International Conference on Research in Education and Science
www.icres.net May 18-21, 2023 Cappadocia, Turkiye www.istes.org

Adaptive Approaches of Primary School Teachers Facilitating Environmental Studies

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Abstract: This paper examines teachers' adaptive approaches with regard to Environmental Studies (EVS) within primary classrooms of government schools located in suburban Mumbai in India. 'Environmental Studies' (EVS), is a significant aspect of school curricula; integrating concepts and issues of science, social studies and environment education. While the effectiveness of curricular activities and materials for EVS in fostering student learning is often examined, teachers' implementation of these resources have received relatively inadequate attention in scholarly research. The local conditions in government schools, as well as the nature of reform curriculum and teacher training form the background to the complexities involved in adaptive teaching. We find that different adaptive methods are developed by some teachers over time in response to their documentation of local concerns and resources. We also find that the teachers' strong sense of professional agency is reflected in their explorations with curriculum-adaptation possibilities. Additionally, teachers' varying levels of trust in the design of existing textbook activities may affect their pedagogical decisions. We propose that delving into teachers' local knowledge provides insights into their perspectives and practices regarding student learning. Studying teachers' adaptive approaches is therefore imperative, and has critical implications for curriculum design and teacher professional development efforts.

Keywords: Environmental education, Teacher practice, Curriculum activities

Citation: Vyas, T. & Dalvi, G. (2023). Adaptive approaches of primary school teachers facilitating Environmental Studies. In M. Koc, O. T. Ozturk & M. L. Ciddi (Eds.), *Proceedings of ICRES 2023--International Conference on Research in Education and Science* (pp. 1567-1588), Cappadocia, Turkiye. ISTES Organization.

Introduction

In accordance with the Education for Sustainable Development Goals (ESD) (UNESCO, 1992), the National Curriculum Framework (NCF) 2005 in India integrates the concepts and issues of science (physical, chemical and biological), social studies (history, geography, civics, society, culture) and environment education (protection and conservation) under the subject Environmental Studies (EVS) for primary grades as part of

formal school curriculum. The National Focus Group on Curriculum, Syllabus and Textbooks recommends EVS syllabus at the primary grade level, 'to introduce ways of looking at the natural and social world in the form of activities, ways of data collection, and making sense out of them" (NCERT 2006a). Due to the predominance of textbooks in the Indian educational system (Clarke, 2001; Sarangapani, 2003); EVS materials and pedagogy efforts in India struggled with synthesizing the syllabus intent, learner context and textbook use in classrooms (Chhokar and Chandrasekharan, 2006). To combat this dominance of prescriptive textbooks and to improve EVS teaching and learning, the National Curriculum Framework (NCF) 2005 introduced reforms. The reform-led EVS textbooks include a variety of teaching-learning methodologies under theme-based lessons, to involve children in relating to their immediate environment through a variety of activities, opportunities to ask questions and ways to explore answers themselves (Pingel, 2009). Studies are being conducted gradually to examine teachers' perspectives, beliefs, knowledge, and professional growth in relation to the NCF-2005 reforms; and the textbook serving as a key manifestation of this change has become an important element of these studies. But empirical studies on teachers' conduct of EVS textbook activities have been neglected (Nawani, 2010; Batra 2005). Although initiatives to improve EVS curricula are significant, it is understood that they will not have the desired effects unless they are combined with suitable modifications to teacher education curricula and teacher preparation (Ravindranath, 2007). One of the criticisms leveled at teacher education in India is that it does not reflect the needs and realities of the communities in which it operates, and that teacher education programs should be structured and modified in a way that enables their teacher graduates to respond dynamically to the new problems and challenges in the field of education (Chitra, 2019). It has also been found that conventional teaching techniques are used by trainers to provide teachers instruction on the reform pedagogy's content (Clarke, 2003). Teachers in the in-service training modules do not actively participate in the learning process; they hardly ever raise questions or engage the trainers in debate or discussion. Most crucially, teachers' classroom experiences are not examined and validated in light of the new instructional methodology, notes Clarke (2003). Thus, teachers' abilities and experiences are not taken into account throughout training, which in turn translates into teachers' constrained perspectives of children as learners possessing unique experiences and abilities.

Curriculum adaptation is an ongoing process that changes the regular prescribed curriculum by modifying or adapting it in terms of the content or delivery of instruction to meet the learning requirements of students (McLaughlin, 1993). While the phenomenon of curriculum adaptation is ubiquitous, still it is poorly understood – "it remains unacknowledged; it is described as a complex clinical skill beyond the ken of most classroom teachers; it is regarded as a mysterious, unanalyzable feature idiosyncratic to every teacher and every classroom; or most frequently, buried in elaborate discussions on individualized instruction" (Hunt, 2016). Undoubtedly, adaptation is a crucial component of teaching. Individual students have unique features, schools are "very dynamic and fluid working settings" (Collie et al., 2018), and any school day is infused with "change, unpredictability, novelty, uncertainty, and transition" (Martin, 2017). Researchers across disciplines overs the years have used various terminologies for adaptive teaching, such as teacher flexibility (Leikin and Dinur, 2007), improvisation (Lobman, 2005), modifications (Denton et al., 2007), adaptive teaching (Vogt and Rogalla, 2009), and so on. It's interesting to see that scholars operationalized the idea of adaptive teaching similarly,

