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## Teaching Comes Naturally – or Does it?

Environmental Education in Indian Primary Schools and the Impediments of its  
Application from Teachers' Perspectives.

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## **Abstract**

Environmental Education [EE] was created in the pursuit of providing specific targets to promote environmental knowledge, attitudes, skills, participation and creating the societal shift. India was perhaps one of the first nations to have internalized EE in primary school curriculums, however, its application is still far from flawless. Teachers have often been observed as they take a central role within education, yet, what current studies lack is to provide a clear link between *What role do teachers' life experiences and beliefs play in the formation of their attitude towards the implementation of EE in their subject?* and *How do teachers perceive barriers to EE and how are these linked to their attitudes?* The following study combines the *Model of Environmental Education Commitment* and the *Ham and Sewing Framework for Classifying Barriers to EE* and through qualitative interviews and Q-Methodology that helps uncover peoples' perceptions is able to categorize the teachers. The study has uncovered that their experiences, beliefs, and attitudes towards EE directly interact with the barriers to EE and determine whether teachers are highly motivated and innovative in overcoming them, whether they take a passive role or even are themselves the barriers.

**Key Words:** environmental education, EE, teachers, barriers, Ham and Sewing, Framework for Classifying Barriers to EE, Q-Method;

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## Acronyms

CEE	Center for Environmental Education
CGE	Center for Global Education
EE	Environmental Education
FE	Formal Education
IE	Informal Education
MEEC	The Model of Environmental Education Commitment
NCERT	National Council for Education, Research and Development
TPB	Theory of Planned Behavior

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# 1. Introduction

Numerous environmental problems such as climate change, biodiversity loss, various sources of pollution, and different health issues restrain every individual on this planet. There have been countless initiatives and numerous temporary fixes that provided impermanent benefits and short-lived solutions; however, it is only through all-inclusive social change that these problems can be thoroughly solved. Consequently, Environmental Education [EE] was created in the pursuit of providing specific targets to promote environmental awareness, knowledge, attitudes, skills, and participation and creating the needed shift within humanity (Eneji et al. 2017).

India was perhaps one of the earliest nations to see EE as a potential instrument of social change (National Council for Education, Research and Development [NCERT] 2006), and by the end of the year 2005, EE was fully integrated into the curriculum of primary schools, although each Indian state still remains somewhat unique in the origin, scope, and level of formality of EE application (Center for Environmental Education [CEE] 2007). While well-intended efforts at local, regional, and national scales such as education programs, field trips, and government mandates for school-based curricular requirements are applied and endorsed, barriers to successful EE in India still remain (Ghosh & Mohan 2015).

Due to the influence teachers have on the children with whom they interact, they play a significant role not only in education but in the society as a whole and can be the essential component in eliminating or endorsing these barriers (Ravindranath 2007: 45-48). The impeding factors of teaching and learning EE have been studied through interviews, surveys, and focus groups with teachers; with the mutual aim of understanding and overcoming existing barriers to improve and facilitate better application and execution of EE (Ham & Sewing 1988; Monroe 2002). Nevertheless, despite a large body of research on barriers to EE, India has been rather understudied, especially considering its lead in the early application of EE. The studies that have been conducted further lack the essential link between teachers' experiences and beliefs, which play a fundamental role in Indian society (Center for Global Education [CGE] n.d.), and different types of barriers that they face.

Hence, the focus must be applied to teachers to see whether these factors affect the way they teach EE and perceive barriers as well as whether they are helping to eliminate them or are in essence the source of their existence. Keeping in mind diverse variables that are prominent in the Indian education system, two different cases were selected for this study in order to control

for the rural and urban divide. Moreover, teachers from both private and public schools in lower and upper primary levels were included to assure the presence of diverse variables within the research. However, none of these factors revealed to play a significant role in the results. Lastly, all teachers have completed semi-structured interviews complemented by Q-Methodology in order to accomplish a comprehensive approach to the topic of barriers to EE.

Ultimately, providing a study that will be able to explore the above-mentioned links and find commonalities could potentially lead to improvements in the application of EE and the elimination of some of the barriers.



## 1.1. Purpose and Research Question

Since its establishment, EE has been a source of numerous studies analyzing its content, teachers, successes, and downfalls. However, what the current literature lacks is to provide a clear understanding between the life experiences and beliefs of teachers as an influencing element towards their attitudes to EE, which then act as a decisive link in either enabling or eliminating existing barriers to EE.

Hence, the aim of this study is to explore the life experiences of teachers, together with beliefs imprinted on them throughout their life in relation to EE. Subsequently, these results are analyzed alongside selected logistical, educational, attitudinal, and conceptual barriers to EE that teachers presently face in pursuit of implementing EE in their respective subject. These steps are taken to help understand how life experiences and beliefs affect teachers' perception of barriers as well as the way they deal with their eradication.

**In order to explore these connections following research questions were created:**

*What role do teachers' life experiences and beliefs play in the formation of their attitude towards the implementation of EE in their subject within Indian primary schools?*

*How do teachers in these schools perceive logistical, educational, attitudinal, and conceptual barriers to EE; how are these barriers affecting teachers' attitudes towards EE?*

## 1.2. Thesis Structure

This study is distributed into seven connected sections. The introduction provided the overview and relevance of the study as well as the identification of research questions. The background section aims to present contextual understanding of EE relevance in the current world, its development, and execution in India, the role that society has in implementation and perception of EE, and the placement of teachers amidst these factors. The literature review will elaborate on the existing research in consideration of a person's life experience and societal beliefs as an influencing factor towards future attitudes and will further expand on global research of diverse EE barriers that affect teachers. The consequent section will define the theoretical framework that facilitated the research process and data analysis. The methodology section depicts the methods used in this study and finally, the analysis section will present this study's findings, and final remarks are given to provide a comprehensive conclusion to the study.

## 2. Background

### 2.1. Environmental Education

The term “environmental education” first appeared in the mid-1960s, more specifically it was *The Council for Environmental Education* which discussed that education and the quality of the environment are unquestionably interlinked (Palmer 2002). UNESCO (2006) further elaborated on this claim by stating that relevant and good quality education empowers people to act meaningfully on the challenges posed by the sources of their vulnerability and risk. Thus, one can describe EE as a permanent investment in creating a sustainable society (Ravindranath 2012: 20).

In order to create and maintain optimal and sustainable relationships between the environment and people, and in pursuit of minimizing environmental degradation and instability, EE has emerged as an international pedagogical trend (Ravindranath 2007; Wood 1989). *The Tbilisi Declaration* has clarified the goals of EE are to create complex awareness about different social, economic and political issues connected to their ecological interdependence various areas; to provide every person with prospects to obtain the knowledge, attitudes, values, commitment, and skills needed to guard and improve the environment; and to form new patterns of behavior of individuals, groups, and society towards the environment (Gillett 1977).

The current status of EE varies by country, region, and even by the school, where curriculum guidelines prescribe what should be covered and often differ in terms of the scope (West et al. 1999). Nevertheless, most of the countries provide either detailed curriculum guidelines or less specific frameworks to teach EE. However, EE is in most cases not taught as an individual subject, but is rather incorporated into other subjects, as encouraged by the *European Commission* (Stokes et al. 2001: 6). One of the implications of this infusion approach is that due to the flexibility in often not prescribed content within the curriculum, each country, region, school, or even teacher can decide on what will be included in their subjects. This is potentially one of the main reasons why the role of the teachers is often highlighted. As stated by Nixon et al. (1999: 311):

The extent of teaching depends on the personality of the teacher. Even where local authority policies are in place, the provision in schools remains patchy and heavily reliant on the interests and will of a small number of committed teachers.

## **2.2. Relevance of Early Application**

Gurung (1993: 96) emphasizes the importance of inclusion of practical activities related to the environment and the necessity of their implementation already at the earliest phases of primary education. Further support of the early practical application of EE is given by Buchan (1992: 6) who states: ‘Much of our consumer-oriented, “Earth careless” attitudes are installed in infancy and youth. We need to instill a new approach from the earliest stages of education’. Hence, it is obvious that schools, especially at the primary level, play an essential role in helping and supporting children to discover their environment and to construct their own meaning from these experiences and interactions from a young age on (*Directorate of State Education, Research and Training* 2012).

## **2.3. Environmental Education in India**

Considering India’s population of 1.339 billion [2020], its diversity in culture and languages as well as its high poverty and low literacy levels, the country is faced with countless challenges (Sonowal 2009). Prevalent environmental problems connected to the loss of biodiversity, high pollution and low awareness of these issues were some of the reasons why India was possibly one of the earliest nations to have internalized EE as a potential instrument of social change, in which every citizen should be actively involved, irrespective of age, gender, social or economic status (NCERT: 90).

The *National Policy on Education* (1986) emphasized the need to create mindfulness towards environmental concerns by integrating EE in the educational process at all stages of education and for all sections of society. Moreover, incorporating EE in the curriculum was regarded as a way of bringing meaningful and comprehensive knowledge about sources of environmental degradation as well as potential solutions to eliminate these problems. Hence, EE aims at giving rise to environmentally literate citizens that will be able to actively address ecological problems and challenges that India faces (Park 2011).

NCERT has conducted a significant amount of work in regard to EE and by the year 2000 had recommended EE as a subject for the primary level in its *National Curriculum Framework for School Education*, thus giving “Environment” needed recognition. A subsequent important push was seen through the position of the *Supreme Court*, where every State Government and every Education Board connected with education, up to matriculation stage, was required to immediately take steps to enforce compulsory education on the

environment in a graded way (Gupta 2012: 90). Nevertheless, up until the present day, EE is not accounted for as a uniquely graded subject. Following this directive, the NCERT published the *National Curriculum Framework* in 2005 which recommended the infusion of environmental issues in different disciplines for the greater impact, ensuring innovative EE methods and adequate time assigned to them (Chopra 2015). By 2015, all twenty-eight Indian states had completed the process of “greening” the EE textbooks (NCERT 2005).

Nevertheless, criticism was uttered towards the requirements of district-, state-, and nation-mandated curricula due to their almost nonexistent flexibility for teachers to adjust the provided content (Adams 2013: 20). Bearing this in mind, the Indian education system and the desire to apply EE is far from flawless and faces many obstacles to successful implementation and execution. Fingers have been pointed at different “blame” agents as the source of stagnation of suitable implementations; most frequently mentioned were the Indian state, teachers, students, the curricula or even wider perceptions of community (Ghosh & Mohan 2015).

Consequently, to comprehend the complexity of implementation of EE, one must first understand the unique features of Indian society, which is both inter-related and inter-dependent with education. Education helps individuals to learn how to live, behave, and organize themselves, making it unquestionably one of the founding factors of any kind of desired social change, while the societal structure and beliefs affect the status of education (CGE n.d).

#### **2.4. Themes in Indian Society**

India is a hierarchical society and although politically identified as a democracy, notions of complete equality are seldom witnessed in everyday life. Hierarchy plays an exponential role within the community and is not only evident through caste groups, but also amongst individuals, family members, and other groups (Appadurai 1988). A special focus must be placed particularly on a person's upbringing through family and kinship groups, where strong hierarchical bonds take place (Mandelbaum 1970). In Indian society, men outrank women of similar age and junior relatives are outranked by the senior ones. The respect is further transitioned through family members in consideration of their age, gender, marital status, and so on. A similar pattern is found in the community and is connected to status and job. Some professions, such as becoming an educator, are perceived as “holy” and looked upon with high respect, while being embraced by the family and kinship groups (Appadurai 1988: 40-42).

Another important theme in Indian society is represented by social interdependence. Group belonging has a significant role and people are not born as purely individualistic, as they belong to family, caste, and religious community which creates a deep sense of inseparability from these communities and provides individuals with so-called informal education from their infancy until they start attending formal education (Mandelbaum 1970). Throughout their lives, they are deeply involved with these groups, whether it is psychologically through emotional interdependence between parents and children or economically, through social connections. Almost all decisions in the life of Indian people are therefore connected to social ties, such as the selection of their spouse, job, or place of residence. Hence, it creates a pressure to comply with the wishes of these groups, even though it might mean that an individual's sense of their own identity is altered (CGE n.d.).

## **2.5. The Educator and the Society**

Formal education is perceived in India as one of the strongest drivers to a sustainable society. Consequently, the influence that educators have on the children with whom they interact, plays a substantial role (Samuelsson 2008). In India specifically, teachers have been traditionally seen in the best light as the source of true and holistic education. The teaching profession has always been looked upon with the highest respect in Indian heritage and apart from conveying education to children, the teacher has been also perceived as a guide and philosopher (Shukla 2014: 44). A teacher's purpose is to analyze, interpret, and essentially implement environmental topics in their classrooms. Realizing this central role of teachers, even UNESCO has described teachers' preparation and participation in EE as the "Priority of Priorities" (Ravindranath 2012: 4). However, despite the importance placed on teachers and EE, they still struggle to integrate environmental issues into public school classrooms (Kim & Fortner 2006; Plevyak et al. 2001; Rickinson et al. 2004). India faces a lack of trained personnel, which requires a tremendous amount of effort to overcome, since appropriate recruitment, training, and sourcing is needed.

There have been numerous backlashes on teachers, especially concerning the lack of commitment and positive attitude towards teaching (Stone 1989: 159; Waite 2009: 18). However, the roots of these failures have not been analyzed thoroughly. Teachers that are either pre-service or in-service and do not possess the understanding, skills, or knowledge to create and teach their curriculum in an "environmental" way are unlikely to form students that are environmentally literate (Ghosh & Mohan 2015: 44-48). Environmental literacy, just like required ecological sensitivity and skills, are essential in the implementation of EE. If these

essentials are scarce, it negatively affects the decision and ability of teachers to properly implement EE in their classrooms (Blanchet-Cohen & Reilly 2013). This is projected by an alarming number of less than 1% of teachers who have taken part in *The Central Teacher Eligibility Test* and qualified. Moreover, during unannounced visits, approximately 25 percent of teachers were missing from the class, and about half of the teachers in class were not teaching (Kremer et al. 2005: 658-667).

However, while it is true that teachers still struggle to integrate environmental issues into public school classrooms (Kim & Fortner 2006; Winther et al. 2002), it is important to understand that the reasons for these struggles are not only of internal matter, such as motivation and attitude, but can also arise externally, as for example in schools which do not have the financial resources to properly apply EE in their curriculum (Adams 2013).

Accordingly, despite the numerous efforts as well as EE being an integrated part of the curriculum in Indian primary and upper primary schools, various barriers are slowing down or even paralyzing the process of successful implementation of EE. These barriers, as well as the influence of Indian society on teachers' attitudes towards these barriers, will be further discussed and categorized in the literature review.

