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Barriers to environmental education in Ethiopia: do they differ from a global analysis?

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ABSTRACT

Environmental education in primary schools plays a critical role in fostering pro-environmental values and behavior among young children. However, multiple contextual barriers hinder the teaching of environmental issues in schools. Drawing on the evident gap observed in Ethiopian primary teachers' beliefs and actual practices, the study elucidates the major barriers teachers encounter in teaching environmental issues. Interviews, grounded in phenomenology, were conducted with teachers in four primary schools. The analysis outlined four ranked categories: training and capacity, administrative and logistical, safety concerns, and attitudinal. Most teachers feel hindered by their lack of pedagogical knowledge for teaching children. While most of the barriers are common in global analyses, the current study also identified noble barriers. Suggestions for tackling the barriers and areas for further inquiry are discussed.

KEYWORDS

Barriers to teaching; environmental education; Ethiopia; phenomenological study; primary school teachers; pedagogical knowledge

Introduction

The critical role of environmental education (EE) in confronting environmental crises is well documented in the global literature. School education and teachers have a paramount role to play in developing environmentally literate people and moving citizens to act for the well-being of the environment (Braus et al., 2022; Post & Meng, 2018; Timm & Barth, 2021). However, addressing EE in schools has never been an easy job for teachers (Kim & Fortner, 2006, p. 15). Teachers' efforts to integrate and properly teach environmental issues in schools are impeded by multiple barriers (Anderson & Jacobson, 2018; Green & Somerville, 2015)

This study grew out of the environmental education (EE) rhetoric-reality gap unveiled in Ethiopian primary schools (Gugssa, 2023). As part of that work, an analysis was performed of teachers' beliefs and the actual teaching of environmental topics in four public schools in Ethiopia. The teachers believed that the delivery of the

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environmental content of textbooks should be supported by hands-on outdoor experiences and students taking local action. They unanimously opined that the traditional approach, which was "talk and chalk" and teacher-dominated, was incompatible with the nature of such content. The teachers' views were in concert with the experience-based strategies proposed by Ballantyne and Packer (2009) and by Stern et al. (2014). They (the teachers) seemed to assume that "confining learning exclusively to the four walls of a classroom just doesn't make sense" (Broda, 2007, p. 2).

Moreover, the curriculum framework of Ethiopia (Ministry of Education, 2009) stipulated that cultivating environmentally active students would only be achieved if opportunities were provided for students to take active roles in their learning through exploring, observing, first-hand experiences, and acting. Despite such stipulations and the fact that teachers favored learner-centered and experience-based strategies, the teachers' self-reported teaching approach tended to be frontal and classroom-based, and it relied on the use of textbooks. This evident mismatch subsequently led the author to delineate the factors that hinder the teaching of environmental issues in primary schools and compare the results with global reports.

A large body of research on the barriers to EE can be traced in the literature. However, most studies have been conducted in developed countries such as the US, UK, Canada, and Australia, and studies in developing countries are lacking (Anderson & Jacobson, 2018). The context of Ethiopia echoes this global trend where research on barriers to teaching environmental issues, particularly in primary schools is scarce. In this study barriers to EE and barriers to teaching environmental topics/issues are treated interchangeably.

Studies of barriers to EE

Despite the benefits of teaching environmental issues and proposed approaches, multiple factors impede teachers' efforts. These barriers differ based on a number of contextual variables and are more issue-specific than applied to every issue (Anderson & Jacobson, 2018; Kim & Fortner, 2006). The first seminal work by Ham and Sewing (1988), provided a vital framework for international studies of barriers to environmental education. The authors outlined four barriers: 1) conceptual—barriers stemming from lack of consensus about the scope and content of EE; 2) logistical—barriers stemming from lack of time, funding, instructional resources, and large class sizes; 3) educational—barriers stemming from teachers' misgivings about their competence; and 4) attitudinal—barriers stemming from teachers' attitudes about teaching environmental issues.