despite differences in nomenclature. Their definitions frequently emphasized teachers' meeting the needs of students and included teachers' response to a stimulus (or stimuli) (Parsons et. al., 2017). In line with these definitions, adaptation is conceptualized for our study as marked by one or more of the following observations – when the teacher verbally announces an alteration to the textbook activity or instruction in response to an external stimulus; and/or makes a change in the activity or instruction based on student response. No curriculum is used uncritically or without adaptation, and adaptation is a key step in how teachers use curriculum materials (Ben-Peretz, 1990). However, studies to comprehend this process explicitly in the context of teacher implementation of activities within reform-inspired EVS education in India are limited. Considering this need, we focus on teacher adaptation approaches along with their reflections on their approaches. Evidence from both research and practice shows that teaching in reform-oriented ways requires teachers to adapt curriculum and instruction while teaching (Drake & Sherin, 2002). In order for curricula to serve as a tool for reform, teachers must be encouraged and supported to make modifications that uphold the reform-focused objectives of the curricular materials while catering to the requirements of their students and unique teaching environments. Given this complexity, we think it's essential to look at how teachers employ reform-based curriculum and, in particular, to identify configurations in the curricular modifications that teachers make.

Method

Through this study we aim to study teacher views and practices of conducting EVS activities in government primary schools of Mumbai. Our study is guided by the following research question: How do primary school teachers view and adapt Environmental Studies (EVS) activities in government-run schools in suburban Mumbai? Teacher practices have been studied using both large scale studies (Schumm et al., 1994; Pettigrew et al., 2013; Zangori et al., 2013) and in-depth cases (Ramchand, 2021; Xiaodong, 2001; Sharma, 2008). Since there is a lack of studies in EVS teacher practice in the Indian context, we prefer in-depth inquiry to understand the complexity of the phenomenon situated within school settings. We used a combination of ethnography and a multi-case study approach. An ethnographic study is largely based on qualitative methodologies and places importance to the narratives of individuals involved in the concerned area of research (Brown et al., 2017). Multiple case studies are useful when there is limited prior information about a phenomenon, and it allows for inclusion of more instances thereby making it possible to make compelling interpretations (Zach, 2006). Since there is limited knowledge about teacher practices in relation to the context of this study, this research design is appropriate. The study was conducted with 15 teachers across 4 government-run schools. The State-board textbooks were being used by the participants. In the primary grades, the EVS teachers teach multiple subjects. Permission for school access was obtained and participant consent was ensured before beginning the study. The participant names are replaced by pseudonyms in the paper. Data collection was performed across 6 months. The researcher conducted interviews of teachers about their approaches towards conducting EVS activities and; observed, audio recorded and took notes of parts of the EVS sessions across the three grades. Average number of students per class ranged from 40 to 60.

Results

We see a range of different approaches in teachers' implementation of textbook activities – such as eliminating, restricting and expanding sections of a task. We refer to the activities as – 'observation' task, 'definitive' task, and 'inquiry task' based on what the students are primarily expected to do in the task. These activities could not be chosen a priori by the researcher, as their selection by the teacher varied according to the chapter in progress.

Approaches to an observation task: (The activity required the students to identify which of the listed food items are usually served with larger spoons/ ladles and which ones are served with small spoons). Ameena, spent 5-10 minutes discussing different aspects of the meal context – "what did you all have for dinner last night?" After she gathered some responses, she asked the questions from the textbook activity. When she realized that her students were unable to appropriately mention the food item quantities, she photographed students' lunch box images and asked them to analyze the meals from the photos. Similarly, when Sheena realized that her students faced difficulties with the task, she drew her own lunch-plate on the blackboard and then asked students to prepare paper cut-outs representing their own meal plates from lunch or dinner time. She gave the students extra time to draw different types of food items and stick them onto paper plates. She even asked probing questions to help students share about the proportion of various food items on their plate. She incorporated students' spontaneous questions such as "why does my mother always serve less pickles, while I want lots of it?". On the other hand, Amruta avoided this task from her lesson saying "this activity is not so important, you all would know the answers, it is very easy". In the case of Devika, we see a minor adjustment. She followed the task as is from the textbook, but took help from a photo-illustration of a meal plate shown in the textbook and asked students to point at the meal item in correspondence to their answers. She spent around 5-7 minutes to complete the entire activity. Avni spent the first 15 minutes verbally explaining the background of why some types of food are served in small quantities and other types of food in large quantities. She then began asking questions from the task. She, unlike all other teachers, framed the activity around the purpose of doing the activity. The rest of the activity was done as per the textbook directions – by drawing a table for writing names of food items under respective headings – 'large spoon' or 'very small spoon'.