### **3. Literature Review**

The purpose of this literature review is to increase the reader's understanding towards the theoretical ground of EE within Indian context and to highlight the existing research to conceptualize both the life experience of the teachers and the creation of their beliefs through social structures as well as different barriers to EE. This literature review is divided into informal education, including society as an agent towards educators' attitudes and formal education where these attitudes meet with different barriers to EE within the school system. Moreover, within both types of education, external and internal barriers play their role and will be further established. The aim is to provide a comprehensive understanding of various issues surrounding EE and the way persons' experiences and beliefs affect their attitudes as a teacher towards these barriers.

#### **3.1. Informal Education: Society as an Agent Towards Educators'**

##### **Attitudes**

Informal Education [IE] does not have a structure, it is something that is seen as a spontaneous process in helping people learn. According to Greenfield (2009), IE is facilitated through experience, conversation, culture, and society that the person is part of and takes into account a person's past, the influence of others, and skills, which form their general attitudes, beliefs, and practices. Ghosh and Mohan (2015: 2) have further stated that IE should be looked at as the real pillar of proper personality and character formation.

Societal influence has been shown as a system of control when it comes to attitudes of teachers (Sacks 1980). Based on Joseph and Efron (1993: 201-220) the way a person was brought up affects the way they teach, since elements of their culture are present in their attitudes and teaching techniques. If society remains conservative and future teachers are raised in a system that is not willing to change old behaviors and habits, this will result in resistance to implement new ideas (Dhull & Verma 2017). Similarly, Ghosh and Mohan (2015) have elaborated that if the country wants to aspire citizens that are able to overcome different barriers, it must be adaptable to changes in knowledge, interests, skills, and values of the people.

Every individual is placed in a learning model from birth on. Essentially, by existing in the environment that surrounds them a human derives different views, attitudes, and beliefs, often without conscious effort (Prévot et al. 2018). The pure manifestation of life is an education in

itself. Ghosh and Mohan (2015: 32-40) have identified various agents that play an important role in shaping the attitudes and behavior of people, such as home, peer group, community, and neighborhood. By living in these community, IE is received through these agents which have been shown to affect a person's behavior equally as strong as the formal one (CGE n.d.), i.e. it will be reflected in the way educators teach.

Numerous studies show that families expressing positive environmental attitudes conveyed these to positive mindsets of their children (Leppänen et.al. 2012; Grønhøj & Thøgersen 2009). Similarly, in a study by Duarte et al. (2017), children that were frequently going out to the nature with their families have shown greater interest and empathy for the environment. Despite the fact that these studies do not focus specifically on children that have become future educators, comparable patterns of reinforcement still could be assumed. The research by Christensen (1993) in similar fashion exposed that children growing up in a polluted environment were more likely to be conscious of the issues involving recycling and pollution control. This was however only investigated in the case that the child was given proper education on the issue. Moreover, this study uncovers an interesting point by highlighting that even the type of "negative reinforcement", such as living in a polluted environment, can create positive attitudes of future teachers towards the elimination of these environmental problems.

However, this might not always occur, since innovation is often blocked by the conservatism created in case that these future teachers are not given appropriate education on the topic and are only reliant on potentially incorrect information from their community. Especially considering the hierarchical society of India, it has been shown to be a challenge to escape the wicked circle of older generations' ideas being imprinted on the younger generation, which then repeats this process for the generation after them (CGE n.d.). While this influence sees saturation as the generations go on, the process is still quite slow (Ghosh & Mohan 2015: 30). This is also pointed out by Mooij (2008), who has proven that one of the reasons why teachers are not motivated to teach is because they have been forced by their families to take the profession in the first place. The same way arranged marriage is still a common practice in Indian society, so is the practice of parents to reinforce their children for a certain job (Fouad 2016: 197). This type of pressure has been shown to negatively affect their attitudes and performances as a teacher and can be imperative in the effort to apply EE if teaching was not a profession that the person was interested in (Ghosh & Mohan 2015).



## **3.2. Formal Education: Where Attitudes Intersect with Barriers**

Once teachers start their profession and enter Formal Education [FE] which is narrower and rather instruction based, they are faced with numerous barriers that can impede their effort to apply EE in their subjects. This section will depict structural, application, and individuals' barriers to EE. These barriers are perceived as a result or consequence of malfunction of either external agents such as the government or school, but can be also seen through the internal lens, which is connected to teachers' competences and perceptions of their knowledge (Ghosh & Mohan 2015: 2-10).

### ***3.2.1. Structural impediments to EE***

Structural barriers could be regarded as mostly external barriers to EE. These barriers are not created by the teacher but are rather something that they have to face, and the way teachers are able to deal with them determines their attitudes towards teaching EE. Structural problems of implementing EE have been seen as an outcome of environmental awareness that is lagging behind, the role of media in promoting EE which is rather low as well as pricing of natural capital which is almost non-existent in India (Siddiqui & Pathak 2014: 7). Studies outside of India looked at factors affecting implementation within primary level schooling through a structural lens and mentioned the inferior position of EE as well as the problems in incorporating local context and relating strategies of EE to their learning fields as some of the significant external structural barriers (González-Gaudiano 2007).

A study by Ketlhoilwe (2007) stressed misconception as one of the main challenges when it comes to EE. Additional research by Heimlich et al. (2004) in 42 different American states elaborated that schools had already too many existing mandates which meant that there was not enough space to apply EE properly. This study has also shown that one of the most essential structural barriers, when it came to the application of EE, was the fact that EE in the United States is not compulsory. This resulted in lower motivation and fewer initiatives from the school or the state to apply the subject. While EE is required in India, its application, execution, and monitoring vary by state which is seen as one of the external impediments in a national context (CEE 2007).

Lastly, a study conducted in China found that the main barriers to EE were the lack of governmental finances and support, which may explain why poor aids and insufficient time were also listed amongst the barriers (Lee et al. 2009).

### ***3.2.2. Application impediments to EE***

Application barriers arise when practical application and implementation of EE is taking place and like the structural barriers arise externally. A study at Queensland University through interviews with key staff members and principals identified a lack of time and finances for innovation as their biggest barriers (Evans et al. 2012). More studies looked at factors affecting implementation within primary level schooling and highlighted curriculum, teachers' turnover, and school management as the main impediments. In fact, the top four reasons reported by teachers in a study by Smith-Sebasto and Smith (1997) included shortages of resources, money, preparation, and class time.

Cronin-Jones et al. (2003) focused on teachers' perception of the status of EE in schools and identified shared barriers such as lack of preparation and teaching time, ineffective instruction materials and unavailability of manuals and handbooks. Paucity of teaching as well as preparation time were discussed by Chi-Kin Lee (2000) while an explorative study by Kim and Fortner (2006) discussed issue-specific barriers in the classroom.

A study conducted on EE policy implementation challenges in primary schools pointed more specifically to the lack of practical knowledge. This study further stated field trips or lack thereof, and exposed an existing separation of practice from theory and extensive reliance on traditional techniques (Ketlhoilwe 2007). Lack of environment in their surrounding would mean that teachers have to organize a nature-oriented trip to more distant places which further creates issues of transportation (Ernst 2007) or safety of the children (Lemmey 1999). However, Talero (2004) has pointed out that the absence of training in a particular setting can be one of the reasons why teachers do not conduct field trips in the first place.

### ***3.2.3. Individuals' impediments to EE***

Individuals' barriers arise internally and could be sometimes the hardest to eliminate, since they are connected to the experiences and beliefs of a teacher and directly and often subconsciously shape their attitudes towards EE (Ghosh & Mohan 2015: 45). Research conducted in India by Mosley and Utley (2008) and Richardson (1996) show that efficacy affects not only what teachers teach but also students' attitudes toward the topic and how much they learn. Smith-Sebasto and Smith (1997) indicated that teachers may not appreciate environmental issues enough to make room for them in the curriculum, because they do not know enough about them to place value on them. One can discuss that EE preparation programs for teachers might be

vital and essential components to the teaching of EE and the creation of higher confidence of professors towards the subject (Ghosh & Mohan 2015: 204-211). However, this statement is presented under the hypothesis that teachers are interested in taking part in such training. Paradoxically, lack of interest and/or commitment and difference in prioritization were the most prevalent barrier in the literature review of an individual's impediments to EE (Kremer et al. 2005; Menon 2004).

The study by Powers (2004) has named barriers such as competition within special interest groups, credit/time acquisition, different attitudes towards the topic, and the absence of role models in in-service teachers as additional internal barriers. Literature has also mentioned controversy of the topic or no career enhancements as additional attitudinal barriers (Fisher 2001: 75-96).

An additional factor that has been frequently mentioned was teachers' confidence. Teachers were short of competencies in pedagogy and the content of the subject, as was shown in studies focused on India (Verma & Dhull 2017; Siddiqui & Pathak 2014). Dealing with multiple interrelationships in the different factors the teacher can convey a message that is too complex and might be unclear, leaving students confused and stressed (Sharma 2015). The study by Winther et al. (2002) explored teacher decision making in relation to their pedagogical knowledge, when implementing environmental programs. This study has shown that they felt enormous pressure, since the programs required shifting the paradigm from traditional teaching methods which were teacher-centered towards student-centered learning in a real-world context.

In multiple studies, including one of Meichtry and Smith (2007), it was highlighted that teachers that have been exposed to environmental preparatory programs had significantly greater knowledge regarding the topic and could integrate it into the curriculum at a higher rate than those who didn't go through similar training. However, they have also pointed out that teacher preparation alone cannot ensure a successful implementation of environmental issues (Monroe 2002: 37-43). The misgivings of teacher abilities were shown in multiple studies that argued that teachers often perceive external factors as more influential barriers, whereas the content and their pedagogical knowledge might in fact be bigger obstacles in the application (Dyment 2005: 28-45; Kim & Fortner 2006: 15-22; Simmons 1998: 23-31). While the studies looking at these types of connections are rather limited, they still indicate that teachers' conceptual understanding of environmental and ecological relationships is scarce.

## 4. Theoretical Framework

To answer the research question presented, two distinctive theories were selected and will be further combined, to address different barriers within formal and informal education affecting teachers and impeding the application of EE.

Firstly, the framework by Shuman and Ham will help to understand teachers' experiences and beliefs that lead to their commitment to teaching EE. Having a better understanding of teachers' backgrounds, attitudes, and the importance they place on different barriers based on their life experiences and beliefs can facilitate successful teaching and learning of EE and help in the implementation of appropriate interventions (DaRosa et al. 2011: 453-459). Consequently, Ham and Sewing's *Framework to Classify Barriers to Teach EE* will be applied to better grasp conceptual, logistical, educational, and attitudinal barriers that impede the effort to apply EE (Cantrell et al. 2003: 177-192).

### 4.1. The Model of Environmental Education Commitment

Teachers play a significant role when it comes to the application of EE and their commitment and attitudes can vary and may result in an insufficient application of EE. The theoretical framework created by Shuman and Ham (1997) presents a link between teachers' commitment to teaching EE, significant life experiences, beliefs, and attitudes. Hence, even before teachers start their service, various factors will affect their commitment to EE in practice.

When creating the model, Shuman and Ham applied *Field Theory*<sup>1</sup>, *Life-Span Development*<sup>2</sup> *Theory of Planned Behavior* [TPB]<sup>3</sup>, and research on life experiences that influence environmentally responsible behavior (Palmer 1993; Tanner 1980) to address the influences that determine teachers' attitudes towards the commitment to educate EE. *The Model of Environmental Education Commitment* [MEEC] was created (Figure 1). As mentioned in their work their model: 'provides a theoretical framework that captures the potential for inclusion of life events in shaping teachers' propensity to teach EE despite the predictable existence of barriers' (Shuman & Ham 1997: 30).

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<sup>1</sup> *Field Theory* is a psychological theory which examines patterns of interaction between the individual and the total field, or environment (Lewin 1942),

<sup>2</sup> *The Life-span Development* perspective 'seeks to predict, explain and optimize changes in behavioral responses as a consequence of life events as they occur over a long period of time' (Brim & Ryff 1980: 370),

<sup>3</sup> *TPB* links one's beliefs and behavior and states that intention toward attitude, subject norms, and perceived behavioral control, together shape an individual's behavioral intentions and behaviors (Ajzen 1991),

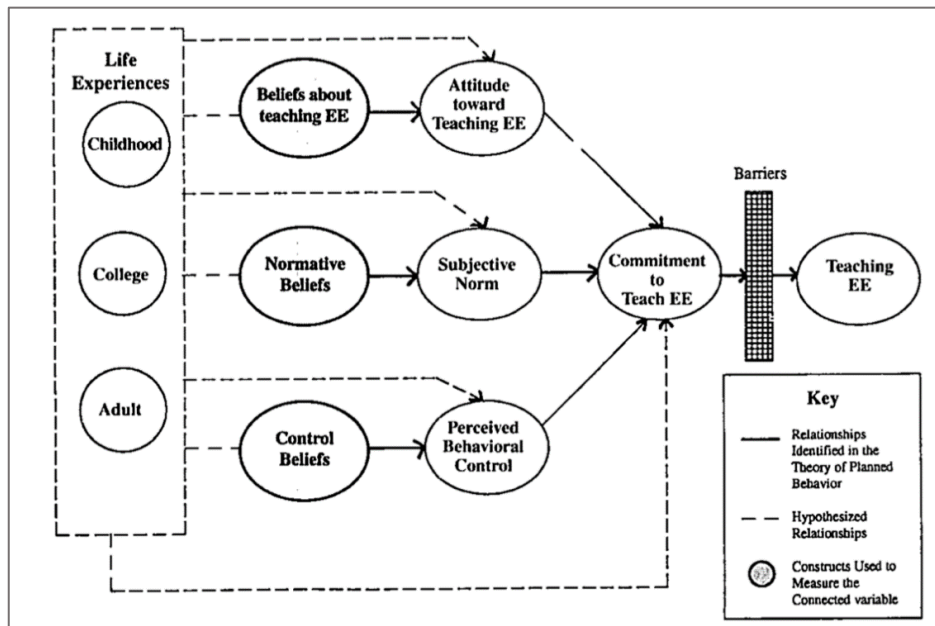


Figure 1: The MEEC (Shuman & Ham 1997: 30)

Firstly, the model works with the construct of life experience of the teacher, and subsequently, it expands the model of TPB to provide explanation and prediction for teaching EE through these life experiences. The three stages of life experiences included in the MEEC model are childhood, college, and adulthood. These life experiences can be influential on their own or as an infused combination of all. An example can be a child that grew up surrounded by nature, participated in activities organized outside and later continued these activities more elaborately throughout their college years, up to adulthood. Another instance can be a teacher that has attended a college that has provided classes focused on EE, they could have taken part in publicly organized cleanups, or different environmental workshops, which inspired or motivated them to teach EE. Hence, when it comes to the commitment to teach EE both life experiences as well as stages in which they occur are important defining factors. Additional studies provide further meaningful insights to the different types of life experiences and discuss that teachers' attitudes are further influenced by factors such as political affiliation, parental influence, their confidence toward the topic of EE, religious beliefs, their connection to nature in the past, social norms and their preparatory training (Bixler & Floyd 1999: 4-11; Moseley & Utley 2008: 15-30; Shuman & Ham 1997: 25-32).