In a later study, Kim and Fortner (2006) classified barriers into internal and external. Whereas internal barriers stem from the individual teacher (including the teacher's attitude, content knowledge, and pedagogical knowledge), external barriers are those outside teacher's control (e.g. resources, time, and funding). The review by Evans et al. (2012) outlined three categories of barriers: grassroots, administrative, and conceptual. Grassroots barriers include lack of time, lack of pedagogical and content knowledge, overcrowded curriculum, and lack of training and capacity. The major administrative barriers were lack of funding and state standard tests. Conceptual barrier referred to the discrepancy between EE theory and school practices.

A substantial number of studies have been conducted to delineate and overcome the major inhibiting factors in the teaching of environmental issues both in and outside the classroom. I have identified and thoroughly scrutinized 18 major studies of barriers to EE in schools (Table 1). Based on my review, I generated five ranked categories:

1. State standards and time constraints (participants indicating time shortage, rigid curricular requirements, and state standard testing, hence less emphasis placed on EE)
2. Administrative and logistical barriers (participants mentioned shortages of budget, instructional materials, and support from administration and government)
3. Inadequate training and capacity (participants felt hindered by lack of expertise due to inadequate/ineffective initial training and further training)
4. Safety concerns (teachers feared potential risks, particularly outdoors, and refrained from taking students outside)
5. Attitudinal (emanating from teachers' lack of commitment and students' disinterest).

Methodology

Study design and participants

The study employed a phenomenological approach to delineate the barriers to EE in primary schools. Phenomenology seeks to describe and interpret the lived experiences of a phenomenon for a group of people (Patton, 2015; Van Manen, 2014). It explores the phenomenon from the perspective of individuals who experienced or are experiencing it (Matua & Van, 2015). Two dominant traditions of phenomenology can be traced in the literature: descriptive phenomenology originated from the work of Husserl, and interpretive or "Heideggerian hermeneutics", stemmed from the philosophy of Heidegger. The current study adopted descriptive phenomenology as it reveals the essence of a phenomenon as lived (i.e. the barriers encountered in teaching environmental topics) by a person who has had the experience (i.e. primary teachers) (Willis et al., 2016). The focus is on describing what all participants have in common and reducing their experiences of a phenomenon to the description of a universal essence (Creswell & Poth, 2018).

The study was carried out at four primary schools in Northwest Ethiopia. Two of the schools were located in inner-city Bahir Dar, while the other two schools were located in rural vicinities. A total of 17 Grades 3–6 teachers were recruited purposively. The principal inclusion criteria were teaching subjects that officially incorporated environmental topics (environmental science, integrated science, and social studies) and having long teaching experience. Six participants were male, while 11 were female. All the teachers had received pre-service training in fields such as biology, geography, and chemistry, and their teaching experiences ranged from 9 years to 40 years.

Table 1 . Reviewed studies of barriers to EE in schools.

Authors	Context and participants	Barriers identified				
		Administrative and logistical	Inadequate training and capacity	State standards and time constraints	Attitudinal	Safety concerns
Anderson and Jacobson (2018)	Primary teachers in Ecuador	✓	✓ *ineffective*		✓	✓
Cutter-Mackenzie (2010)	Primary and secondary teachers in Australia	✓		✓	✓	
Diaz et al. (2019)	School garden experts in USA	✓		✓		
Dillon and Dickie (2012)	Analysis of literature	✓	✓	✓		✓
Dring et al. (2020)	Elementary and high-school teachers in Canada	✓	✓	✓		
Dyment (2005)	K-12 administrators, teachers, and parents in Canada		✓	✓		
Edwards-Jones et al. (2018)	Teachers, headteachers, and project staff in England	✓	✓	✓		
Ernst (2007)	K–12 teachers in USA	✓		✓		
Ernst (2009)	Middle school teachers in USA	✓		✓		
Ernst (2014)	Early childhood educators in USA	✓		✓		✓
Evans et al. (2012)	Primary teachers and principals in Australia	✓	✓	✓	✓	
Fazio and Karrow (2013)	Teachers and administrators in Canada	✓	✓	✓		
Kim and Fortner (2006)	Secondary science teachers in USA	✓	✓	✓		
Lane et al. (2018)	Teachers in Turkey	✓		✓		✓
Moseley et al. (2010)	K-12 Teachers in USA	✓	✓	✓		
Patchen et al. (2022)	Teachers and principals in elementary schools in USA	✓		✓		✓
van Dijk-Wesselius et al. (2020)	Primary school teachers in the Netherlands		✓	✓		
Velempini et al. (2018)	Secondary school teachers in Botswana	✓	✓			