In case of another activity from the chapter on transport (The activity contains a picture prompt. The picture shows some vehicles on a road lined with some plants/ trees. The question is: State the difference between the plants close to the road and those far away from the road based on the following points – freshness of leaves, colour of leaves and appearance of plants). We see certain additions by teachers. This activity was provided in the textbook, and it required students to observe an image and then answer corresponding questions. However, Prajakta initiated a discussion saying, "Do you hear any noise? This noise is coming from outside. Can you see?". Prajakta turned the students' attention to the trucks unloading construction material adjacent to the school. She then took the students out into the schoolground and asked them to spot plants in the vicinity, both near the school's inner ground and outer ground (the outer ground was closer to the construction site). She then asked them to observe the texture and colour of the leaves on the plants in the two grounds. As opposed to

Prajakta, Nilima used the same activity but used a few different images from her phone which she had captured from around her own neighborhood. She repeatedly mentioned, “all these images that I am showing are real photos that I have clicked. So that you can see the leaves in detail. You must observe the difference in the colour and texture of leaves in various parts of your neighborhood also”.

Approaches to a definitive task: (The activity required students to fill in the blanks in sentences about oral hygiene). In her approach to the definitive task, Parul asked questions about oral hygiene in the sequence of the ‘fill in the blanks’ as given in the textbook and then asked the students to make a larger chart on which they were to write the same information from the textbook but with few drawings of the process of brushing teeth. Whereas, Rekha added an extended discussion while conducting the same task. First, she asked a few basic questions – “Why should we keep our teeth clean? How do we keep our teeth clean? When should we brush our teeth?”. Then, she asked the students to draw “happy teeth and sad teeth” in their notebooks. Next, she initiated an elaborate discussion about what types of toothpastes are better, while emphasizing that students must look for “toothpastes with natural ingredients” in order to have “happy teeth” along with their “usual practice of brushing twice a day as mentioned in the textbook”. Rekha used her mobile phone to show images off the internet of certain “natural ingredients” such as cloves, salt and mint leaves. It is important to note here that Rekha was aware of an upcoming school exhibition which had the theme of organic and eco-friendly living. Rekha initiated a ‘happy teeth sad teeth’ poster making activity from the ‘fill in the blanks’ activity keeping in mind the exhibition theme. In contrast to Parul and Rekha, Amit read out all the points of the task and gave the answers by himself, stating that “you all already know the answer to these questions”.

Approaches to an inquiry task: (The activity required the students to fill a large container with water, collect the materials listed, and observe which of the materials float and which of them sink). While attempting the inquiry task ‘float or sink’, we again see some very different approaches by teachers. Kapil and Maria followed the activity exactly the way it was given in the textbook, but with slight differences. When Kapil realized that the students gave a few wrong answers, he paused to ask the students about their answer. He asked them to think why an object might float or sink, but did not spend much time waiting for students’ response. Also, he did not include a wide range of objects, and picked only a few objects from the textbook list as part of his discussions. Maria, on the other hand, followed the activity by spending more time on resolving students’ queries such as “what will happen to the objects if the water is replaced with oil?”. However, neither Kapil nor Maria attempted to physically do the activity in class. They only used discussions and questioning.

In contrast to Kapil and Maria, when Zareena conducted the ‘float or sink’ activity, she spent more time asking students questions about which of the objects provided in the list would sink or float. She then asked them to bring some objects from home and promised to dedicate a Saturday (designated as activity day by her school) to experimenting with more objects. She thus extended the time of the activity beyond normal class sessions. Amar conducted a lesson that had already been covered by Gauri (in the absence of Amar as he was on leave). In this activity, students had to collect some objects mentioned in the activity and drop them in water to check whether they sank or not. Gauri had conducted the activity by reading it in class, and stating the outcome of the activity

as mentioned in the textbook – "As time is short you all will do this at home. When you do this activity, you will find that things that float are lighter than water and things that sink are heavier". She went over each of the objects and gave the answer as to which one would float or sink. She had asked the students to do the activity as homework and write their findings in their notebooks.

In contrast to Gauri, Amar introduced "guessing". He first checked whether students knew the answers to the exercise. Interestingly, Amar did not ask the students how they knew the answers. Here, Amar initiated the exercise by saying, "... you all must have copied answers from each other or seen the picture in the textbook and written the answers. But then you have not experimented enough". Amar can be seen explicitly mentioning the relevance of the adaptation he wishes to make, by describing the premise. He then asked five students to walk around the school and collect different small objects, thus providing an opportunity for out-of-classroom exploration. As the students went to hunt for several small objects, Amar got a small plastic tub filled with water. He divided the class into two teams, thus changing the participant structures. The objects brought by the students were assembled neatly besides the tub. He proceeded by writing 'team A' and 'team B' on the blackboard. Right before beginning the activity, a student spoke of how he plays with paper boats with his friends and that he knows that a paper boat would float but a simple piece of paper would get soaked and sink quickly. Amar incorporated the student's response and initiated a few more questions – "What do you think will happen if we make a crumpled paper ball and throw it on water?". After a while, Amar began the activity – "I will call a student from each team turn by turn. That student will drop one of these objects in the tub. But before dropping the object into the tub you all have to guess whether the object will sink or float. The team with the correct guess will get a point. Ready?". Once the activity was over, he said, "You all might have done this activity in haste, but did you see how you got confused with some objects? Some objects had different types of materials with different properties. So, you don't know what might happen when they are dropped in water". Here we see that Amar attempted to change the amount of time spent on an activity, he emphasized the activity's goal of experimentation and conducted extended discussions on properties of objects.