The second part of the MEEC touches upon the relationship of these life experiences and subsequent beliefs that underlie teachers' attitudes towards EE.

#### ***4.1.1. Beliefs about teaching EE***

Beliefs and attitudes about teaching EE are a result of individual experiences that might increase or decrease the importance of the subject in their conviction. An example could be a recent environmental disaster, growing up next to a place that has been affected by pollution or even being exposed to a television program about a certain environmental issue.

#### ***4.1.2. Normative beliefs***

Normative beliefs are individuals' beliefs about the extent to which other people who are important to them think they should or should not perform particular behaviors. The sum of these beliefs across the circle of important people surrounding the subject results in subjective norms (Trafimow & Fishbein 1995: 257-266). This could be an encouragement from the loved ones or principal in school that acknowledges and appreciates their effort.

#### ***4.1.3. Control beliefs***

On a conceptual basis, perceived behavioral control is similar to self-efficacy (both concepts assume that the person's belief and the behavior in question is under their control) however, operationally, perceived behavioral control is often assessed by how easy or difficult behaving in a certain way is (e.g., "I find it difficult to teach EE as part of my curriculum"), while self-efficacy is operationalized by the individual's confidence in being able to carry out the behavior even with unfavorable circumstances (e.g., "I am confident that I can teach EE even though certain barriers are presented in my way").

Additionally, MEEC suggests that the constructs of attitudes, subjective norms and perceived behavioral control influence the probability of the actual behavior taking place as a direct result of teachers' intentions. According to the model, 'the stronger the teachers' commitment to teaching EE, the greater the probability that they will overcome existing barriers and actually carry out the behavior' (Shuman & Ham 1997: 30). However, research by Ham and Sewing (1988) has indicated that even if teachers have a strong commitment to teaching EE, the actual behavior may not occur due to existing barriers. Moreover, MEEC has given only minimal attention on EE in the classroom, and attitude alone is not a reliable predictor of teachers' commitments to teaching EE. Ham and Sewing (1988) found that this inconsistency was in part due to barriers that intervened between teachers' positive nature toward EE and their consequent teaching behavior. The barriers shown as a last component in the MEEC can be seen in two

alternatives: either both life experiences and beliefs of teachers act as a way to overcome the barrier or contrary can result in a barrier itself. Since MEEC has not given a further focus on barriers, the *Framework for Classifying Barriers to EE* by Ham and Sewing (1988) was applied to gain a comprehensive understanding of different categories of barriers to EE and teachers' role in them.

## **4.2. Ham and Sewing Framework for Classifying Barriers to EE**

Research by Ham and Sewing (1988) provided one of the first categorizations of barriers for a successful implementation of EE: logistical, educational, attitudinal, and conceptual. This classification is useful for better comprehension of different internal and external barriers surrounding teachers and, facilitated further, more profound understanding and classification of the results.

### ***4.2.1. Logistical barriers***

Logistical barriers are connected to time, resources, funding, efficient class size, and more. Being faced with these barriers can hinder the teaching of EE, since time is needed for the development of a comprehensive curriculum, where objectives and goals need to be clearly defined. However, even with efficient material, it still might happen that there is a problem of allocation of actual class time for EE, the class size might prove inefficient for the information that has to be presented or the time assigned to corresponding classes might be short. Other problems included in logistical barriers are mismanagement of school administration, safety and liability concerns, or unavailability of nature. Logistical barriers are of external nature and have not resulted from teachers' experience or their beliefs. However, teachers' attitudes and beliefs can either contribute to the barriers (when the motivation is low) or can help eliminate them (e.g. a teacher that is experienced enough to sufficiently teach even a class of 60 students).

### ***4.2.2. Educational barriers***

Educational barriers are directly associated with the abilities of teachers to teach EE and the misgivings they have about their skills. The teaching of EE requires specific knowledge and competence, not only within the classroom, but also when classes take place outside and specific practical knowledge is needed. If the teachers have poor or no background in the subject, their confidence to instruct it is rather low. Moreover, they might not possess the personal interest or commitment towards the subject which reflects in their willingness to

prepare material for their EE classes and teach it. Education barriers can hence be seen as a direct consequence of both teachers' experiences and teachers' beliefs.

#### ***4.2.3. Attitudinal barriers***

Attitudinal barriers are present when there are negative attitudes towards EE shown by different interest groups: teachers, students, principals, society etc. Since EE has been a relatively newly established subject, it means that teachers would have to obtain new knowledge. Moreover, since lower grades of primary school do not have EE as a separate subject, teachers have been somewhat forced to take upon the burden often without previous training or consultation. Teachers' perceptions of the importance of EE relative to other parts of their curriculum can differ, meaning that a teacher trained in instructing languages or math doesn't have to possess a positive attitude to teach a subject that is not related to their field.

#### ***4.2.4. Conceptual barriers***

Conceptual barriers are characterized by the lack of general understanding of the content and scope of EE. These barriers arise when teachers' perceptions of the definition of EE differ from their colleagues, school, curriculum, or wider scope of national and global understanding. Such misconceptions are for example that EE is often believed to be part of a science or is understood to be solely an outdoor activity. Other conceptual barriers are presented when EE is perceived as a separate subject, creating a problem in adding it to the already existing curriculum. This barrier could be interpreted both as a result of teachers' experiences and beliefs but can also be a result of the system applying it, such as government or school recommendation on the concept of EE, in which the teacher does not possess the power to change regulations.

Thus, the combination of MEEC, as well as the classification of barriers to EE, can provide a meaningful and comprehensive understanding of the different issues that exist when it comes to teaching EE. Moreover, while teachers' perceptions are placed in the center of the interest, both theoretical frameworks help to discover the underlined issues that can hinder teachers' perception through the analysis of their beliefs and life experiences. These will be subsequently paired with the viewpoint they have on different barriers, as well as the importance they assign to each of them. By combining the two separate theories, the author is able to create a comprehensive framework in pursue of closing the existent research gap, since current literature does not provide a model which can combine experiences, beliefs and consequent attitudes of teachers with their perceptions and dealings with existent barriers.



## **5. Methodology**

### **5.1. Research Design**

To be able to answer the research question presented in this study and to uncover teachers' experiences and beliefs as a source of their attitudes as well as finding a way to connect these outcomes to their perceptions of barriers to EE it was essential to use a mixed method approach across cases with diverse factors. Cases in both urban and rural area were selected and included private and governmental primary schools. A qualitative approach of semi-structured open-ended interviews was picked as the most suitable option for getting answers to different experiences of teachers' lives and beliefs that were imprinted on them through the society they interact with. This qualitative approach was then accompanied by the semi-quantitative Q-Methodology which helped categorize different barriers that teachers face, while giving them the space to voice their experience, concerns and general thoughts of each barrier.

### **5.2. Case Selection**

Keeping the population of interest in mind, researchers have to understand their limitations in terms of financial resources, time, and skills in given settings (Seawright & Gerring 2008). Since EE has been applied in all the states of India (CEE 2007), the state of Tamil Nadu, more precisely the area of Virudhunagar was selected as the rural case. This was mainly due to convenience, easy access to rural schools, and gatekeepers within selected areas, which helped to organize interviews in rural primary schools. To be able to control for the rural/urban differences and because of the initial convenience of accessibility, safety within the urban area as well as initial contacts of a researcher within the city, the second chosen area was Mumbai, the capital of state Maharashtra.

The differences in the cases arise from the urban-rural dissimilarities, the distinctions between traditional and modern society as well as the diverse geographical region where the cities are situated, and while the cases show many differences in various factors, connecting characteristics between them provide valid results (Goerres et al. 2019: 82). The main connecting factor is the type of educational institution, which were primary schools (see Appendix 1). Both private and governmental institutions were included in selected cases. Tamil Nadu, as well as Maharashtra state, have introduced the infusion approach for lower standards and the separate subject of EE to higher standards of primary schools. Newly printed textbooks

have been supplied free of cost for all the school students of government, government-aided, and matriculation schools. Training for teachers has taken part in both states, in Maharashtra through the radio programs and in Tamil Nadu through the *District Institute of Education and Training*. Lastly, both states have provided their teachers with teacher learning material which covers the major concepts of Environmental Science (CEE 2007).

### 5.3. Sampling techniques

The selected sample of this research consisted of 22 teachers in both Virudhunagar and Mumbai responsible for students in primary schools. The sample had no limitations in gender, age, or years of experience (see Table 1).

Table 1: Teachers' Information

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current. School, Years	Teaching Grade	Subject	Type of School	Area
RKVS1	30	Female	4	4	6, 7	Math	Private	Rural
RKVS2	36	Female	9	6 months	10	Chemistry, value education	Private	Rural
RKVS3	24	Female	3	3	1 - 4	English, science	Gov.	Rural
RKVS4	37	Female	10	1	6 - 10	Physics	Gov.	Rural
RKVS5	63	Female	40	7 months	7 - 10	Biology and science	Private	Rural
RPU1	46	Male	25	9	5	Science, social science, math	Gov.	Rural
RPU2	39	Female	15	13	6 - 8	English, math, social science	Gov.	Rural
RSI1	45	Male	15	11	6 - 8	Science	Gov.	Rural
RSI2	51	Female	22	21	1, 2	Tamil, English	Gov.	Rural
RSI3	46	Male	16	15	4,5	Science, PE	Gov.	Rural
UCA1	32	Female	13	13	1 - 4	Marathi and EVS	Gov.	Urban
UCA2	53	Female	22	22	2	English, Marathi	Gov.	Urban
UCA3	44	Female	24	4	4	Geography, Marathi	Gov.	Urban
UCBSE1	46	Female	22	20	9, 10	English, geography	Gov.	Urban
UCBSE2	37	Female	17	15	5 - 8	Social science, history, geography	Gov.	Urban
UCBSE3	41	Female	16	15	5 - 10	Science and math	Gov.	Urban
UOR1	40	Female	4	5 months	1 - 3	Math, behavioral studies	Private	Urban
UOR2	49	Female	23	6 months	4, 5	Math	Private	Urban
UOR3	25	Female	4	5 months	1 - 5	Psychological support	Private	Urban
UWE1	35	Male	10	2	2	English	Gov.	Urban
UWE2	40	Female	14	14	4, 5	EVS, English, math	Gov.	Urban
UWE3	31	Male	4	4	5 - 8	Math, EVS	Gov.	Urban
Mean (SD)	40.45 (± 9.34)		15.09 (± 9.11)	10.94 (± 6.91)				

As the selected individuals were based on non-random criteria, and not every individual had a chance of being included in the research, the non-probability sampling method was applied. Multiple types of data sampling were executed to get the number of participants that was achieved. Firstly, purposive sampling took place through the research of primary schools and

direct contact with selected schools. Once the school was contacted it was either a voluntary response sampling, purposive sampling or even convenience, as the principals were choosing participants that volunteered themselves, were available, or participants that principals thought would be the most ideal fit for the research (Cochran 2007).

#### **5.4. Interviews: Uncovering the Life Experiences and Beliefs**

Personal semi-structured and open-ended interviews (see Appendix 2) were conducted with each participant between December 2019 and January 2020. Interviews were arranged in advance either through the principal of the school or a contact person of the researcher. Each interview took place at the school property. Five of the ten rural interviews and one urban interview were conducted in the classroom with students being present, since there was no other option available at the time of the interview. The remaining 16 interviews were conducted in empty classrooms. All except for one interview were also taped on the voice recorder and transcribed by the author through the online transcription software *Otter*. The interviews lasted 21 minutes on average with a range from 15 to 34 minutes.

At the beginning of the interviews, teachers were asked to provide basic demographic data regarding their age, gender, the number of years taught as well as the number of years teaching at the current school. Following the introduction, further interview questions were focused on the research question in regard to teachers' life experiences and beliefs to set the appropriate ground for understanding their attitudes towards teaching EE. Teachers were first asked about their reasons for teaching, when exactly this interest has emerged, and whether the decision was done through their own motivation/ambition/will or whether becoming a teacher was something that developed through societal influence. This particular question helped the researcher to better understand their life experiences especially in childhood, college, and adulthood. The next question of the interview was focused on the teaching experience. Teachers were asked to describe their teaching style and the way they convey information to students, which facilitated a deeper understanding of their life experience as a result of their attitudes towards teaching. At this part of the interview, the focus also started to shift towards the topic of EE. While teachers were describing their experiences in teaching, they were also asked to elaborate on the position of EE within their subjects, which uncovered some of their normative beliefs in the process. This question facilitated a better comprehension of their attitude towards teaching EE, even if their subject wasn't directly related to the topic. Lastly, teachers were asked to describe the sources they use to educate EE, their previous training specific to EE and what type of topics

through in their classes. These final questions assisted in better perception of control beliefs and commitment to teaching EE, thus covering the entire MEEC model. Once this set of questions was completed, teachers were presented with the Q-Methodology and Q-Set.

## **5.5. Q-Methodology: Categorizing and Understanding the Perception of EE Barriers**

Q-Methodology was developed by psychologist William Stephenson and functions as a research practice used to study subjectivity and viewpoint of interviewees. Hence, the Q-Methodology and Q-Set research through qualitative interpretation aims at revealing participating groups' existing perspectives about a topic in a more categorized way to uncover patterns that could be missed if merely qualitative interviews were conducted. Q-Methodology is especially beneficial when it comes to interviews that are focused on the perception of their participants. While perceptions are a subjective matter of each individual, the Q-Methodology facilitates the process of a deeper understanding of where these viewpoints come from and often uncovers beliefs that are subconscious to the participants (Németh & Prokša 2014). Hence, a combination of semi-structured interviews and Q-Methodology provides an ideal combination of qualitative and somewhat quantitative techniques to answer the research question.

### ***5.5.1. Review and categorization of global literature***

The initial part of creating the Q-set was through a global literature review that was focused on the perceived barriers of implementation of EE in different primary schools and identified 40 different barriers to EE (see Appendix 3 for detailed process). Subsequently this number was narrowed down to 23 statements to meet the Q-Set with the normal distribution. The selection was based on the frequency of presence in global literature as well as on the relevance to the selected context. Moreover, all the statements were categorized through the Ham and Sewing model and simplified in a language that would be understood in the context with limited English knowledge. Lastly, two additional statements were added based on the recommendation from the initial interviews making it a total of 25 (see Table 2).