Data collection

Semi-structured interviews were held as they provided rich and diversified descriptions of teachers' experiences (Bevan, 2014; Shorey & Ng, 2022). I contacted each teacher separately and discussed the purpose of the project. This preliminary contact with teachers was an opportunity to establish a rapport with them. All participants signed an informed consent form, and I obtained ethical approval from the Norwegian Centre for Research Data (Ref. nr. 584605). Following key ethical procedures, times and places convenient to the teachers were identified. Thereafter, the teachers were asked the following core questions:

1. What barriers do you face in teaching environmental topics to your students?
2. In what ways do these barriers affect your teaching of environmental issues?
3. What do you suggest would improve the practices of teaching EE in the school?

Interviews lasting an average of 20 minutes were conducted in Amharic (the official language). The methodological underpinnings of phenomenology (Englander, 2016) were carefully followed before, during, and after interviews. I strived to "bracket out" my prior understandings and beliefs (Finlay, 2014), and listened to the teachers with an open mind, except when asking probing questions for elaboration and reflection. To preserve anonymity and confidentiality, taped recordings, field notes, and transcripts were fully protected, the names of the participating teachers were changed to pseudonyms, and school names were deidentified using alphabetical letters (schools A, B, C, and D).

Data analysis

I held back my original beliefs, contentions, and understandings about EE theories and practices, and strived to generate unbiased findings relating to the teachers' lived experiences. The interviews were transcribed verbatim in English. The thematic analysis for descriptive phenomenology was followed (Sundler et al., 2019). The process involved three major stages.

First, I read and reread each participant's account several times to establish familiarity and obtain an overall sense of their experiences. Second, I identified and highlighted meaningful statements and phrases. Then, meanings pertaining to the objective of the study were formulated. Meanings related to each other were compared to identify differences and similarities. Meanings that were similar in essence were tentatively organized into patterns. After a thorough scrutinization of the patterns, themes emerged. The process was iterative; themes were re-examined against meanings and the original dataset, and they were modified as necessary to ensure that each teacher's voice was captured. Third, and finally, the themes were explained through descriptive texts. Bracketing of presuppositions continued, and efforts were made to ensure that the reporting of the themes was grounded in the teachers' described experiences.

Rigor

Necessary steps were taken to ensure the rigor of the study. I made a list of my own biases, understandings, and expectations regarding the barriers to teaching environmental topics in EE and set them aside to avoid any risk of interference with the data collection and analysis. The lists were checked back and forth to ensure the research process reflected teachers' direct lived experiences. I found a "critical friend" (Smith & McGannon, 2018) at the Norwegian University of Science and Technology (NTNU). He closely inspected and commented on the data analysis and reporting process. Transcripts, meanings, and associated patterns were shared with him in order to appraise critically the development of meanings and themes. The report was also shared with six participating teachers to identify any gaps in the results and to generate additional data and insights—an important procedure known as member reflection (Smith & McGannon, 2018). Peer debriefing took place with teacher educators at NTNU, during which I gained important inputs. Moreover, I demonstrated the analysis procedure, from transcription and the formulation of meanings to the generation of themes and reporting of the findings. Direct quotes from the participants were included to support my interpretations.

Results

The interviewed teachers admitted that they had not been able to address environmental topics in the way that they would have liked. Engaging in environmental activities, exercises, and tasks specified in the textbooks seemed to be hampered by multiple factors. The analysis of teachers' responses distinguished four groups of barriers that ranked in order of importance: Inadequate training and capacity, administrative and logistical, safety concerns, and attitudinal.