Discussion

Although there has been significant discussion about the need for curriculum and textbook reform over more than a decade, viewing teachers as more than implementers of the textbooks is a perspective missing from the education dialogue in India. In our study with 15 participants – we observe that some teachers adhere to the textbook activity with minor modifications, some teachers personalize activities, and others either attempt modifications while inserting new activities or; attempt parts of or avoid activities. Thus, we find that teachers' adaptation approaches of the activities are varied.

Firstly, the majority of the teachers in our sample pursuing the textbook activities through different approaches, is a finding commonly present in research elsewhere with teachers newly experiencing reforms (Remillard, 2005; Glasnović and Jukić, 2021; Singal et. al., 2018; Dar, 2021; Bianchini and Kelly, 2003). Yet this finding

has significant implications for a context where the textbook is considered the prime resource for teachers, which is the case with EVS textbooks in India. As is evident, that teachers tend to rely on their own methods of instruction or spend efforts gathering supplementary material from other sources. As a result, the reforms introduced through the textbook and allied material may not be utilized as envisioned. Secondly, by focusing on a range of teachers across four government schools, who were predominantly adhering to the textbook activities though with a range of different adaptation approaches, we were able to investigate teachers' capacities to design various experiences for the students in their process of engaging with the affordances of the textbook activities. We see different ways of mobilizing their pedagogical capacities around tasks. Recognizing that teachers' approaches are not identical is important in terms of not just curriculum designing but also the associated teacher support. Small scale initiatives are starting in science education (Ramadas, 2017) – where teachers' varied experiences with curriculum contributes to curriculum design. Yet, such studies are almost absent in primary EVS in India. We find that teachers have varying approaches to the activities in the textbooks, however it is important to note here that our findings do not imply that the teachers will always teach in these ways. Thus, these are not fixed labels for teachers, rather indicators to help situate teachers' work in relation to the textbooks.

Adhering to the textbook activity with minor modifications

Devika, Kapil, Parul and Maria, four teachers, were observed to supplement the textbook activities with small additions and modifications, but mostly treating the textbook as a script. In a way, these teachers may be seen as "adhering" to the textbook (Nicol & Crespo, 2006), which means that the textbook is being considered as an authority by these teachers. This commitment does not, however, imply that these teachers always agreed with the content and design of the textbook. Devika and Parul, two of the teachers, highlighted what they felt to be a number of problems with the textbook activities. For instance, Devika expressed her displeasure with the textbooks and noted that the writers had overemphasized community-based exercises. She mentioned how an activity was incongruent to the social situations in student families.

"Activities are beneficial, but some of them are very strange. For example, this one (points to the textbook) – 'write an application to the school administration requesting that parents be allowed to run the school for a day'. Do parents have so much time? They drop the children to school, go to work, ask the grandparents to take care of children once they are back from school, and even send the grandparents for parent-teaching meetings. The grandparents come here reluctant, clueless and helpless." – Devika

When it came to her lessons, Devika was seen concentrating on most of the assignments from the textbook, trying all the different kinds of questions, and very occasionally modifying activities. She mentioned, "a textbook is ultimately like our sacred text, we must follow it". The 'official' status of the textbook itself may be one cause for such a difference between the teacher's opinions about the textbook and her instruction. She considered it a part of her job in the government school to follow and conform with this curriculum, which may have contributed to her allegiance to the textbook assignments. Since the teacher has delegated the agency to the

textbook, the pervasiveness of the textbook culture also suggests that the teacher herself did not conceptualize her instruction as being shaped by her own views. Because of this, even though they disagreed with the textbook in some ways, Parul and Devika seemed to think that it had to be the main authoritative source of information (Kumar, 2005b) in their classes.