Table 2: Twenty-Five Selected Statements

Barrier	Adjusted Terminology/Additional Information
<b>LOGISTICAL</b>	
Challenged by time constrains (preparation)	Lack of preparation time (don't have enough time to prepare material)
Challenged by time constraints (teaching)	Lack of teaching time (not enough hours available)
Poor teaching aids	Poor teaching aids (books, other material)
Heavy workload	Same
Lack of governmental support	Same
Finances	Not enough money to support activities (finances)
Absence of natural environment	Not enough nature around (nothing or very little to show children)
Classroom management (safety, liability, etc.)	Safety and liability (classes outside) classroom management
Unavailable transportation	Problems with transportation
Inadequate class size	Class size too big
Inadequate class size	Class size too small
Emphasis on testing	Testing instead of practical knowledge
Issues with curriculum	Not in the curriculum
Lack of support from the school administrators	Same
<b>EDUCATIONAL</b>	
Lack of training in particular setting	Lack of practical knowledge (working outside of the classroom)
Lack of training	Lack of EE training
Lack of content knowledge	Lack of content knowledge (don't know enough about the subject)
<b>ATTITUDINAL</b>	
Lack of student interest and/or commitment	Students not interested in EE
Lack of student understanding	Students don't understand EE
Controversy of the topic	EE is a controversial topic
<b>CONCEPTUAL</b>	
Lack of relevance to teacher's curriculum	Not relevant to what I teach
Major focus on other disciplines/subjects	More important subjects exist
Seeing EE as a unique entity rather than integrati subject	EE is not part of other subjects (should be more as one subject)
Inappropriate integration of EE within other subjects	Additional statement 1
Issues connected to specific settings	Additional statement 2

### 5.5.2. Q-Set

Q-Methodology consists of a set of cards with statements about a particular topic that are drafted and presented to the participants. In this research, each teacher was presented with 25 cards with statements on barriers to EE. Detailed procedural instructions were explained to participants. Cards were then sorted by the interviewees according to the importance and personal beliefs they had towards each card through normal distribution, where “-4” indicated the statement they *disagree with the most* while “4” meant *most agree with* (see Figure 2).

MOST DISAGREE	WHY IS IT HARD TO TEACH ENVIRONMENTAL EDUCATION?							MOST AGREE
-4	-3	-2	-1	0	1	2	3	4

Statements: Lack of preparation time (don't have enough time to prepare material), Lack of teaching time (not enough hours available), Poor teaching aids (books, other material), Heavy workload, Lack of government support, Not enough money to support activities (finances), Not enough nature around (nothing or very little to show children), Safety and liability (classes outside) classroom management, Problems with transportation, Class size too big, Class size too small, Testing instead of practical knowledge, Not in the curriculum, Lack of support from school administrator, Lack of practical knowledge (working outside of the classroom), Lack of EE training, Lack of content knowledge (don't know enough about the subject), Students not interested in EE, Students don't understand EE, EE is a controversial topic, Not relevant to what I teach, More important subjects exist, EE as a stand-alone subject, Inappropriate integration of EE within other subjects, Issues connected to specific settings

Figure 2: Q-Set Board and Statement Cards Presented to Teachers

Throughout the process of card placing, teachers were asked to elaborate on the placement of the card and the relevance to their teaching. Once they placed all the cards (creating **Q-Sort**), they were asked once again to review their choices and comment on the most and least relevant factor they have chosen. Moreover, they were asked to elaborate on steps or concrete actions that they personally, their educational institution, or government could take to eliminate the biggest barriers. Lastly, they were encouraged to provide personal stories and encounters with specific barriers bridging the connection with the MEEC model.

### 5.5.3. Interpretation of created groups

After analysis of data from 22 interviewed teachers through the *KADE* software designed to categorize Q-Sorts, participants were distributed into four groups based on the most common variance in their Q-Sorts. The four-group analysis which was extracted through principal components explained over half of the total variance (53%) and all the participants were included as defining variables (detailed process in Appendix 4). Table 3 further describes the specification of demographic factors for the teachers included in each of the groups. Statistical process for assigning teachers to corresponding group and the teacher to group specification can be seen in Appendix 5.

Table 3: Teachers' Demographic Information by Factor

	Group 1	Group 2	Group 3	Group 4
Number of Participants Assigned to Factor	6	8	5	3
Females <sup>a</sup>	6	5	3	3
Mean Age <sup>b</sup> (SD)	41.00 (9.59)	36.75 (6.48)	39.20 (9.20)	53.33 (11.50)
Teaching Experience <sup>b</sup> (SD)	15.50 (8.02)	11.88 (7.70)	13.60 (7.77)	25.33 (13.32)
Teaching Experience at Current School <sup>b</sup> (SD)	10.00 (9.69)	7.36 (6.41)	6.80 (5.93)	11.86 (10.38)
Teaching Grade 1-5 <sup>c</sup> (%)	50	50	60	67
Rural School <sup>d</sup> (%)	33	25	80	67
Governmental <sup>e</sup> (%)	50	75	100	67

<sup>a</sup> Remainder of participants were male; <sup>b</sup> In years; <sup>c</sup> Remainder of participants were teaching grade 6-10; <sup>d</sup> Remainder of participants were teaching in urban schools; <sup>e</sup> Remainder of participants were teaching in private schools

Once the groups were extracted, separate distinguishing statements were exposed (see Table 4). This table shows the rankings of each of the 25 provided statements that were generated for the four extracted groups based on the Z-score (see Appendix 6 for detailed statistical process).

Table 4: Group Array, Including Statements' Score and their Significance

		Group 1	Group 2	Group 3	Group 4
	No. of Defining Variables	6	8	5	3
	% Explained Variance	20	14	10	9
	Cumulative % Explained Variance	20	34	44	53
	Eigenvalues	4.4744	3.174	2.2486	1.9755
<b>LOGISTICAL</b>					
S1	Lack of preparation time (don't have enough time to prepare material)	0	**>3	*< -2	0
S2	Lack of teaching time (not enough hours available)	* 1	*>2	** -1	**< -3
S3	Poor teaching aids (books, other material)	-1	1	**< -4	**> 3
S4	Heavy workload	*1	* 2	**< -2	**> 4
S5	Lack of government support	**> 3	-1	0	-2
S6	Not enough money to support activities (finances)	-2	**>2	*	-1
S7	Not enough nature around (nothing or very little to show children)	0	0	1	-1
S8	Safety and liability (classes outside classroom management)	2	**< 0	2	2
S9	Problems with transportation	-3	-2	*>2	*1
S10	Class size too big	0	1	0	1
S11	Class size too small	0	-1	-1	0
S12	Testing instead of practical knowledge	2	0	1	**< -2
S13	Not in the curriculum	-1	**< -3	0	**> 2
S14	Lack of support from school administrator	-3	*< -4	**> -1	-3
<b>EDUCATIONAL</b>					
S15	Lack of practical knowledge (working outside of the classroom)	**> 3	0	-2	0
S16	Lack of EE training	1	1	3	3
S17	Lack of content knowledge (don't know enough about the subject)	1	0	**< -3	1
<b>ATTITUDINAL</b>					
S18	Students not interested in EE	0	* -3	0	*< -4
S19	Students don't understand EE	-2	-2	0	-1
S20	EE is a controversial topic	-2	1	2	-1
<b>CONCEPTUAL</b>					
S21	Not relevant to what I teach	-1	-2	-3	0
S22	More important subjects exist	**< -4	*4	** -1	*2
S23	EE as a stand-alone subject	-1	-1	**>1	-2
S24	Inappropriate integration of EE within other subjects	2	-1	3	0
S25	Issues connected to specific settings	4	*3	4	**<1

Legend: \* Distinguishing statement at P< 0.05; \*\* Distinguishing statement at P< 0.01; ► z-Score for the statement is higher than in all other groups; ◀ z-Score for the statement is lower than in all other groups

## **5.6. Additional Methodological Considerations**

### ***5.6.1. Study limitations***

The first limitation of the study comes with the Q-Methodology, which despite producing significant results, causes a lack of facilitation with other studies that use different methods in various educational and situational contexts (Anderson & Jacobson 2018: 1694). The statistical comparison of results was limited by the lack of literature provided in the developing context and the fact that the researcher alone could not review all the existing literature regarding this topic within a given time and resources to create a fully representative set of cards.

Moreover, while conducting a case study allows for a more in-depth analysis, it is not equipped to create a generalization that can be applied in other contexts (Fryberg 2006). While the effort was to include a wide spectrum of factors, the study still remains limited to the particular settings of the seven chosen schools and the teachers interviewed in them (Creswell, 2014).

Lastly, when talking about limitations and validity of results, one must think of language (Temple & Young, 2004). English is neither the author's nor any of the participants' native language. Hence, it must be taken into consideration that some valuable information might have been lost in the translation through different channels. Moreover, two interviews were conducted with the help of a translator, making it harder to compare the results directly to each other, especially in consideration of the dominant nature of the particular translator (ibid 162).

### ***5.6.2. Ethical considerations***

In line with qualitative research principles and academic ethical standards (Bryman, 2012) each interviewed teacher was informed about the scope of the interview topic and has given verbal consent prior to the recording. Interviewees were told of the possibility to withdraw from the interview whenever they would feel uncomfortable and would not want to continue. While it might be considered that a written consent form would have more tangible value, the reason to use only a verbal consent form was purposeful. Creating a verbal rapport, and not presenting teachers with formal letters, such as a consent form, has created a more relaxed and less formal atmosphere to initiate the interview. Further emphasis was placed on keeping the anonymity and confidentiality of each participant (Kaiser, 2012). Hence, all the names of the teachers were synonymized.



### **5.6.3. Positionality**

Considering one's positionality within the research is quite crucial, not only throughout the interviews but also through the transcription and analysis of the data where the researcher has to be self-reflective about their role (Bryman, 2004:682). While certain parts of perceived domination were at place throughout interviews, Rose (1997: 312) states it might be challenging to define these positions exactly, however the researcher should be persistent in minimizing them.

Each researcher comes with certain predispositions in the way they interact with people and how their answers are interpreted. This is potentially reflected in understanding of different power relations that have been observed throughout the interviews. One way of dealing with this type of positionality was to elaborate on the role of the researcher as a student and the fact that this practice was seen as a valuable learning process of empowering teachers' experiences (Scheyvens et al. 2003: 151). The other way to deal with subjectivity was to provide the interviewee with a clear and resonant voice, thus an extensive number of direct quotes are used in the analysis section.

## 6. Analysis

The analysis section is divided into four different subsections based on the four groups of teachers that were extracted through the Q-Methodology (see Appendix 5). Each section starts with a short description of demographic information of the teachers within the group, then continues by the analysis of their beliefs and experiences which are connected to the corresponding Q-Sort in consequent section (see Appendix 6). This connection facilitates the analyses of teachers' perception of different barriers to EE and the importance they place on them while referring back to the beliefs and experiences. Lastly, each section concludes by analysis of teacher's commitment to teach and their response in eliminating EE which act as a direct consequence of their experiences, beliefs and perception of barriers.

### 6.1. Teachers' Group 1: Good Attitude vs. Diverse Barriers

Table 5: Demographic Information for Group 1

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current. School, Years	Teaching Grade	Subject	Type of School	Area
RKVS1	30	Female	4	4	6, 7	Math	Private	Rural
RKVS2	36	Female	9	6 months	10	Chemistry, value education	Private	Rural
UOR2	49	Female	23	6 months	4, 5	Math	Private	Urban
UCBSE1	46	Female	22	20	9, 10	English, geography	Gov.	Urban
UCA1	32	Female	13	13	1 - 4	Marathi and EVS	Gov.	Urban
UCA2	53	Female	22	22	2	English, Marathi	Gov.	Urban
Average Group 1	41		15.50	10.00				
Overall Average	40		15.09	8.56				

#### 6.1.1. Experiences and beliefs of teachers: 'I think I am in the right place'

The choice of becoming a teacher within group one was rather versatile. Some of the women within this group wanted to be a teacher from their childhood on and their passion resonated quite strongly through the interviews. Teacher UOR2 stated:

It was always by choice that I wanted to be a teacher, it was never by chance. So even before I could be a teacher, right after school, I was teaching little children, actually, that's when I decided this is where I want to go ahead in my life...So I think I'm in the right place.

Others stated that they had no other choice than becoming a teacher. UCA2 became a teacher because of 'poor financial condition' throughout her college years, which resulted in providing

lectures to her peers. UCBSE1 wanted to become a police officer, but family pressure led her to switch profession. RKVS1 experienced a similar situation when her husband moved, and despite having an engineering graduate degree, she had to become a teacher. While these examples expose the strong hierarchy and social interdependence that these women experienced when they were entering the job market, they have all expressed that teaching has become something that they now enjoy doing. As UCBSE1 elaborated: she is 'very happy to be a part of this institute and part of this profession'.

Indeed, the period of their childhood, college, and early adulthood was related more to them becoming a teacher rather than being associated with their interest in EE. Nevertheless, teachers within this group have expressed strong opinions, regarding their beliefs about teaching EE. They not only deeply cared about EE, but they have seen it as a necessary tool for a sustainable society and a better future for the children. RKVS2 stated: 'I want to bring my students eco-friendly...to bring a bright future'. UOR2 elaborated on the importance of EE being part of the curriculum stating that 'children can relate to it', since they experience it daily. UCBSE1 related EE issues to something that was 'close to her heart', such as deforestation and cruelty towards animals. Lastly, UCA2 connected the importance of EE to good quality of life and particularized on the importance of keeping the environment neat, connecting her duty as a teacher to the motto of Mahatma Gandhi: 'Cleanliness is next to godliness'.

The same teacher was also the only woman within this group that have expressed normative beliefs. UCA2 mentioned the importance of the school principal that encourages students and helps them understand their impact the environment.

The most resonating beliefs within this group of teachers were the control beliefs. RKVS2 mentioned global warming and the ozone layer. She encourages her students and facilitates topics that are relevant to current settings, such as establishing a science exhibition focused on agricultural practices to bring forward 'eco-friendly organic farming'. UOR2 supports this practical learning in light of climate change and different issues not only in India but around the world:

We talk to the children on these issues. And that's how they can relate to it because they see it happening around them...What are these things? What are the actions that we can do as we are the 21<sup>st</sup> century learners? ...What is their part and opinion on that? ...How they want to work towards that, to make this place a better place for all of us.

UCBSE1 elaborated that the environment should be understood ‘beneath what you see in the textbook’ and that topics such as alchemy of nature bring students close to understanding that there are ‘different ways in which we touch environment and we feel that how important it is for us, it is because of them that we are there today’. UCBSE1 emphasized the fact that India is a traditional country in the sense that people are connected to the ‘river, the trees, and nature’ underlining the significance of EE. For this reason, students should be encouraged to take part in practical day to day activities. Lastly, UOR2 concludes this discussion by also pointing out the connection between the environment and social aspects:

We want to be more responsible towards the environment. And it can be social environment, it can be this environment; connected to water, air, humans, social behavior, anything. There are so many aspects to that, it's very difficult to just catch one of them.

