.1080/2159676X.2019.1628806>>.
- Chauhan, S. S. (2003), "Environmental education and water representation among high-school students: A Case Study of Rajasthan (Jaipur Area)", *Journal of Human Ecology*, Vol. 14 No. 2, pp. 113-117.
- Declaration of the Tbilisi Intergovernmental Conference on Environmental Education 1978, *Environmental Conservation*, Vol. 5 No. 1, pp.63-64, viewed on 5 January 2022, <<https://doi.org/10.1017/s0376892900005294>>.
- Doyle, W. (2009), "Situated Practice: A Reflection on Person-Centered Classroom Management", *Theory Into Practice*, Taylor and Francis, Vol. 48 No. 2, Taylor & Francis, Ltd., pp. 156-59.
- Fernandes, P., Leite, C., Mouraz, A. and Figueiredo, C. (2012), "Curricular Contextualization: Tracking the Meanings of a Concept", *The Asia-Pacific Education Researcher*, Vol. 22 No. 4, pp.417-425.
- Gagné, K. (2013), "Gone with the Trees: Deciphering the Thar Desert's Recurring Droughts", *Current Anthropology*, Vol. 54 No. 4, pp.497-509.
- Georgiou, Y., Hadjichambis, A.Ch. and Hadjichambi, D. (2021), "Teachers' Perceptions on Environmental Citizenship: A Systematic Review of the Literature", *Sustainability*, Vol. 13 No. 5, p.2622.
- Goodson, I. and Deakin Crick, R. (2009), "Curriculum as narration: tales from the children of the colonised", *The Curriculum Journal*, Vol. 20 No. 3, pp. 225-236.
- Haydock, K. and Srivastava, H. (2017), "Environmental philosophies underlying the teaching of environmental education: a case study in India", *Environmental Education Research*, Vol. 25 No. 7, pp. 1038-1065.
- Kalbach, L. and Forester, L. (2006), "The world and the world: A lesson in critical literacy and its impact on student achievement and self-esteem", *Curriculum and Teaching Dialogue*, Vol. 8 No. 1-2, pp. 69-82.
- Kemp, A. (2006), "Engaging the environment: A case for a place-based curriculum", *Curriculum and Teaching Dialogue*, Vol. 8 No. 1/2, pp. 125-142.

- Ko, A. and Lee, J. (2003), "Teachers' perceptions of teaching environmental issues within the science curriculum: A Hong Kong perspective", *Journal of Science Education and Technology*, Vol. 12. No. 10, pp. 187-204.
- Kollmuss, A. and Agyeman, J. (2002), "Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to pro-environmental behavior?", *Environmental Education Research*, Vol. 8 No. 3, pp. 239-260, viewed on 5 February 2022, <<https://www.tandfonline.com/doi/pdf/10.1080/13504620220145401>>.
- Marsick, V.J. (2016), "Informal and incidental learning in the workplace", Taylor & Francis.
- NCERT 2018, Science textbook for Class VI, NCERT, pp. 155-156, viewed 30 December 2021, <<https://ncert.nic.in/textbook.php?fesc1=16-16>>.
- NCERT 2018, Science textbook for Class VII, NCERT, pp. 220-230, viewed 30 December 2021, <<https://ncert.nic.in/textbook.php?gesc1=18-18>>.
- NCERT 2005, National Curricular Framework 2005, NCERT, New Delhi, viewed 2 January 2022, <<https://ncert.nic.in/pdf/nc-framework/nf2005-english.pdf>>.
- Sadler, T.D. and Zeidler, D.L. (2004), "Patterns of informal reasoning in the context of socioscientific decision making", *Journal of Research in Science Teaching*, Vol. 42 No. 1, pp. 112-138.
- Schwandt, T.A. (1994), "Constructivist, interpretivist approaches to human inquiry", in NK Denzin & YS Lincoln (eds), *Handbook of Qualitative Research*. SAGE Publishing, pp. 118-137.
- Singh, J. (2012), "Assessment of environmental awareness and attitude among the school teachers in Bareilly city", *International Journal of Innovative Research & Development*, Vol. 1, pp. 486-492.
- Song, Y.I.K. (2012), "Crossroads of public art, nature and environmental education". *Environmental Education Research*, Vol. 18 No. 6, pp.797-813, viewed on 7 February 2022, <<https://doi.org/10.1080/13504622.2012.670208>>.
- Steele, A., Hives, L., Scott, J. and English, R.M. (2016), "Stories of learning: Inquiry-based pathways of discovery through environmental education", *Cogent Education*, Vol. 3 No. 1, p.1202546.
- Taylor, P. and Mulhall, A. (2001), "Linking learning environments through agricultural experience — enhancing the learning process in rural primary schools", *International Journal of Educational Development*, Vol. 21 No. 2, pp. 135-148.

UNESCO (2005a). United Nations Decade of Education for Sustainable Development 2005-2014, Draft International Implementation Scheme. Paris.

Yamauchi, L. (2003), "Making school relevant for at-risk students: The Wai'anae High School Hawaiian Studies Program", *Journal of Education for Students Placed At-risk*, Vol. 8 No. 4, pp. 379-390.