Understanding teacher practice also requires taking into account the institutional context in which the teachers work. Throughout the duration of our fieldwork, Devika (senior teacher) in particular was frequently asked to carry out a number of administrative tasks because few other senior teachers had recently retired and new teachers were not as experienced in administrative tasks. She continually emphasized how much time this took away from her, leaving little time for teaching. Maria and Kapil also stated how "schedule conflicts" (Maria) and "non-teaching responsibilities" (Kapil) made it difficult for them to give their lessons the attention they needed. Teachers' workload has often been discussed as a barrier in curriculum implementation (Rose and Sika, 2019), along with decreasing focus on pedagogical skills (Gitlin, 2001). Teachers must balance their numerous responsibilities and hence teachers like Devika and Parul may not be able to use their time to work on a suitable implementation approach for a task, amidst the institutional framework of the textbook culture, and work pressure. There was only one teacher, Kapil, who seemed to show closer alignment between his views and the way he conducted the textbook activities. He did not disagree with the way the textbook activities were structured. It's interesting to observe the contrasts between Kapil and Parul, who both follow the textbook's instructions; are from the same institution, have similar levels of expertise, and instruct the same grade. But the way they viewed the textbook activities was different. Neither of them noted how their professional training translated into their practice. Instead of noting any formal professional training inputs, Parul noted one short storytelling workshop she had referred to online during her preparation for World Environment Day celebrations, which she could "use in her EVS lessons on biodiversity". This workshop link was shared with her by a colleague who taught science in higher grades and had been organizing 'eco-club' events in schools where she worked earlier.

Personalizing activities

Prajakta, Rekha, and Zareena, three other teachers, could be seen taking a more active role in modifying the textbook activities to better reflect their own perspectives (personalizing) on environmental education pedagogy. They were seen organizing their teachings around some new activities and complimenting them with certain adaptations of the textbook activity. They gave greater priority to conducting activities, while still managing to complete the rest of the chapter sections through posing questions along with lectures. In Zareena and Prajakta's classes, they could be seen devoting time to certain activities in different ways than the textbook. They also decided which section of the activity was to be done during class-time and as homework. As the textbook does not indicate time-breakdown of sections of an activity, teachers exercised their agency in determining the same. When Zareena conducted the 'float or sink' activity, she spent more time asking students questions about which of the objects provided in the list would sink or float. She then asked them to bring some objects from home and promised to dedicate a Saturday to experimenting with more objects. Zareena was very clear about her decision

to “extend” the activity. She said, “This activity is rushed past by many teachers in my own child’s school or given as homework. Sometimes the teacher just gives away all the answers. But it is an important one, so it should be given extra time. The textbook must mark it as important or mandatory”. This decision in Zareena’s opinion was essential and she also makes a recommendation to have some activities to be especially marked as “mandatory” to be done with students in class. Prajakta mentioned that she introduces an activity on planets in the beginning of the chapter on solar system.

“I always teach the names and positions of the planets on my own. Right at the beginning of the chapter. Students must know and remember this basic information. I ask them to come in front of the class and then I arrange them as planets in the way it is shown in the textbook and help them to memorize their names and positions. I was taught this way when I was a child, and it works well. For this chapter, the textbook only has questions and no physical activity as such.” – Prajakta

Prajakta also began the lesson on transport through an activity rather than following the textbook headings. She explained her approach saying, “In some chapters they have put too many activities. Yet in some other chapters where hands-on activities are actually needed, there are only questions and answers with some small accompanying illustration which is not very helpful”. Rekha, Zareena, and Prajakta modified and added material because they felt it better reflected their personal interpretation of activities and their relevance for children's needs. Here, teachers used the textbook as a guide. They took pedagogical decisions in elaborating the activities (Nicol and Crespo, 2006). Teachers' perspectives on EVS learning must be taken into account in order to comprehend the motivations for this type of textbook implementation. Teachers seemed to find a mismatch between their expectations of “important” activities and availability of such activities in the textbook. Teachers consider certain activities as more relevant, and when they do not find the activities in the textbook as prominently present, their confidence over the textbook seems to diminish. Teachers' opinions regarding the (perceived) missing components in the textbook further demonstrate their lack of "curricular trust" (Drake and Sherin, 2009); in other words, these three teachers appeared not to trust the textbook and utilized their autonomy to tailor their implementation strategy. Because of this perceived deficiency and mistrust of the textbook, personalization emerged as a way to bridge the "gap" (what is lacking) between their objectives and what they observed in the textbooks. Teachers look for resources other than the textbook to aid in ‘personalisation’. Zareena sought ideas from Eco-club workshops at school, but mentioned her failure to attend such workshops “peacefully”.

“Sometimes, Eco-clubs happen and I look forward to them as I feel I could gain some new ideas from them to incorporate in the classroom. But I do not have the time to peacefully attend these workshops as I am busy organizing its events along with my other school-work” – Zareena

Zareena’s comments are in line with research on efforts of the National Green Corps (NGC) in India – the majority of school teachers, or "teachers in charge", report having little free time to devote to Eco-Club projects because they are overburdened with other teaching duties and school-related responsibilities. This is also a result

of the unavailability of qualified trainers and the dearth of high-quality training, both of which revealed a pattern of irregularities in the supervision and execution of the programme (Roberts, 2009). Moreover, the lecture style is predominant even in the teacher-trainings for EE, and there is no mandatory, uniform training (Personal conversation with a teacher educator from a teacher training college in Mumbai, Oct 3 2022). The NGC report suggests that in order to ensure organized learning and professional development, more practical strategies are required and are advised for the future. Few teachers also sought help from videos on social media as well as some privately published textbooks which they got from their own children who were studying in private schools. Nilima, Zareena, and Avni in particular talked on how they included them into their lessons. For instance, Nilima believed that the privately published textbooks had "larger and easily comprehensible" pictures which she could use with her students. Zareena mentioned using a video on her phone and some images from other textbooks showing night-sky constellations and asked her students to guess their names.