### 6.1.2. Finding connection within Q-Methodology

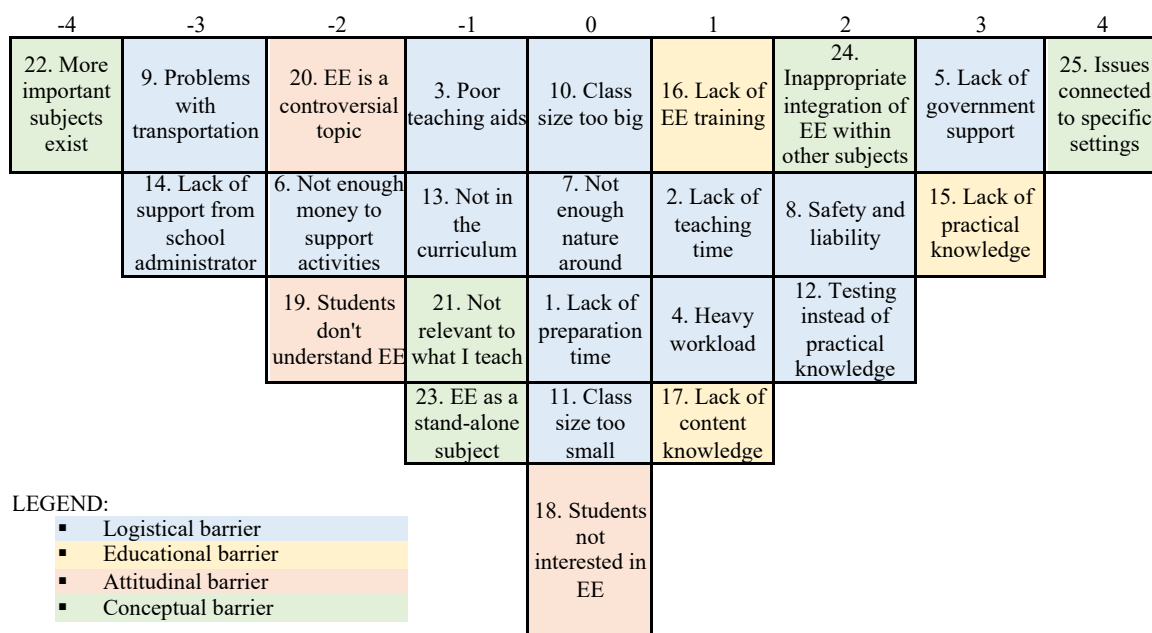


Figure 3: Composite Q-Sort for Group 1 (see Appendix 7)

Looking at the Q-Sort created by group one teachers, it can be seen that the main barriers were rather variegated, however, a clear connection to their beliefs and experiences resonates throughout. The three biggest barriers included conceptual issues connected to specific settings, educational lack of practical knowledge as well as a logistical issue connected to a lack of government support. Teachers have complained about the government often demanding paperwork and having more of an informative function rather than a supportive one. UCA2

mentioned that it is often forgotten that there are certain issues connected to specific locations such as slums where children live and ‘it is very dirty’. In her opinion is the duty of the government to resolve these issues so children can focus on education. Presently, even though these schools have applied EE in their curriculum, it often wasn’t relevant to the situation of the children, thus minimizing the impact of meaningful EE and creating frustration in teachers. Moreover, teachers felt limited in their powers. As stated by UCBSE1 ‘the school works according to the curriculum’ and teachers ‘cannot go against that or anything other than that’.

Teachers within this group were passionate about practical learning, which they wanted to apply in their subjects, as strongly expressed through their beliefs highlighted in the previous section. Hence, it is understandable that this particular barrier created frustration in their minds and ranked so high.

Interestingly, lack of practical knowledge was placed as the biggest barrier followed by lack of EE training and lack of content knowledge, all educational barriers. While some of the teachers assigned the lack of knowledge to their colleagues stating that ‘they’ should have proper training and ‘they’ should have knowledge in that field, others talked rather collectively about this issue, stating that ‘we [the teachers]’ do not have the practical knowledge as a result of teaching in the classroom environment. Perhaps the most noteworthy observations within this group was that teachers would be so keen to apply practical learning, but simultaneously singled out the lack of needed education as some of the biggest barriers. Only UCA1 being asked whether she possess enough content knowledge stated:

As per my knowledge I'm not perfect yet...so and every human being is the end of age, it means that they have to learn something... I think I'm not perfect. I want to take more knowledge.

It is worth to also mention the other side of the spectrum in connection to their experiences and beliefs where the strongest factor was the *disagreement* with the fact that more important subject exists, which is fully aligned with their expressed experiences and beliefs. UOR2 stated that EE is ‘the utmost important subject’ and ‘need of the hour’ and UCA2 added ‘we have to place environment first because if there is no environment, there is no us’.

### ***6.1.3. Pro-active and practical approach***

Teachers within the first group found a consensus in the need of practical application of EE.. As UOR2 elaborated:

Children should be given an opportunity. [Knowledge] on papers is fine, but then they should be given some outlet whether can do things. Small way where they can make a difference for the society.

RKVS1 further expressed that ‘practical knowledge should be tested so then the learning can be enhanced’. However, since EE is not a standalone subject this might be a problem. UCBSE1 added that teachers ‘have other workload’ which makes their time distribution quite challenging. However, she believed that if EE was one subject, she would be able to ‘balance’ her time. Teachers in this group agreed that proper training for them and their colleagues is needed. UOR2 said teacher struggle with practical application:

How to deal with these [environmental] issues and how to talk to the students about. What to expect from them, what are the next steps they can take, talking about it is very easy, but then putting them it into action.

A similar statement came from RKVS2 who emphasized that ‘we [the teachers] can use some practical knowledge’ and UCBSE1 concluded that this will facilitate teachers to ‘teach children what they want them to’.

What was apparent in this group was that teachers were pro-active and not afraid to take steps towards implementation of EE. Their main struggle was with their limited position as a teacher, since they are still bound by rules administered from the government and school administration and expressed a wish of a bigger power within the education system.

## 6.2. Teachers' Group 2: Mentoring vs. Conceptual and Logistical Barriers

Table 6: Demographic Information for Group 2

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current. School, Years	Teaching Grade	Subject	Type of School	Area
RPU1	46	Male	25	9	5	Science, social science, math	Gov.	Rural
RPU2	39	Female	15	13	6 - 8	English, math, social science	Gov.	Rural
UWE1	35	Male	10	2	2	English	Gov.	Urban
UWE3	31	Male	4	4	5 - 8	Math, EVS	Gov.	Urban
UOR1	40	Female	4	5 months	1 - 3	Math, behavioral studies	Private	Urban
UOR3	25	Female	4	5 months	1 - 5	Psychological support	Private	Urban
UCBSE2	37	Female	17	15	5 - 8	Social science, history, geography	Gov.	Urban
UCBSE3	41	Female	16	15	5 - 10	Science and math	Gov.	Urban
RPU1	46	Male	25	9	5	Science, social science, math	Gov.	Rural
Average Group 2	36.75		11.88	7.36				
Overall Average	40.00		15.09	8.56				

### 6.2.1. Experiences and beliefs of teachers: 'For me teaching comes naturally'

When it comes to the choice of becoming a teacher, four of the teachers did not see this position as their first choice. UOR3 has entered the psychology field which later on guided her towards teaching, while RPU1 was unable to find applications within business administration. UCBSE2 was educated in Java programming, however, market failure and parental pressure made her switch the profession, and lastly, UCBSE3 wanted to become a doctor, but after failing the state exam she was encouraged by her family to pursue teaching. However, similarly to group one, each of these teachers expressed content of "ending up" in this position. UCBSE2 said she feels 'lucky' and 'grateful' while UOR3 sees her previous education in psychology as a benefit being a teacher. The strongest legacy was expressed by UCBSE3, where becoming a teacher has helped her in exploring her own strengths and confidence as a person and 'accepting all the challenges' while having a pro-active attitude. However, only UOR1 connected her choice of profession to her childhood experience:

For me, teaching comes naturally. In fact, when I was a baby, I used to see my mentors, my teachers, teaching me and the way they used to teach me fascinated me...every time I would think maybe one fine day I got a chance to do it on my own.

Within this statement, the role of the educator was perceived through a holistic societal view, as it was described by Shukla (2014), where the teacher's role is also seen as the one of mentor.

Similarly, UWE1 said that ‘a teacher is a person that can attract 1000 of people at the same time’, and ‘spread name and fame of the school not only in India but all over the world’. Both of these statements show the importance of perception of teachers in Indian society and just how these beliefs shaped the decision of these teachers to choose their profession.

And while all of them expressed positive attitudes towards their profession, one of the biggest differences in this group arises from various beliefs about teaching EE. Four of the teachers had a resonant voice and saw EE as integral parts of childhood development. UCBSE3 explained that nature, humans, and their behaviors are deeply connected and consequently affect each other on multiple levels. However, UOR3 stated that ‘a lot of people never had any practical learning’ which makes it harder for them to be responsible. She further added that ‘Theoretical knowledge is very easy to give, but to deal with it with practically [is needed]’. UCBSE3 pointed out flaws in the curriculum which is not adjusted to properly apply EE: ‘we should start developing [EE knowledge] right from a very early age rather than putting it in an eight standard or ninth standard, that is slightly delayed’.

Remaining teachers, however, did not have any strong opinions on the topic of EE. Their knowledge was mostly based on books, literature, or the prescribed curriculum. The only exception was seen through RPU1 who would use ‘personal stories’ to elaborate on different issues surrounding the environment. A personal connection to the environment could be also observed through statements from UOR1, which pointed out issues connected to cities such as Mumbai and Delhi where pollution levels are categorically high, consequently affecting the citizens’ health. Pollution was mentioned by multiple teachers bridging the connection to the fact that the majority of the teachers within the second group belonged to the urban area.

Lastly, normative beliefs played an essential role in their lives. Teachers felt especially supported by their school administrators who would often encourage them or inspire them to do better in their jobs. The teachers stated that their requests have been considered by the school administrator and often resulted in an application if circumstances were favorable. Most said that it was freeing for them to be open with their opinions which created real reassurance in their skills. UCBSE3 stated, that by having role models such as their principals, they are encouraged to become exemplary themselves.



### 6.2.2. Finding connection within Q-Methodology

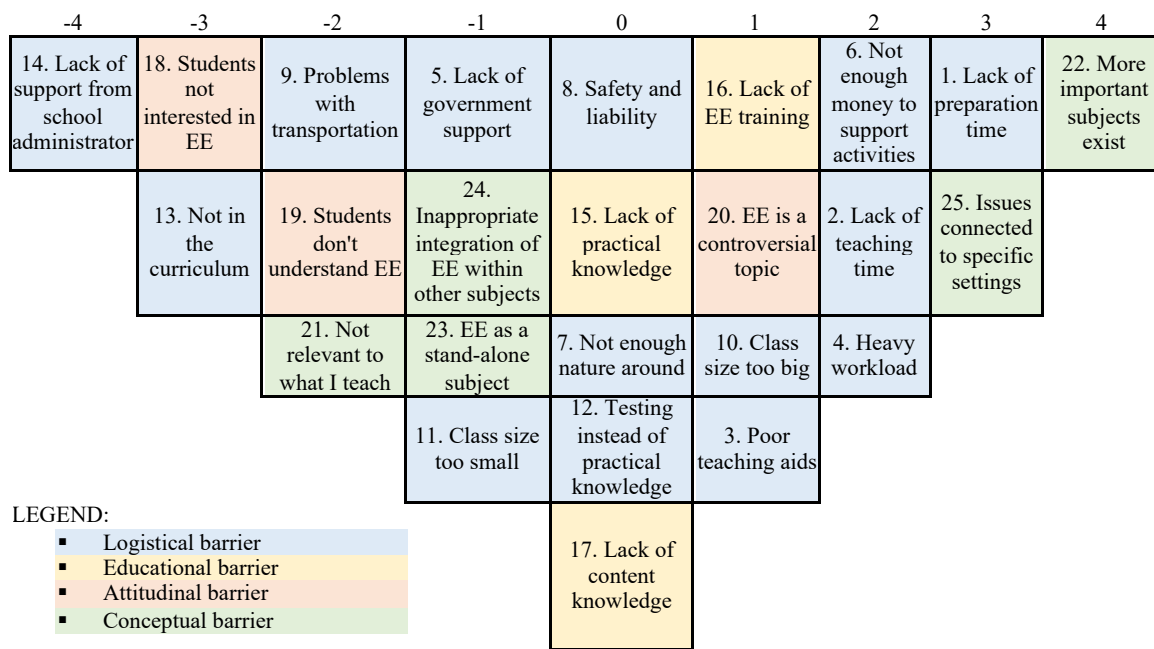


Figure 4: Composite Q-Sort for Group 2 (see Appendix 8)

Looking at how vocal teachers were about the importance of EE as a subject it is understandable that this card placed the highest on their Q-sort. UOR3 stated: ‘I believe EE is as important learning matter, because [the students] will have to use that knowledge to survive’. Since in their perception other subjects are having priority over EE they see it as the biggest barrier. This placement creates noteworthy observation in comparison to group one where the same card was placed on the opposite side of the scale and shows how differently teachers can interpret the same statement.

Another conceptual problem characterized by this group was the issue connected to a specific setting. Teachers were mentioning policies that should be applied by the government at the local or regional level to minimize specific pollution affecting the selected area. Some of them believed that only measures such ‘strict ban’ as elaborated by UCBSE3 can help in the elimination of the issues connected to a specific setting.

Other teachers pointed at the lack of teachers’ power. Their curriculum is regulated through external sources, which leaves them only limited space for any kind of alteration. There is no voice, time or additional support provided for the group of teachers that would like to apply the change. Teachers within this group heavily criticized multiple logistical issues, such as lack of preparation and teaching time and heavy workload. This creates another important connection to their life experiences and beliefs. Since they perceive being an educator as something holistic

and connected to mentoring, it is understandable that they would not place educational barriers high. Teachers were confident about their motivation to teach however, these somewhat “external agents” were limiting them in proper application.

On the other hand, support from the school administrator was placed as the biggest advance for the teachers in this category. Each of them stated that their school administrators, were extremely supportive of their activities and even pushed their initiatives forward creating connection to their experiences and beliefs.

### ***6.2.3. A teacher without appropriate training is like a doctor without a license***

Teachers in this group have provided many innovative solutions and sparked an interesting debate around EE. Similar to group one, they also thought that appropriate EE training could enhance the way they teach the subject. As UOR1 put it:

A doctor will not operate somebody until he has a certain education. The teacher will not teach until she is trained to do. Especially for the EE you need very high knowledge and how to use and give it. The training over here would help.

UCBSE3 added that the training should not only give the knowledge to teachers but also show ‘how they can make it interesting for the students’ which is ‘the key issue’. She further added that perhaps an app providing ‘daily updates regarding the environment’ together with ongoing issues could help. If teachers are ‘being trained properly’, as she continues, they can teach the subject in ‘impactful way’ and students will take the topic ‘seriously’.