Inadequate training and capacity

Lack of pre-service and in-service training on the strategies of EE was cited by the teachers as the most prevalent inhibiting factor. Most teachers reported a lack of expertise to teach environmental issues, which they attributed to lack of training opportunities. They admitted that they were not teaching environmental content by considering the values and principles of EE. The challenge appeared to be more pronounced for teachers in lower primary schools (Grades 1–4). During pre-service training, there was no course named environmental science that would have equipped teachers to teach the same course. They were trained in other subjects and assigned to teach environmental science to lower grades. The teachers mentioned that courses in pre-service education chiefly target subject content, instead of strategies for teaching environmental topics. Thus, teachers are required to deliver what they did not learn as pre-service trainees. The following statements illustrate the inadequacy of pre-service training:

> Well, during pre-service, we were trained to have knowledge about the subject content, not what and how to teach schoolchildren. Much credit was placed on pure physics,

> chemistry, and math content. I do not remember any training targeting how we teach particularly environmental issues to students. (Etenesh)

> I really lack the capacity to teach environmental issues, especially to children. I was not trained [in pre-service] on how to plan and implement environmental activities for primary students. I often teach based on my assumptions and general understanding. (Genet)

Lack of in-service training was identified as a critical barrier by all of the teachers. They had never accessed training opportunities for teaching mainly environmental subjects. Not only were the teachers inadequately prepared, but also they had never received in-service training. They appeared to be disenchanted with the in-service training opportunities and underlined that training was essential to develop their profession:

> I never received training […] the priority should have been training. To teach certain environmental topics, we have to be supported with relevant training. (Melkam)

> There are no capacity enhancing packages about environmental topics. We simply teach through our way, as our capacity permits. (Emebet)

Administrative and logistical barriers

Resources

The teachers mentioned that there was a serious shortage of resources to facilitate learning activities. The schools lacked science kits to integrate environmental concepts. The teachers resented that the lack of science kits affected not only the teaching of environmental topics but also other science concepts. My personal experiences and observations showed that private schools supply science kits and teachers did not face constraints. Furthermore, the schools were short of instructional aids relevant to environmental topics, and therefore the teachers cover the course content mainly by using a "talk and chalk" approach.

Alemu was uncomfortable with the instructional aids in the school. He felt that much of the environmental content needed aids, especially in the form of photographs and pictures, videos, and models, yet he had never availed these aids in the classroom. Alemu stated:

> If you can't physically show students degraded lands, you could show them pictures and videos. Also, instead of explaining how the wastes from the factory pollute the water bodies, it is better to illustrate through photographs. In the textbook, there are pictures drawn in black and white which makes it difficult to identify what the picture is depicting.

Resource constraint was more pronounced in School C, which had been established in recent years and had meager resources compared to the other three schools. The teachers indicated that their teaching depended heavily on textbooks, as they had little or no access to instructional material other than textbooks and chalk. Teachers in School D were grateful for the support rendered by Frances G. Cosco Foundation (now Partners in Education Ethiopia). The organization provided seedlings, water tanks, and expertise for the greening of the school. The school

established a schoolyard garden where students were encouraged to apply in practice the environmental activities indicated in the textbooks. Teachers felt that the school was privileged since it received financial and material support from the organization. Despite the relative advantage, the school was still challenged by a shortage of learning aids such as maps and models, as indicated by Gubay:

> [T]here are topics that require maps. I should have illustrated to students. For example, when the topic is about four countries located in the horn of Africa, Ethiopia, Eritrea, Djibouti, and Somalia, I simply orally present where these nations are located, instead of displaying maps.

Shortage of textbooks was identified as one of the most critical barriers in the schools. Not only had the teaching of environmental issues been seriously affected by the lack of textbooks but also teaching in general. The teachers reported that one textbook was provided for between six and ten students to use in turn, which caused problems in terms of fair use of the textbooks, which gave rise to students' complaints. The teachers were forced to take some time to write notes on the board so that students could copy them. The following statements are typical of those made by the teachers:

> Students do not have textbooks to bring to the classroom. In a single class of over sixty students, we have only nine textbooks […] there is a serious shortage of science textbooks. I write everything on the board, and then I explain it. (Etenesh)