"The textbook asks teachers to arrange a night-sky watch with students and their parents. It is difficult to arrange this type of large event. Using images from elsewhere is the next best option." – Zareena

These teachers demonstrated the opposite pattern from Kapil, who placed his reliance on the textbooks. They believed the privately printed textbooks to be better than the state-produced textbooks in some cases. Due to their own children attending private schools, all three of the teachers had access to the privately-published textbooks.

"If our regular textbooks can have better support in terms of executing the activities, then children in the government school would also benefit. We would not have to hunt for support elsewhere". – Avni

In such a scenario where teachers' views on the official textbooks are divided and various other materials are affecting teachers' personalisation of the textbooks; it is essential to encourage effective teacher professional development initiatives that help primary school teachers comprehend, interact with, and use these textbook activities as they were really intended to be used – as robust yet flexible resource material empowering the teacher to create contextually relevant learning experiences.

Attempting modifications and inserting new activities

There were three teachers – Ameena, Amar and Sheena who did not criticize the textbook's structure or the activities. These teachers were rather appreciative of how the textbook was "flexible" to provide teachers the opportunity to see it as a "companion".

"It is like a companion in my teaching. I am free to pick and choose which activities are possible and required in my context, and take help from the textbook." – Ameena

"I often refer to various teacher-handbooks just as I refer to this textbook. It is like a tool to think with." – Amar

While these teachers are comfortable with the way EVS textbooks are, they do not use the tasks as described in the textbook, but instead modify them or add their own smaller activities. This presents a chance for us to discuss their own distinctive capabilities to consciously design their acts around the given activity in elaborate ways. Their intention to bring something new to the students' classroom experience echoes a shift towards seeing the teacher as an active agent in shaping the curriculum on the field. Earlier, curriculum reformers and developers depended on the notion that only high-quality resources created by experts could improve teaching, and that teachers would use those resources in the manner intended by the resource's creators (Clandinin & Connelly, 1992). They disregarded the teacher's function and her impact on instructional strategy, which reduced the teacher to only serving as a mediator for the material to reach students (Love & Pimm, 1996). However, the perception of the teacher's role within the curriculum setting has changed recently: from being seen as only a mediator between the curriculum and students to a developer of curriculum instructions (Brown, 2009; Remillard, 2005). According to Pepin et. al (2013), "teaching as design" refers to a dynamic and collaborative relationship between the teacher and the curriculum materials. Teachers use curriculum materials to organize lessons; they interpret and modify them as they develop instruction. This is referred to as the teachers' design capacity (Brown, 2009). It is also described as the teacher's capacity to identify and observe the potential of resources (Remillard, 2005). We notice this when Amar says that the textbook is a tool to think with. This interpretation and resource design continues in the implementation of lessons. We contend that Ameena, Amar and Sheena's opinions and use of the textbook could be conceptualized using this kind of teaching-as-design perspective.

Unlike teachers who describe how they use textbook activities; Ameena, Amar and Sheena believed that the adaptations were not a separate alteration or disruptive element but a naturally essential aspect of the textbook's implementation process. For instance, Sheena responded, "This exercise which I have thought of is part of the whole activity itself. It is part of how we must respond to student needs while conducting the activity.", showing that she did not see her additions as being all that different from the textbook. She also had a different perspective on the textbook activities than the teachers who personalized them. She and Ameena were the only teachers in the study who stressed that they would change teaching strategies based on student understanding as opposed to their own assumptions about how students must absorb EVS concepts. Discussing why Ameena, Sheena and Amar were such peculiar instances is crucial, particularly when opportunities to expand on such skills are minimal for teachers. Ameena explicitly stated that during her pre-service training she would make sure to attend internships in schools while most others in her batch would spend the internship-period completing pending assignments.

"I would observe senior teachers, and discuss my doubts with them. We would talk about student problems or our difficulties in preparing a lesson." – Ameena

Sheena mentioned diligently using the resource material provided to her at a skill-enrichment camp organized at her school. She had won an award during a workshop for making eco-friendly teaching-learning material and she had received an invitation to host a session at the next event. Sheena repeatedly stated the importance of

such incentives in making her feel confident about her work as a teacher and her contentment in sharing her learning with her colleagues.