UCBSE2 said that there are workshops available, however these often happen during the school day, meaning that teachers would miss their classes, increasing their workload and creating circumstances where they ‘cannot concentrate’. Hence, employment of more qualified teachers, narrowing down the curriculum and easing up teachers’ workloads were solution that this group established to eliminate different barriers to EE. Teachers also mentioned singling out EE as a unique subject or making a separate period in other subjects oriented solely on EE.

UOR1 stated that the government can give a helping hand in this establishment. She interestingly compared EE within the education stream to becoming an orthopedic in the medical stream. There are different governmental support programs and schemes supporting people to become an orthopedic, then ‘why don't the government come up with some sort of a program which helps [people wanting to become a specialist in EE]’.

### 6.3. Teachers' Group 3: Low Involvement vs. Conceptual Barriers

Table 7: Demographic Information for Group 3

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current. School, Years	Teaching Grade	Subject	Type of School	Area
RSI3	46	Male	16	15	4, 5	Science, PE	Gov.	Rural
RKVS3	24	Female	3	3	1 - 4	English, science	Gov.	Rural
RKVS4	37	Female	10	1	6 - 10	Physics	Gov.	Rural
UCA3	44	Female	24	4	4	Geography, Marathi	Gov.	Urban
RSI3	46	Male	16	15	4, 5	Science, PE	Gov.	Rural
Average Group 3	39.20		13.60	6.80				
Overall Average	40.00		15.09	8.56				

#### 6.3.1. Experiences and beliefs of teachers: 'I have not chosen this job; it was decided for me'

The majority of teachers have not chosen this job, but it was delegated to them by their parents which may explain their low responsiveness during the interviews. RKVS4 said that her father has chosen this position because it was 'secured for girls', RKVS3 wanted to enter the medical field, but her parents decided against it. RSI3 was also pressed by his parents to become a teacher. When asked if there was another reason like children or passion for a subject, his reply was simply 'no' which might be an indication of his low interest in the interview. The remaining two teachers said that now they 'love' their job (RKVS3) or that they are now in words of RKVS4 'a perfect teacher'. RSI1 started teaching because it was his 'ambition' and UCA3 said that becoming a teacher was something highly spiritual to her: 'Teacher's work is holy work. No? Like Jesus. Jesus was a teacher; he was the teacher of teachers'.

When looking at their beliefs about teaching EE, teachers in this group mostly focused on present environmental issues and the different contexts in which they were happening. UCA3 said that 'EE is needed' because issues such as fires in Australia and consequent water and air pollution are happening and thus 'students need to know the importance of the EE'. RKVS3 said that there have been many changes happening in the past and that the resources are scarce and we have to 'get a clear idea of the problem what we are facing now...and get some solution'.

The most resonating irregularity in this group compared to the other groups is that no normative beliefs were detected. Not a single statement showed a connection these teachers might have felt towards EE through their family and peers. Moreover, all except for two of the respondents have shown rather negative or completely neutral attributes, regarding their control beliefs. RKVS3 stated that there is no separate subject for EE, however she said there is nothing she

can or wants to do declaring: ‘we don’t have that much problem in that context’. RSI1 and RSI3 did not add anything to the discussion. A slight difference was seen for RKVS4 who despite being a teacher of physics said that she must expand her focus beyond the subject where she ‘according to the data [from her physics subject] try to solve, but also implement more’. The strongest control belief was shown by UCA3 which after a huge cutting of a tree array colony in Mumbai in 2003 created a school drama in which students presented the problem to the school. She further mentioned that her classes included a focus on things happening “in the neighborhood”, such as ‘Diwali crackers which are polluting the air’ as well as ‘noise pollution connected to the city’.

### 6.3.2. Finding connection within Q-Methodology

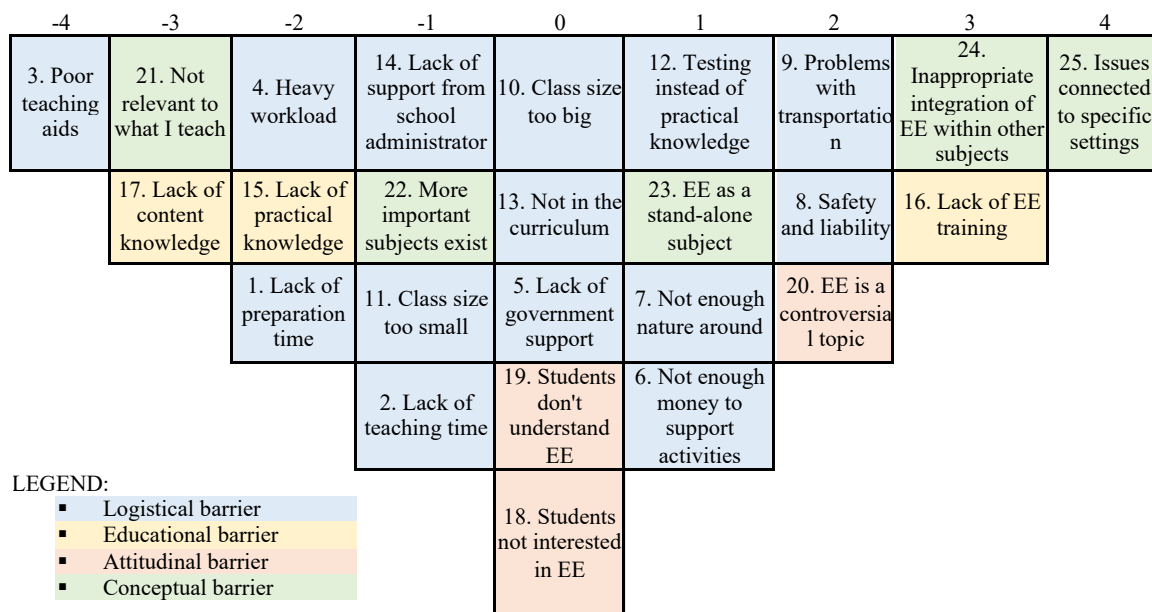


Figure 5: Composite Q-Sort for Group 3 (see Appendix 9)

Teachers within this group were connected by a consensus that conceptual issues are the most pressing when it comes to barriers to EE. Issues connected to specific settings were marked as the biggest problem which is strongly aligned with their experiences and beliefs. UCA3 brought up an interesting point regarding India and different types of cultural celebrations:

There are so many air pollution and voice pollution because of festivals, fireworks and crackers, water pollution... Statues are in the water, make very dirty. Come to shore and no one cleans it. All because different festivals.

The second issue connected to conceptual barriers to implementing EE was the inappropriate integration of EE. The main point made was specifically the amount and difficulty of topics included in the curriculum. This could be also seen in the connection to the fact that becoming a teacher wasn't their first choice and some of them expressed very little enthusiasm to teach in the first place, which could be a contributing factor when motivation is needed to implement new elements such as EE to their subjects. Hence, integrating EE in their curriculum is perceived as a struggle considering the difficulty of topics that are assigned to specific subjects within. RKVS4 elaborated:

Content [is the problem], but actually the content according to the age base. It's very hard for the students and teachers also. Grade five has content for grade seven maybe. Grade seven for grade eleven. It is not well combined.

This issue could be also connected to another conceptual barrier highlighted by this group which is the fact that EE is part of other subjects. Teachers claimed difficulties with integration and stated that EE would have been executed better if it was a stand-alone subject.

Additional issues mentioned in this group were connected to the impracticality of the subject mostly due to high reliance on tests and lack of possibility of conducting classes outdoors because of problems with transportation, safety, and liability as well as the scarcity of nature in surroundings.

On the other hand, teachers within this group were highly confident about their practical and content knowledge. In fact, they ranked both of these statements noticeably higher in comparison to the other analyzed groups.

### ***6.3.3. Drama, low commitment and unwillingness to change***

The commitment of teachers within group three to educate EE was noticeably lesser than the commitment expressed by teachers in previous groups. RSI1, despite stating that 'EE should be important' and 'major part of the curriculum', explained that they 'cannot change [the curriculum]' and that they 'cannot give full importance to EE'.

RSI3 on the other hand pointed out that a separate subject for EE is needed, but concluded that he would not be willing to teach such a subject and someone else should take on the role. RKVS3 said that 'theoretical classes will help them to increase their knowledge' if they are

connected to observation and further stated that subjects that she is teaching, such as science, have enough topics on the environment.

Lastly, even though RKVS4 expressed criticism towards the government stating that it ‘should support school, but it is not regular here’, she added that she just might be not aware that government does something and did not express interest in knowing whether it does. These four teachers were more passive when it came to the improvement that was needed in application of EE, especially if it meant getting outside of their comfort zone and/or expressing the motivation that was needed for the application.

The only exception within this group was with UCA3 who uses drama to educate children through an interactive way on various environmental problems. She would include topics such as ‘air pollution’, ‘increase in carbon dioxide’ or ‘cutting of trees’. She says that this helps the children understand the issue better while they also enjoy the spectacle.

#### 6.4. Teachers’ Group 4: Long Experience vs. Logistical Barriers

Table 8: Demographic Information for Group 4

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current. School, Years	Teaching Grade	Subject	Type of School	Area
RSI2	51	Female	22	21	1, 2	Tamil, English	Gov.	Rural
RKVS5	63	Female	40	7 months	7 - 10	Biology and science	Private	Rural
UWE2	40	Female	14	14	4, 5	EVS, English, math	Gov.	Urban
Average Group 4	51.33		25.33	11.86				
Overall Average	40.00		15.09	8.56				

##### 6.4.1. Experience and beliefs of teachers: Teaching experience vs. the environment

The uniting factor of all teachers within this selected category is that becoming a teacher did not come from a self-motivation but rather was a result of the decision made by various family members.

UWE2 became a teacher because her aunt was a teacher and influenced the decision of her family, further stating that there was no other option, since their mind was made up. RKVS5 came from a poor family with many siblings and said that within her family she was rather lucky to be given the option to study and become a teacher since her sisters and mother didn’t have the same opportunity. As she says: ‘my father gave permission to continue school’ and

when he wanted to take her out it was her ‘gurus, teachers’ that persisted and put pressure of the father to keep her in.

Even within this short statement it is obvious that hierarchy plays a role, especially the gender roles of women and their place in society. Moreover, it describes the role of teachers seen as gurus, philosophers, and guides, whose opinions are taken seriously and, in this case, even outweighed the practices of Indian culture.

The teachers within this group had the highest average age and ten more years of experience than the overall average. Both of these factors played a role in the way they perceived their role as an educator and the role of EE within their subjects. Teachers have complained that in their career they haven’t been given appropriate EE training, however neither have they confirmed that they would have taken part if it would have been provided.

Their beliefs on teaching EE were based on their life experience and their long involvement in teaching. When asked about what type of environmental topics they include in their subject the answers were quite scattered and indeterminate.

UWE2 talked about pollution and trees but also mentioned ‘how we can grow the [human] population’ as one of the topics of EE which is rather unsuitable. She has further mentioned ‘satellites’, ‘solar system’, and ‘communication’ which perhaps shows apprehensiveness towards the topic. RSI1 has focused all her classes on ‘punjaputhas’ which are the elements of nature. However, when asked if she would be able to elaborate on these or provide the connection to existing environmental problems, no answer was provided. Lastly, RKVS5 stated that people nowadays live ‘sophisticated lives’ and do not care about nature which results in the cutting of the trees.

Teachers in this group expressed no normative beliefs towards teaching EE and their control beliefs were also not resonating through their answers. One notable thing was that these teachers were heavily focused on their syllabus, and most of the information they have given to the students came either from provided prescribed textbooks or apps that were created by the government.

### 6.4.2. Finding connection within Q-Methodology

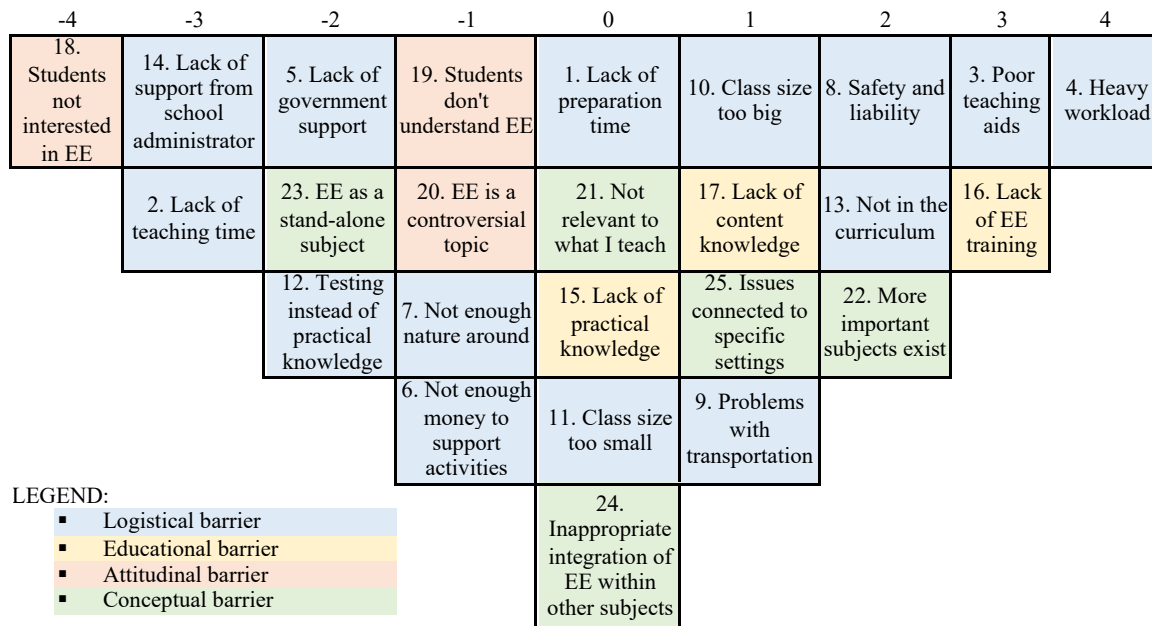


Figure 6: Composite Q-Sort for Group 4 (see Appendix 10)

It should be noted that teachers within this group had the lowest responsiveness, when it came to the Q-Sort. Patterns of answering questions just with one word or not giving any verbal comment to the cards was quite prevalent.

The biggest issues recorded by this group were heavy workload and poor teaching aids. Teachers stated that there is too much pressure keeping up with teaching EE when there are more things they have to take care of in the class, other than the class itself. This was for example associated with record maintaining, where the teachers have to order the records weekly and then submit them to the principal.

Poor teaching aids was another logistical issue highly ranked by the teachers within the group. Once again, this can be linked to their life experiences and beliefs. Since they heavily rely on educational material by the government, on which they place their trust, when the information is insufficient it certainly creates a big barrier for them.