> We got forty textbooks for three sections […] there are about eighty-eight students in each section. So, we are obliged to offer one book for eight students to use in a group. Each of them can't access the book fairly and sometimes they quarrel with each other. They complain about this problem throughout the year. (Degitu)

Large class size

The teachers noted that the classrooms had an average of 70 students, which presented a serious challenge when organizing participatory lessons. The large numbers of students in classes across all schools forced teachers to set aside the basic tenets of EE lessons, such as being interactive, locally situated, and both experiential- and problem-based. Most often, the teachers provided detailed explanations of environmental issues:

> In a single class, you will find over eighty-five students. There shouldn't have been over fifty to take them and facilitate outdoor experiences. (Degitu)

The degree of difficulty teachers faced in facilitating outdoor opportunities was apparent. Apart from the problems of taking students into the field, teachers bitterly complained about the difficulties in providing instruction in the classroom. Due to large numbers of students, topics that required fieldwork had been skipped and instead addressed orally in the classroom. The teachers also mentioned the issue of equity in taking one section to the field and ignoring other sections. In addition, they felt uncertain about handling students' behavior during fieldwork:

> I teach four sections […] I can't take one section separately because all are in the same grade and [have the same] curriculum. (Genet)

> The number of students is very large and most of the time they misbehave. It is tough to take all students and return them back safely. It is difficult these days to handle them here [in school], let alone taking them outside. They lack good manners. (Halima)

Budget and transportation

Budgetary constraints and lack of transportation were a deterrent to environmental lessons and activities. The teachers showed strong interest in organizing outdoor opportunities for their students. However, lack of budget and transportation inhibited them from applying outdoor learning. This forced the teachers to limit students' learning to within the walls of the classrooms:

> When you plan a field visit, transport should be secured. There are also other expenses. The school doesn't have such packages. So, we teach them in class … that is all! It is a luxury to plan that in my school. (Genet)

Etenesh was passionate about student excursions and field trips. She had an immense interest in linking the content of textbooks and activities to various outdoor opportunities. For instance, she wanted her students to visit a textile factory, Lake Tana, and Abay River (all located at the center of the city in which the school was located); the water bodies are located in and cross the city of Bahir Dar. Despite this, Etenesh resented the fact that majority of her students did not know about those water bodies located a few kilometers away from their school. She always made plans, but she had never taken her students to the sites, primarily because there was no budget allocated specifically for that purpose. The problem of lack of funds was also highlighted by Zewditu:

> There is poultry farming in Andasa [a nearby village]. I wish I could take students there. I have never seen it, either. There is no budget for such activities.

Furthermore, due to budgetary constraints, three of the schools were not able to support teachers' and students' efforts to plant trees, prepare seedbeds, and pick up trash. The efforts can be seen as part of the curriculum or students' voluntarism. Gardening tools, including a hoe, shovel, pickaxe, jars, and seedlings were needed to prepare seedbeds and plant trees in the schools. Degitu, a grade 3 environmental science teacher, noted that seedbed preparation activity was most often overlooked because the school was short of the necessary tools:

> It would be great if we can at least access resources prescribed in the textbook. For example, when we prepare seedbeds, there are necessary tools, like shovels and hoes, but the school has no such tools and I mostly explain the procedures in the classroom.

The teachers pointed out that students were deeply interested in planting trees and picking up trash in the school compound. However, despite the integration of such tasks into the curriculum, the teachers were compelled to skip them due to the lack of tools.

Administrative support

The support of school leadership was evidently poor. First, teachers were expected to pass through long procedures to secure transport, which was experienced as daunting. Therefore, they avoided submitting requests for transport to the school administration. Additionally, among the administrators, there was a poor attitude and poor understanding of the educational value of education outdoors. They were mainly engaged in supervising classroom teaching. Alemu and Emebet respectively said:

> the most serious problem is the bureaucracy, [which is] full of impediments. The procedure to secure transport is daunting. The knowledge and experience gained by students is not emphasized and valued. These factors pose hindrances to taking students on field visits.

> Lack of support from the management side is a critical challenge. You can find only chalk […] The school doesn't accept and facilitate our initiatives.