In India, teachers' reflective practice is hampered by a summative learning strategy that emphasizes exam achievement and rote learning, which forces them to operate as a mere intermediary who transmits textbook material (Samuel, 2019). But we find that Ameena's case reveals a unique instance. Ameena kept an activity-register, in which she would note down new activities or even some small issues encountered while interacting with students. She mentioned that she developed this habit when she shifted from being a teacher in a private school to the current government school. She noted, "I moved to this locality as my family moved here. This school was the nearest. But I took some time to get accustomed to the atmosphere and students of this school. Maintaining my own activity register helped. I often refer back to the activities to see what worked and what were the issues. Initially some of my colleagues would laugh at me, but then slowly a couple of them also got into this habit as they felt it helped them to understand their students better." Ameena's decision to use her phone to capture pictures of students' lunch-boxes was not an in-the-moment decision. She explained, "I had noted down that children often make mistakes in giving answers in this activity. This left me puzzled, because it is quite a simple activity. So, a week before this class I took photos of my own meal. I also decided to capture students' lunch-box photos and then asked them to observe quantities of various food items. I showed all these pictures to them. I realized that they were making mistakes because their own food items were quite different from the food items in the textbook, and the quantity of items varied too." Thus, we see how Ameena's focus on documenting challenges pertaining to students' learning needs is an important aspect of her daily practice. Here, we see that more than just being able to respond to change, adaptability also involves putting the needs of the students ahead of even the best-laid plans. We align with Wender's (2021) description of adaptability as more than "just being ready to adjust to change". In Rekha's case, she extended the 'fill in the blanks' activity about oral hygiene to a poster activity, based on her awareness of the 'organic and eco-friendly living' themed school-exhibition. Here, her purpose for adapting the textbook activity was determined by a situation other than purely increasing student participation. She was also meant to lead the preparation of a tableau in the school foyer on the theme of oral hygiene. Rekha's own views about this event were mixed. She said, "I am supposed to guide the students into making a huge thermocol tooth and toothbrush and install it in the foyer. On the one hand the textbook teaches about protecting the environment, and here we have been given thermocol. Those posters showing organic toothpaste-ingredients which we made as part of the classroom activity will be hung around that tooth. Inspectors will be coming to visit, so it all needs to look grand."

The above examples show that some teachers seemed to allow more time for students to engage with activities, and attempted to provide support depending on student needs. This suggests that they intentionally created and extended their own curriculum, proving that active planning was employed by them.

Attempting parts of or avoiding activities

Three of the fifteen teachers – Amruta, Gauri and Amit, held very brief sessions for their EVS classes (around

25 minutes long) as compared to the other subjects they taught; and only attempted a few activities from the textbook. Unlike other teachers, they did not consider EVS to be as important a subject as the rest of subjects. They would often assume that the activities provided in the textbook need not be conducted in the class as these activities "do not require class time" (Amit) or "are unnecessarily far too many" (Gauri). These teachers neglected activities, and EVS as a subject. There are a number of reasons for this kind of textbook avoidance and subject neglect. First, they mentioned that "something concrete" (Amit) and "usual question and answer type" (Amruta) exercises were expected by the student's parents in terms of written classwork, and hence these teachers put more emphasis on fact-based tasks. Accountability pressures experienced by teachers have been mentioned in previous research as well, wherein "teachers argue that instructional time is considered to be well spent by school administrators and parents if it is used in direct lecturing" (Bansal, 2018). For parents, effective teaching is marked by order, memorization, and homework that emphasizes reading and writing; eventually perceived as leading to satisfactory performance in exams and subsequent access to professional opportunities (Sriprakash, 2012).

"Parents want to see something concrete in their ward's notebooks such as 'fill in the blanks' or usual 'question and answer' or 'essay'." – Amit

"Children's parents are just seeing EVS as any other subject in which rote learning works like history facts or mathematics formulae. All rote, rote, rote. So, they expect us to dedicate more time for written classwork and less for activities." – Amruta

Second, the teachers were in charge of teaching all subjects, EVS included. They distributed their time across subjects according to their choice. For instance, Amruta and Amit spent less time on EVS subject lessons. Amit who spent around 25 minutes on an EVS lesson explained how he would "cover just the important activities". The "important activities" which he prefers to spend time on, are essentially fact-based questions or tasks for which answers could be easily found in the chapter text. Similarly, Gauri seemed to avoid the activities which specifically required her to invite student experiences. In Gauri's case, we see a similar situation. When she began a chapter about biodiversity, she asked her students to describe a forest and note down all that they see in a forest. When one of the students spoke of having seen garbage lying around during his visit to a forest, Gauri paused and brought the conversation back to the image in the textbook listing green leaves, huge trees, colorful birds and animals, a pond and so on. Gauri's discomfort with the student's response became clear when she said (in post-observation interview), "I was not sure whether to take the discussion forward. It would have been a deviation from the textbook topic which we were studying at that point and I was not sure what that discussion might have led to". One of the criticisms of teacher education in India is that it doesn't take into account the requirements and conditions of the contexts where it operates. Since "teacher training is predominantly academic and theoretical; and socially, economically and environmentally dislocated" (Ravindranath, 2007), teacher candidates struggle to connect their instruction to real local concerns and are inadequately aware of the sociocultural, economic, and environmental factors at play in the communities in which they teach. Furthermore, teachers could be confused about what subjects are suitable for their students to discuss and

understand (Hartsfield and Kimmel, 2020; Oulton et al., 2004). All students and teachers come to the classroom with diverse experiences and worldviews, which may influence their comfort level and willingness to discuss sensitive subjects.