While nature and transportation were both ranked quite low in this group, safety and liability were given high values and resulted in EE classes being often taught indoors, which could be also connected to the high age of the participants and their unwillingness to take risks within their classes. This only added to the importance they place on materials such as books, boards and visual tools and the consequent stagnation of implementation of EE in their subjects.



Teachers within this group also stated that the lack of EE training is one of the main impediments to EE. Moreover, teachers mentioned that while they are being supported by the administration as well as the government, this support does not touch upon EE. If there is training available, it is in regard to different topics unrelated to the environment so that teachers cannot further transfer the appropriate knowledge.

The last important observation was seen when RSI2 and UWE2 have disagreed the strongest with the statement that “students are not interested in EE” giving it both -4 score, while controversially RKVS5 marked this as the biggest barrier stating that her ‘ancestors lived outside not in the room’ but the modern world with TVs and cellphones makes student ‘highly interested in studying’ and makes it difficult to bring ‘awareness of this environment’.

#### ***6.4.3. Students are not interested, and neither am I***

Quite interestingly all the teachers in this group agreed on one thing when it came to EE, and that was the fact that classes should be taken outside more often. However, each of them has taken a different approach to the same solution. UWE2’s reasoning for why children should have outside classes and why those classes are not happening was as follows:

We should take the children for field trips, to show them. Like we have *Euro Planetarium*, we can show the children stars and planets and we can give them information, but these places are not very nearby. We have to take them far and we don’t have the teaching aid to take them.

On the other hand, RKVS5 elaborated once again on her skills as a teacher and blamed agents for why the classes are not happening outside:

We are trying to cultivate it in we are giving and again and again this part about we are living in an environment it is must. To keep our environment safe. So, the children are not at all [interested]. But the students are only inside the class.

Lastly, RSI1 was the least vocal out of the three and simply stated that ‘more practical approach is needed’. When asked if she could elaborate on the point, the only addition was ‘include field trips’.

## 7. Conclusion

The purpose of this study was to answer the following questions: *What role do teachers' life experiences and beliefs play in the formation of their attitude towards the implementation of EE in their subject within Indian primary schools? How do teachers in these schools perceive logistical, educational, attitudinal, and conceptual barriers to EE; how are these affecting teachers' attitudes towards EE?* In the following section, the main summaries of this study will be highlighted.

When it came to the application of EE within primary schools, this study has found that life experiences and beliefs play an essential role in the formation of teachers' attitudes towards EE as a subject. While previous assumptions could have been that childhood plays a crucial role, it was uncovered that attitudes were mostly formed throughout adulthood and by certain beliefs that teachers were exposed to. Whether teachers chose this position or were forced by their family members and other societal factors affected their attitudes towards teaching. If encouragement was involved and teachers came to enjoy their job, their attitudes were positive. However, if the job decision was done through force, teachers showed resistance towards their job and showcased a lower motivation to follow their profession.

Teachers that have expressed normative beliefs and felt supported by their colleagues, principals, or family members, showed greater motivation and a positive attitude. A similar pattern was observed in teachers that have seen themselves as creators of normative beliefs and consequently acted as mentors towards students. Likewise, teachers with strong control beliefs were more likely to overcome obstacles and came up with innovative solutions and ways to enhance EE within their subject even if financial and/or time resources were scarce.

Lastly, their beliefs about teaching EE have shown to be strongly affected by current happenings, not only on a local scale but also globally. It was highlighted that the more sources of information teachers have used such as the internet, TV, news, and textbooks, the more aware and involved they were in the subject. Nonetheless, the strongest beliefs were expressed by teachers that were in some way directly affected by an environmental issue which consequently created their strong drive to eliminate it.

The second question: *How do teachers in these schools perceive logistical, educational, attitudinal, and conceptual barriers to EE; how are these affecting teachers' attitudes towards EE?* revealed interesting complementary findings. An undoubtful correlation was exposed

between the experiences and beliefs of teachers and their perception of barriers. Teachers that have shown little motivation to teach in the first place had the conception that their knowledge was sufficient, and it was the other factors, such as uninterested students or logistical barriers that impeded their efforts to apply EE. On the other hand, teachers with strong beliefs towards the environment who also expressed normative and control beliefs would look at themselves more critically and placed education barriers as some of the more significant barriers to apply EE. This study has further exposed that the biggest issues experienced by highly motivated teachers were the lack of proper and practically oriented EE training and not enough support on the application of EE from the government. This was explained by the high placement of conceptual and logistical barriers. Despite these obstacles, highly motivated teachers were still able to find a way to apply EE in their classes.

Hence, through the MEEC model and the research by Ham and Sewing, this study was able to an extent explain why some teachers can overcome the barriers of teaching EE, whereas others do not. The study has shown that some are able to follow through on their positive attitudes toward teaching EE, despite the existence of barriers, which correlated with their deeper commitment to EE while teachers uninterested in the job, who are bound to old ways of teaching and refuse critical and innovative teaching can be an impeding factor in the application of EE. Understanding the development of different backgrounds that teachers come from and consequently influence their commitment to teaching EE is crucial for the future of EE and potential social change. Firstly, conducting similar research on a wider scale could be central in the formulation of strategies for preparing young teachers to teach EE. Even small-scale applications at individual schools could help to facilitate a better selection of teachers for EE. Moreover, both pre-service training and in-service educational programs focused on EE could be improved by understanding different factors influencing teachers' attitudes and the importance they place on different barriers. Additionally, career counselors could benefit from guiding youngsters with specific life experiences towards careers in EE.

As Kothari & Chairman (1966) emphasize, any kind of change has to come at a grand scale and catalyze the society that is bound to tradition into its modernized version. Hence, the application of similar research within educational institutions could lead to the development of a generation of teachers more committed to EE. Lastly, it can potentially create a tool that helps to solve the challenging task of social transformation, which involves metamorphosis of habits and reorientation of values in order to equip the citizens with a brighter environmentally friendly future.

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# Appendices

## Appendix 1: Information about Interviewed Schools

INFORMATION ABOUT INTERVIEWED SCHOOLS

School	Area	School established	Number of teachers	Number of students	Students per class	Periods per day
Panchayat Union Primary School, Chittoor, Kalligudi, Madurai Dist. Tamilnadu, India	Rural	1960	8	110	16	6
Panchayat Union Primary School m.Puliyankulam, Madurai Dist. Tamilnadu, India	Rural	1963	20	175	30	8
Kshatriya Vidhyasala Centenary School, Virudhunagar, Madurai Dist. Tamil Nadu, India	Rural	2010	45	430	20	10
Versova Welfare Association School, Mumbai, Maharashtra, India	Urban	1962	60	2000	60	9
Orchids Global Learning Academy, Mumbai, Maharashtra, India	Urban	2019	22	50	4	8
Cosmopolitan's Primary School CBSE, Mumbai, Maharashtra, India	Urban	1965	52	1800	60	10
St.Catherine's Primary School, Mumbai, Maharashtra, India	Urban	1971	13	450	35	6

## **Appendix 2: Interview Guideline**

### **Questions for Principal**

School established in:

Number of teachers:

Number of students:

Students per class:

Periods per day:

Classes:

### **Questions for Teachers**

#### **1. Demographic questions**

- Name:
- School:
- Age:
- Gender:

Teaching experience (years):

Teaching experience at current school:

What grade currently teaching:

#### **2. Open-ended questions**

Why have you decided to become a teacher?

How do you understand EE being part of what you teach?

Did you conduct any previous trainings in relation to EE?

When you teach about EE, where do you get your information from:

What are the different environmental problems discussed or taught in your class?

#### **3. Q-Sort**

#### **4. Additional questions for participants**

Do you have any personal experiences with certain barriers?

Would you like to name any additional barriers that were not mentioned in the table?

Ideas for diminishing barriers:

### Appendix 3: Categorization of Literature Review

The selection of literature was done through keywords association including "EE", "sustainability", "teachers", "education", "barriers" and similar related terms. All together the researcher has reviewed 45 different peer-reviewed global studies dealing with barriers in primary education. Once the literature was reviewed, 40 different barriers that have been frequently mentioned throughout the literature were identified and listed. These were then categorized based on four different groups of barriers to EE according to Ham's and Sewing's model: logistical, educational, attitudinal, and conceptual:

BARRIER	CITATION IN GLOBAL LITERATURE	TOTAL %
<b>LOGISTICAL</b>		
1. Challenged by time constrains (preparation)	F, J, M, N, P, R, U, Y, Z	20.0
2. Challenged by time constrains (teaching)	B, E, F, M, N, P, R, S, U, Z, A', C'	26.7
3. Poor teaching aids	B, J, M, N, P, R, S, Y, A', E'	22.2
4. Heavy workload	B, J, P, D'	8.9
5. Unavailability of manual/handbook	B, E, F, J, K, N, P, R, Y, E'	22.2
6. Lack of governmental support	B, M, N, P, R	11.1
7. Technology	B	2.2
8. Finances	E, F, J, M, O, S, T, U, Z, W	22.2
9. Absence of natural environment	F, M, N, S, C'	11.1
10. Classroom management (safety, liability, etc.)	F, G, M, S, T, B'	13.3
11. Unavailable transportation	F, M, O, S, W	11.1
12. Inadequate class size	F, R	4.4
13. Inadequate class size	F, R	4.4
14. Inappropriate setting	G, B'	4.4
15. Emphasis on testing	M, T, A', C', D'	11.1
16. Lack of community support	M, P, R	6.7
17. Issues with curriculum	F, M, N, P, Q, R, Y, C', D'	20.0
18. Lack of support from the school administrators	B, F, H, M, N, P, A'	15.6
<b>EDUCATIONAL</b>		
19. Lack of training in particular setting	B, C, G, M, O'	11.1
20. Lack of training	G, J, M, O, H', O'	13.3
21. Lack of content knowledge	B, C, D, E, F, I, J, L, M, N, O, R, Y, H', J', K', M', N'	40.0
22. Wider educational barriers	C, M, N, Q, D', L'	13.3
23. Lack of pedagogical knowledge	F, L, M, N, O, T	13.3
24. Inadequate trainings	I, M, O	6.7
25. Teacher's misgiving about their own competence	E, J, P, T, D', J', K', Q'	17.8
<b>ATTITUDINAL</b>		
26. Lack of student interest and/or commitment	B, N, C', X, G'	11.1
27. Lack of teacher's interest and/or commitment	E, J, M, N, Q, B', C', I'	17.8
28. Lack of student understanding	L, C', X, G, L'	11.1
29. No career enhancement opportunity	A, C', R',	6.7
30. Uncomfortable feeling associated with outdoor classes	M	2.2
31. Different prioritization	T, D', I', R	8.9
32. Controversy of the topic	M, T, M', N', R'	11.1
33. Teachers confidence	A, B, G, H, M, P, S, Y, N',	20.0
<b>CONCEPTUAL</b>		
34. Lack of relevance to teacher's curriculum	F, M, N, P, T, D'	13.3
35. Lack of relevance to teacher's grade	M, T	4.4
36. New growth of ecology	C	2.2
37. Major focus on other disciplines/subjects	E, H, I, M, N, P, T, Q, D'	20.0
38. Misconceptions/ misdirection in terms	I, H, O, W, L'	11.1
39. Emphasis on cognitive aspect of EE	E, D'	4.4
40. Seeing EE as a unique entity rather than integrative subject	G, I, M, N, C'	11.1

Citation Code: A, Evans et al. (2012); B, Rahman et al. (2018); C, Talero (2004); D, Ravindranath (2012); E, Ham & Sewing (1988); F, Ham et al. (1988); G, Simmons (1998); H, Moore (2005); I, Briggs et al. (2018); J, Stone (1989); K, Simmons (1989); L, Fox & Carpenter (1992); M, Ernst (2007); N, Kim & Fortner (2006); O, Ernst (2007); P, Chi-Kin Lee (2000); Q, González-Gaudiano (2007); R, Lee et al. (2009); S, Hanna (1992); T, Lemmey (1999); U, Smith-Sebasto & Smith (1997); W, Kethoilwe (2007); X, Moseley & Utley (2008); Z, Bruyere et al. (2012); Y, Cronin-Jones et al. (2003); A', Easton & Monroe (2002); B', Waite (2009); C', Fisher (2001); D', Menon (2004); E', Carrier et al. (2013); F', Monroe (2002); G', Richardson (1996); H', Ghosh & Mohan (2015); I', Kremer et al. (2005); J', Verma & Dhull (2017); K', Siddiqui

## Appendix 4: Statistical Process towards Creation of Four Groups

*Q-Sorts – Cards Ordered by each Teacher* table shows the way each participant have ordered their Q-Sorts and which number have they assigned to each of the statements.