Safety concerns

Students' safety was identified as an important factor in hindering students' outdoor activities. Even though teachers are informed about the value of exposing students to natural and human-made systems, they felt they were not in a position to take risks due to fear of unforeseen incidents. They cited previous instances when their colleagues had taken students out of the classroom and accidents had occurred. The teachers reported injuries and even incidences of death outdoors, and therefore they avoided considering outdoor learning. They seemed to lack the capacity to organize outdoor activities, anticipate circumstances, and monitor and handle students' behavior. From teachers' utterances, it can be inferred that the fear of taking students outside stemmed from having little or no experience. They lacked the expertise to integrate environmental content with teaching outdoors:

> That is really risky! A teacher from a private school took students to Blue Nile Falls. One of the students drowned and died. I know it is good to take students to the field and show them natural features, but they are kids, they are not conscious of the dangers. (Hirut)

> If I take them to the field, and something goes wrong with students, I will be responsible […] I don't want to take risks. (Emebet)

Moreover, according to the teachers, parents feared for the well-being of their children outdoors, but the teachers and the school administration could not assure parents of the safety of students. Moreover, parents were not informed about the educational value of taking students on field trips. It seemed that for them, proper teaching was done by teachers in the classroom. According to the teachers, parents thought that spending time outdoors was a waste of time, and therefore they did not give permission for their children to leave school. More importantly, parents felt insecure about allowing their children to leave the school compound, and especially girls were not allowed to leave the school for fear of unnecessary sexual relationships:

> Students are not allowed by their parents to travel long distances. Parents are not happy with that. Girls in particular are not encouraged to leave home and school. (Dereje)

> parents feel that taking students outside or to remote areas is risky. They fear car accidents, animal attacks, and insect bites. (Hamelmal)

Attitudinal barriers

The teachers' responses also concerned attitudinal factors among teachers and students. Some of the teachers felt that they could not change anything. They were frustrated by how it was difficult to change classroom teaching and the school situation. The teachers considered that there was a series of challenges and believed it was futile to input efforts on their own. The belief that "I alone can't make a difference" seemed to be common to a few teachers. Those teachers refrained from taking small actions because they assumed that their actions would not be noticeable. The teachers appeared to be cognizant of the limitations of such beliefs:

> Hmm … how can I individually make changes? My sole efforts can't bring any change. I have that weakness […] Basically, this thinking is wrong. (Alemu)

Students' disinterest has become a critical barrier for not only EE but also other subjects. The teachers claimed that currently, students exhibited a lack of interest and motivation to attend lessons. Emebet and Melkam were worried about the students' lack of interest and felt discouraged to teach all subjects, let alone environmental topics. Moreover, some students were destitute, and some students engaged in small businesses to support themselves. The problem was, and is, widespread and beyond the teaching of environmental issues. The majority of students from schools A and B had low socioeconomic backgrounds. They were often starving when they arrived at school and could not concentrate on their lessons. by contrast, some students from schools C and D engaged in small businesses and therefore constantly missed classes. Particularly, businesses involving the sale of khat were common around school C and students spend most of the day collecting and selling khat. They learned how to make business, and consequently developed low interest in their schooling:

> Most students are from poor parents […] some are self-supporting. They attend lessons being starved […] sleep during classes. (Halima)

> Students nowadays develop low interest in learning. Khat is widespread in the area. Students are now being business-oriented and [have] developed a money-making mentality. They are not interested in learning. (Zemenu)

Discussion

Inspired by the gap between teachers' beliefs about pedagogical strategies and teachers' actual practices (Gugssa, 2023), this study aimed to outline the barriers to teaching EE in Ethiopian primary schools. Four categories of barriers were identified and they were ranked in order of importance as follows: 1) inadequate training and capacity, 2) administrative and logistical barriers, 3) safety concerns, and 4) attitudinal barriers. These barriers are consistent with those identified in previous empirical studies and reviews (Anderson & Jacobson, 2018; Dillon & Dickie, 2012; Ham & Sewing, 1988) and with the categories developed in the Introduction.