Third, there was a sense of hesitation and low self-confidence about teaching EVS in these teachers. Amruta expressed that she did not consider herself an "expert" of this subject because it seemed to require a special set of competencies as compared to other subjects. This comment echoes previous research on the need for specialized training for environmental education (Ravindranath, 2007). Another reason expressed by Amruta for making her feel hesitant to teach this subject was its distance from how she was taught this subject during her own school days.

"We were never taught this way. We never even had something called EVS in our school days. I just remember the 'good habits and bad habits' chart which used to be hung on our classroom wall. I remember we had a moral science textbook, which said plant trees and be kind, and our teacher would just ask us to repeat sentences after her. Not many hands-on 'EVS' activities like they have now. So, I have to put in more effort in comprehending these activities, and sometimes I do not know how to go beyond verbal examples." – Amruta

Research on teacher challenges with EVS has found similar issues, which raises important questions about whether current training practices are adequate in providing teachers with the skills for activity-pedagogy for EVS (Dogra, 2013). It also shows how the textbook activities might appear complicated for some teachers, and might affect their confidence in adapting the activities to their context. Anxiety can increase when a textbook presents itself in a complicated manner and requires careful and deep study (Bapat & Takker, 2016).

Conclusion

We believe that teachers attempt to strike a balance between accurate curriculum application and essential modification while implementing EVS activities. While a majority of teachers in our study adhere to textbook activities; we found that they follow, omit, extend, edit and modify activities in varying measures; and sometimes even insert new activities. This finding is important in a scenario where claims of teachers' over-reliance on EVS textbooks are dominant (Ravindranath, 2007). The significance of this finding lies in the way it allows us to reconceptualize curriculum adaptation. In line with Wender (2021), when we broaden the notion of adaptability to include instances of actively looking for opportunities for modifying activities prioritizing student learning, adaptability starts to resemble more of a viewpoint or an approach or an outlook than just a strategy for dealing with uncertainty. The evidence for this argument can be found in teachers systematically tracking their own and students' learning (Ameena and Amar's case); actively tapping into out-of-classroom opportunities to conduct textbook activities (which may/may not mention an 'outdoor' component) (Prajakta's case), seeking collegiality and professional support to aid activity implementation (Ameena, Sheena, Amar's case), and employing local resources beyond textbook (Nilima, Zareena and Avni's case). These methods are

developed by teachers over time in response to their documentation of local concerns and resources. As stated by Mascarenhas et. al (2012), adaptive teachers are those who are constantly aware of the potential ways they may modify their instruction to better support students' learning. This finding has implications for how training needs to acknowledge teachers' local knowledge of supporting student learning. The term "local knowledge" refers to knowledge that is based on experience and reproduced in a culturally specific environment (WINKLERPRINS. (n.d.).). We also find that the teachers' strong sense of professional agency was reflected in their explorations with curriculum-adaptation possibilities while critically contemplating textbook goals. Here, we align with previous research which suggests that teachers who have a strong sense of professional agency see a lot more possibilities in terms of nurturing transformative curricula (Dyer et. al, 2004). We contend that teachers' adaptation of activities is encompassed not only by their views about reform-oriented EVS pedagogy; but also, by how they view their own abilities to engage with the textbook content.

This contention arises from instances of teachers' omitting or modifying certain aspects of an activity due to their feeling of being a 'non-expert' (Amruta's case), teachers' level of trust in textbook activity design (for instance, Devika's comment about an activity involving community participation; or Amar's comment about using the textbook as a tool to think with), dependence on availability of appropriate logistics and resources (Zareena's comment on arranging the night-sky watch activity), and teachers feeling under-confident in their ability to conduct certain activities owing to their experiences of how this subject was taught to them during their school days or as part of professional training (Amruta's case). Thus, some activities seemed complicated for the teachers. The possibilities of adapting activities are limited for these teachers by a deficit interpretation of their setting, which they may also apply to themselves. This amounts to teachers' varying confidence in the viability of policy proposals encouraging child-centered, activity-based learning under the current system (Dyer et al. 2004). Without addressing this problem, ongoing efforts to improve teachers' adaptive capacities are likely to encounter obstacles since training-messages may not sufficiently support teachers' confidence in their own capacity to make a difference (Pryor, 1998).

Recommendations

The several ways that primary school teachers use EVS textbooks are examined in this study. Insights from the study expand our knowledge of how teachers interact with textbook activities in a setting where the "textbook culture" (Kumar, 1988) is pervasive. The development of textbooks and teacher education can both benefit from the study's findings. The study contends that teacher professional development for reform-oriented textbooks must include teachers' local knowledge and experience. Recognizing that teachers' involvement with textbooks varies emphasizes the need for establishment of suitable teacher education support to build teachers' pedagogical design capacities. The relationship between the teacher and the EVS textbook activities must be adequately taken into consideration especially when future curricular changes are likely as a result of the new National Education Policy 2020 (NEP 2020).

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