Inadequate training and capacity

The interviewed teachers felt that their current capacity was inadequate to apply the principles and pedagogical strategies of EE. This was due mainly to a lack of pre-service and in-service training in the theoretical and practical issues in EE. This finding supports findings from previous research in Australia (Evans et al., 2012), Botswana (Velempini et al., 2018), Canada (Dring et al., 2020), Greece (Spiropoulou et al., 2007), and Serbia (Stanišić & Maksić, 2014), suggesting that initial and further professional development opportunities on EE and education for sustainability are inadequate. The teachers also pointed out that courses taken during the pre-service training were content-loaded and subject-specific, with less focus on strategies of teaching environmental issues to children. Similarly, although elementary teachers in Ecuador received training, it was ineffective to equip teachers with the knowledge and skills to teach their pupils (Anderson & Jacobson, 2018).

Administrative and logistical barriers

The study identified resources as constraining factors for teaching EE. The mentioned resources were mainly textbooks, budget, and transportation, for which the findings were mixed when compared with findings from the global reports. This indicates that some of the barriers are context specific. A number of studies have revealed a shortage of material resources, budgets, and transportation for outdoor trips (Anderson & Jacobson, 2018; Davies & Hamilton, 2016; Dring et al., 2020; Ernst, 2009, 2014; Fazio & Karrow, 2013; Lane et al., 2018; Patchen et al., 2022; Velempini et al., 2018), which were also prevalent in the present study. Time constraints, despite being extensively reported by the aforementioned studies, were not experienced by most of the interviewed teachers in my study. Large class size posed a significant challenge to the teaching of environmental issues, but similar findings have only been made in a previous few studies (Davies & Hamilton, 2016; Ko & Lee, 2003).

The dire shortage of textbooks hampered not only the teaching of environmental issues but also the teaching of all other subjects. Strikingly, none of the reviewed studies report the shortage of textbooks as a barrier to teaching EE, although material resources are mentioned. Emphasis on state standardized testing and curricular pressures were not identified as barriers by the teachers, despite having been reported as primary barriers in some studies and reviews (Dillon & Dickie, 2012; Ernst, 2009; Lane et al., 2018). The lack of administrative support and commitment to environmental activities reported by the teachers aligns with findings reported in other studies from Australia, Ecuador, and Canada (Anderson & Jacobson, 2018; Cutter-Mackenzie, 2010; Dring et al., 2020).

Safety concerns

Teachers' and parents' fears and concerns about children's safety hindered outdoor activities. The teachers avoided the risk of unforeseen accidents involving children and limited their teaching to the classrooms. Similar challenges are identified in a

review by Rickinson et al. (2004) and in other empirical studies (e.g. Ernst, 2014; Lane et al., 2018; Patchen et al., 2022). The teachers were also uncertain about managing large groups of students outdoors. This concern is also revealed in studies by van Dijk-Wesselius et al. (2020) and Lane et al. (2018), who report that teachers found it demanding to handle children's behavior outside the school premises.

Attitudinal barriers

Attitudinal issues emerged as barriers to the teaching of environmental issues. The interviewed teachers appeared to avoid additional effort because they assumed it would be futile and would not lead to change. They also mentioned that students' poverty and disinterest had become serious problems in schools. The lack of teachers' interest and commitment has similarly been observed in other studies (Anderson & Jacobson, 2018; Lane et al., 2018). Some teachers also assumed that schoolyards were not that relevant since students were already aware of their school's features. Similarly, a review by van Dijk-Wesselius et al. (2020) showed that teachers struggled with outdoor learning not being a "real thing", meaning that they were skeptical about the need to have outdoor activities. By contrast, a study by Kim and Fortner (2006) and a study by Velempini et al. (2018) indicated that teachers exhibited a positive attitude and strong interest in teaching about environmental issues both inside and outside the classroom.

Implications

The findings presented and discussed in this paper have a bearing on teacher education in Ethiopia. The study unveiled that both pre-service and in-service training were insufficient and ineffective to enable teachers to address environmental issues in schools properly. First and foremost, in order to help students become action competent and live and act sustainably with respect to the environment, teachers themselves need to be action competent (Eames et al., 2008; Tolppanen & Kärkkäinen, 2022). This entails the need for relevant teacher training in EE and education for sustainability, primarily in pre-service programs and continuing with in-service training opportunities.

Furthermore, a strong foundation should be laid during pre-service training. Teachers who receive proper pre-service training in EE can develop increased self-efficacy beliefs and confidence in teaching environmental education in schools (Dada et al., 2018; Saribas et al., 2017; Tuncer et al., 2009). The current trend shows that much emphasis is placed on the pure sciences, which tend to develop teachers' content knowledge. Pre-service programs should provide future teachers with practical experiences in how to teach pupils about environmental matters. Efforts should be made to equip prospective teachers with participatory, experiential, and place-based pedagogies of EE. Teacher training institutions must incorporate place-based outdoor activities in their programs (Meichtry & Smith, 2007). Saribas et al. (2017) suggests also the integration of presentations, reflections, and discussions on authentic, local, and specific environmental issues in the training. Overall, the training should develop

teachers' knowledge and confidence in designing and implementing teaching strategies relevant to EE. With such grounded and hands-on training, pre-service teachers would be able to play their role as the greatest multipliers of effective EE in schools (Powers, 2004).

Additionally, ongoing training and professional development opportunities must be provided for in-service teachers. Training should emphasize effective pedagogical practices for teaching environmental issues to schoolchildren. Such training can be organized to help teachers recognize, identify, and utilize spaces and resources at their disposal for use in their teaching. Some of the barriers to teaching EE, such as safety concerns, attitudinal problems, and lack of expertise, can be overcome through training. As outlined by Darling-Hammond et al. (2017), professional development efforts in EE should be guided by the following practices: focusing on the environmental content that teachers teach in the classroom, engaging teachers directly in designing and implementing teaching strategies, encouraging teachers to share ideas and work collaboratively, providing coaching and expert support in the area of EE, facilitating reflection and feedback on teachers' understandings and practices, and providing adequate time for teachers to learn, practice, and reflect. Universities and teacher education colleges, through their community service and consultancy missions, can play vital roles in developing the capacity of in-service teachers.

Shortage of resources, mainly textbooks deterred the teaching of environmental issues. The delivery of EE in schools cannot be effective given the prevalent resource constraint. Teachers will be compelled to rely on the usual way of teaching environmental topics, that is teacher-dominated and indoors-based. Hence, at least basic resources such as textbooks, gardening tools, and minimal funds should be availed. The MoE is set to publish and dispatch new textbooks to primary schools. It is therefore high time to adequately publish and provide textbooks to students. There is also an urgent need to devise national EE guidelines for schools. The guidelines could provide practical examples and directions for teachers on teaching strategies with regard to environmental issues. School principals and district education officials should provide continuous support for teachers. Education for sustainability was made possible in schools with strong and proactive support from principals (Evans et al., 2012).

Conclusions and future directions

The teachers in the present study experienced multiple barriers in their teaching of environmental topics. While most of these barriers are common around the globe, the study identified noble barriers. With the current barriers prevailing in primary schools, and teachers confining lessons into traditional classrooms, it is unlikely that the outcome will be environmentally informed and active youths. The study findings are significant for decision-makers and practitioners in that they provide useful insights into major barriers encountered in primary schools and the entry points to overcome these barriers. Efforts should be made to overcome the identified barriers so that teachers can fulfill their substantial roles. Some of the barriers can be addressed by teachers and school-level administration. Other barriers, such as pre-service and in-service training and resources need the attention of top-level government.

It should be noted that the study was limited to a small sample of four schools and therefore the findings cannot be generalized to other contexts. Future studies might involve a large number of teachers and schools to provide more comprehensive insights. Categories of barriers delineated from the global literature and in this paper can be used for further studies. Also, researchers are encouraged to carry out participatory action research to overcome barriers and improve practices. Recent works in South Africa (Matsekoleng & Awshar, 2020) and the Netherlands (van Dijk-Wesselius et al., 2020) are commendable since apart from analyzing barriers, the researchers applied progressive action research to empower teachers to mitigate barriers and enhance their practices.

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