Q-SORTS – CARDS ORDERED BY EACH TEACHER (STATEMENT [S])

TEACHER	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25
RSI1	-2	-2	-3	2	-3	0	-2	4	3	0	-1	0	-1	2	1	-1	-4	0	1	2	3	-1	1	0	1
RSI2	1	-3	3	4	-1	-1	-2	2	1	1	0	-2	2	-3	0	3	0	-4	-1	0	0	2	-2	-1	1
RSI3	0	-1	-3	-2	-1	2	1	-4	3	2	0	0	0	1	-3	3	-2	-1	-1	0	1	-2	1	2	4
RPU1	1	2	-4	4	-2	0	-2	-1	-1	1	0	0	0	-3	1	3	0	-3	-2	-1	-1	2	3	1	2
RPU2	4	3	1	1	-2	-1	2	-3	-2	0	0	1	-3	-2	2	0	2	-4	0	-1	-1	1	0	-1	3
RKVS1	-3	3	-3	2	2	-1	0	1	-1	3	-1	4	0	-2	0	1	0	-1	-2	-2	2	-4	0	1	1
RKVS2	0	2	-1	0	3	-2	1	1	-3	0	0	2	-1	-3	3	1	0	1	-2	-2	-1	-4	-1	2	4
RKVS3	-3	1	-4	2	1	-2	-1	1	3	-1	-1	2	0	-2	1	3	-3	0	-1	0	-2	0	0	2	4
RKVS4	-2	-1	-4	-3	3	-2	0	2	2	-1	-1	0	0	0	-1	2	0	1	1	1	-3	-2	1	3	4
RKVS5	-1	2	-1	-1	1	3	3	0	0	-2	2	1	-4	-2	-2	1	-3	4	-3	0	0	1	0	-1	2
UWE1	2	2	0	1	0	4	1	1	-1	0	-1	0	-2	-4	0	1	-1	-2	-3	2	-2	3	-3	-1	3
UWE2	-1	-2	1	2	-3	-1	4	3	0	1	0	-3	0	-1	-2	2	3	-2	-1	-4	0	1	0	1	2
UWE3	0	1	4	2	-1	2	-2	1	0	-1	-3	1	-2	-4	0	1	0	-3	-1	0	-2	3	2	-1	3
UOR1	4	-1	-1	-2	3	2	-1	1	-3	3	-3	-1	-2	-4	1	2	1	0	-2	2	0	1	0	0	0
UOR2	1	-1	2	0	0	-2	2	3	-2	-3	1	0	-1	-1	4	1	0	-2	-1	1	-3	-4	0	2	3
UOR3	-2	-3	-1	-3	-1	1	2	1	1	0	0	4	3	2	2	0	1	-1	-2	-4	0	-2	3	-1	0
UCBSE1	4	2	1	3	0	-3	-1	2	-1	1	-2	2	0	-3	3	1	-2	1	-1	-1	0	-2	-4	0	0
UCBSE2	2	1	-2	3	0	0	2	1	-3	3	-1	1	0	1	-3	-1	0	-2	0	-2	-4	4	2	-1	-1
UCBSE3	1	3	2	0	-1	2	-2	0	0	1	0	1	-3	-2	0	4	1	3	2	-4	-3	-2	-1	-1	-1
UCA1	-1	-3	1	2	3	1	-2	1	0	0	0	-2	-1	-4	-3	4	2	1	0	-2	0	-1	-1	2	3
UCA2	-1	-1	1	0	3	0	-3	2	1	0	0	0	-1	-2	1	2	2	-3	-2	1	-2	-4	-1	3	4
UCA3	1	-1	-3	-2	-2	2	1	4	-1	0	0	1	0	-1	-2	1	-3	-1	0	3	-4	2	0	2	3

The statements were ordered from “-4” when people disagreed the most with the statement, to “4” when they have agreed that that particular statement created the biggest barrier in their perception. Cards were sorted through normal distribution which is displayed in the following table:

Weight	-4	-3	-2	-1	0	1	2	3	4
Number Of cards	1	2	3	4	5	4	3	2	1

Once this process was completed the *KADE* software has calculated the correlation between the answers of different teachers (different Q-Sorts). This was done in order to understand more clearly which of the teachers may have similar answers to each other and how-to better group them based on the Q-Sorts they have generated. *Correlation Between Q-Sorts* table shows the correlation more precisely:

## CORRELATION BETWEEN Q-SORTS

TEACHER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.RSI1	100	6	14	5	-41	9	-22	36	16	-5	-17	-6	-8	-26	-4	7	-1	-21	-31	-15	-2	24
2.RSI2	6	100	-13	34	13	-11	-13	11	-23	-35	33	46	49	15	15	-20	31	7	-4	44	32	5
3.RSI3	14	-13	100	21	-1	17	0	33	39	23	3	6	-13	-2	-17	18	-32	-13	-7	18	16	25
4.RPU1	5	34	21	100	44	33	20	48	1	-1	37	21	43	22	3	-9	17	39	8	17	17	22
5.RPU2	-41	13	-1	44	100	2	28	-8	-29	0	45	18	44	19	30	-17	28	28	18	-13	5	-3
6.RKVS1	9	-11	17	33	2	100	63	47	21	9	0	2	-4	6	5	23	34	4	12	17	34	-11
7.RKVS2	-22	-13	0	20	28	63	100	44	39	24	19	2	4	26	61	9	53	-13	23	29	54	4
8.RKVS3	36	11	33	48	-8	47	44	100	64	24	19	0	19	-9	21	3	22	-7	1	27	42	36
9.RKVS4	16	-23	39	1	-29	21	39	64	100	12	-11	0	-15	5	30	14	-16	-16	-7	33	51	45
10.RKVS5	-5	-35	23	-1	0	9	24	24	12	100	45	-7	10	10	-3	-10	-8	-4	21	13	-11	28
11.UWE1	-17	33	3	37	45	0	19	19	-11	45	100	9	61	52	15	-36	27	23	12	18	22	49
12.UWE2	-6	46	6	21	18	2	2	0	0	-7	9	100	19	-9	19	16	-7	27	2	40	10	9
12.UWE3	-8	49	-13	43	44	-4	4	19	-15	10	61	19	100	27	17	-17	14	20	23	28	30	21
14.UOR1	-26	15	-2	22	19	6	26	-9	5	10	52	-9	27	100	6	-24	27	13	13	30	26	24
15.UOR2	-4	15	-17	3	30	5	61	21	30	-3	15	19	17	6	100	11	33	-21	0	11	58	24
16.UOR3	7	-20	18	-9	-17	23	9	3	14	-10	-36	16	-17	-24	11	100	-25	-3	-11	-20	0	-3
17.UCBSE1	-1	31	-32	17	28	34	53	22	-16	-8	27	-7	14	27	33	-25	100	-2	32	6	18	-7
18.UCBSE2	-21	7	-13	39	28	4	-13	-7	-16	-4	23	27	20	13	-21	-3	-2	100	1	-14	-32	30
19.UCBSE3	-31	-4	-7	8	18	12	23	1	-7	21	12	2	23	13	0	-11	32	1	100	31	9	-12
20.UCA1	-15	44	18	17	-13	17	29	27	33	13	18	40	28	30	11	-20	6	-14	31	100	58	3
21.UCA2	-2	32	16	17	5	34	54	42	51	-11	22	10	30	26	58	0	18	-32	9	58	100	15
22.UCA3	24	5	25	22	-3	-11	4	36	45	28	49	9	21	24	24	-3	-7	30	-12	3	15	100

Once this calculation was completed *KADE* software distributed teachers into four different groups based on the most common variances in their Q-Sorts. The four groups were not only selected based on the most common variance but also on the eigen values assigned to each group, which are in ideal case higher than 1.0. In this case the highest eigen value was over 4.47 in group number 1 while the lowest in the group 4 was 1.98 which is still above 1.0, showing that the choice of four groups would provide significant results. Moreover, *KADE* also calculated the percentage of explained variance. In ideal case this number would be over 50%. When the values of explained variance are added up together within the four created groups, more precisely 20 percent from group one, 14 percent from group two, 10 percent from group three and lastly nine percent from group four, they add up to 53 percent, further supporting the significant results provided by choosing 4 group distribution. Detailed numbers and values can be seen in the *Group Matrix* table and *Cumulative Communalities Matrix*:

GROUP MATRIX

TEACHER	Group 1	Group 2	Group 3	Group 4
RSI1	-0,1168	0,4207	0,3548	0,2651
RSI2	0,4157	-0,3916	0,1354	0,7173
RSI3	0,1292	0,4596	0,4482	-0,1371
RPU1	0,5813	-0,1746	0,333	0,0248
RPU2	0,4147	-0,5445	-0,119	-0,1855
RKVS1	0,4157	0,3873	-0,2681	-0,1504
RKVS2	0,6752	0,3224	-0,5167	-0,2536
RKVS3	0,5851	0,5519	0,2349	-0,0136
RKVS4	0,3371	0,7762	0,1641	-0,0288
RKVS5	0,2217	0,127	0,2267	-0,6775
UWE1	0,6501	-0,4233	0,3131	-0,2935
UWE2	0,2682	-0,1488	0,2024	0,5022
UWE3	0,58	-0,4563	0,223	0,1282
UOR1	0,4748	-0,276	-0,0085	-0,2416
UOR2	0,5151	0,1755	-0,3469	0,1906
UOR3	-0,178	0,4038	-0,04	0,1146
UCBSE1	0,4789	-0,2035	-0,5151	-0,0328
UCBSE2	0,0887	-0,4538	0,3935	-0,1565
UCBSE3	0,2909	-0,1922	-0,3352	-0,2594
UCA1	0,5685	0,1214	-0,0107	0,3177
UCA2	0,6943	0,3552	-0,2078	0,3223
UCA3	0,3837	0,1533	0,6477	-0,1721
Eigenvalues	4,474394	3,174031	2,248614	1,975547
% Explained Variance	20	14	10	9

CUMULATIVE COMMUNALITIES METRIX

TEACHER	Group 1	Group 2	Group 3	Group 4
RSI1	0,0136	0,1906	0,3165	0,3868
RSI2	0,1728	0,3262	0,3445	0,859
RSI3	0,0167	0,2279	0,4288	0,4476
RPU1	0,3379	0,3684	0,4793	0,4799
RPU2	0,172	0,4685	0,4827	0,5171
RKVS1	0,1728	0,3228	0,3947	0,4173
RKVS2	0,4559	0,5598	0,8268	0,8911
RKVS3	0,3423	0,6469	0,7021	0,7023
RKVS4	0,1136	0,7161	0,743	0,7438
RKVS5	0,0492	0,0653	0,1167	0,5757
UWE1	0,4226	0,6018	0,6998	0,7859
UWE2	0,0719	0,094	0,135	0,3872
UWE3	0,3364	0,5446	0,5943	0,6107
UOR1	0,2254	0,3016	0,3017	0,3601
UOR2	0,2653	0,2961	0,4164	0,4527
UOR3	0,0317	0,1948	0,1964	0,2095
UCBSE1	0,2293	0,2707	0,536	0,5371
UCBSE2	0,0079	0,2138	0,3686	0,3931
UCBSE3	0,0846	0,1215	0,2339	0,3012
UCA1	0,3232	0,3379	0,338	0,4389
UCA2	0,4821	0,6083	0,6515	0,7554
UCA3	0,1472	0,1707	0,5902	0,6198
Cumulative % Explained Variance	20	34	44	53



## Appendix 5: Statistical Process for Assigning Teachers to Corresponding Groups

The next step in the process was to find out which exact teachers belong to the selected four groups. This was done through the search of the explained variance. As can be seen in the *Group Matrix with Defining Sorts Flagged*, teachers for each group were selected by the highest scores in the selected group and flagged. This has defined participants for each group. More concretely: six participants for group one, eight participants for group two, five participants for group three and finally three participants for group four.

GROUP MATRIX WITH DEFINING SORTS FLAGGED

Q-Sort	Group 1	Group 2	Group 3	Group 4
RSI1	-0,1233	-0,3806	0,4381 flagged	0,1866
RSI2	0,0398	0,2395	-0,1025	0,8886 flagged
RSI3	0,0069	-0,0779	0,6586 flagged	-0,0879
RPU1	0,1263	0,5179 flagged	0,3151	0,3108
RPU2	0,1344	0,6555 flagged	-0,2577	0,0538
RKVS1	0,6055 flagged	-0,0116	0,1739	-0,1425
RKVS2	0,9072 flagged	0,1718	0,0438	-0,1915
RKVS3	0,485	0,0303	0,6748 flagged	0,1031
RKVS4	0,4495	-0,2732	0,6817 flagged	-0,0506
RKVS5	0,0706	0,3713	0,401	-0,5216 flagged
UWE1	0,0854	0,8498 flagged	0,2185	0,0938
UWE2	-0,0013	0,094	0,0746	0,6106 flagged
UWE3	0,0761	0,6387 flagged	0,054	0,4406
UOR1	0,219	0,5584 flagged	0,0072	-0,0121
UOR2	0,6329 flagged	0,031	-0,0252	0,225
UOR3	0,0665	-0,4288 flagged	0,1382	-0,0463
UCBSE1	0,5557 flagged	0,3177	-0,3524	0,0576
UCBSE2	-0,361	0,5034 flagged	0,073	0,0641
UCBSE3	0,3241	0,3319 flagged	-0,2382	-0,1711
UCA1	0,4442 flagged	0,1188	0,1906	0,4373
UCA2	0,7447 flagged	-0,008	0,2189	0,3908
UCA3	-0,0639	0,3324	0,7077 flagged	0,0665
% Explained Variance	16	15	13	10

The next tables *Group Score Correlations* and *Group Characteristics* provide additional information and support of four group argumentation:

GROUP SCORE CORRELATIONS

	Group 1	Group 2	Group 3	Group 4
Group 1	1	0,2477	0,2927	0,0388
Group 2	0,2477	1	0,0863	0,3048
Group 3	0,2927	0,0863	1	-0,074
Group 4	0,0388	0,3048	-0,074	1

GROUP CHARACTERISTICS

	Group 1	Group 2	Group 3	Group 4
No. of Defining Variables	6	8	5	3
Avg. Rel. Coef.	0,8	0,8	0,8	0,8
Composite Reliability	0,96	0,97	0,952	0,923
S.E. of Factor Z-scores	0,2	0,173	0,219	0,277

The following table provides an overview of teachers within each group:

Teacher	Age	Gender	Teaching Experience [TE], Years	TE Current School, Years	Teaching Grade	Subject	Type of School	Area
<b>GROUP 1</b>								
RKVS1	30	Female	4	4	6, 7	Math	Private	Rural
RKVS2	36	Female	9	6 months	10	Chemistry, value education	Private	Rural
UOR2	49	Female	23	6 months	4, 5	Math, UOA	Private	Urban
UCBSE1	46	Female	22	20	9, 10	English, geography	Gov.	Urban
UCA1	32	Female	13	13	1 - 4	Marathi and EVS	Gov.	Urban
UCA2	53	Female	22	22	2	English, Marathi	Gov.	Urban
<b>GROUP 2</b>								
RPU1	46	Male	25	9	5	Science, social science, math	Gov.	Rural
RPU2	39	Female	15	13	6 - 8	English, math, social science	Gov.	Rural
UWE1	35	Male	10	2	2	English	Gov.	Urban
UWE3	31	Male	4	4	5 - 8	Math, EVS	Gov.	Urban
UOR1	40	Female	4	5 months	1 - 3	Math, behavioral studies	Private	Urban
UOR3	25	Female	4	5 months	1 - 5	Psychological support	Private	Urban
UCBSE2	37	Female	17	15	5- 8	Social science, history, geography	Gov.	Urban
UCBSE3	41	Female	16	15	5 - 10	Science and math	Gov.	Urban
<b>GROUP 3</b>								
RSI1	45	Male	15	11	6 - 8	Science	Gov.	Rural
RSI3	46	Male	16	15	4,5	Science, PE	Gov.	Rural
RKVS3	24	Female	3	3	1 - 4	English, science	Gov.	Rural
RKVS4	37	Female	10	1	6 - 10	Physics	Gov.	Rural
UCA3	44	Female	24	4	4	Geography, Marathi	Gov.	Urban
<b>GROUP 4</b>								
RSI2	51	Female	22	21	1, 2	Tamil, English	Gov.	Rural
RKVS5	63	Female	40	7 months	7 - 10	Biology and science	Private	Rural
UWE2	40	Female	14	14	4, 5	EVS, English, math	Gov.	Urban

## Appendix 6: Detailed Process Explaining Creation of Q-Sorts for each Group

Once the participants were identified the following step was to generate significant statements for each group in order to create a representative Q-Sort that would best characterize combined answers of teachers within each group. In essence Q-Methodology is used to find variances in the answers provided by teachers and the final product - Q-Sort - depicts significant statements and properly orders them so they are most representative for the general opinion of the group. *Group Scores with Corresponding Ranks* table shows the Z-scores assigned to each statement and their corresponding rank in the answers based on these scores. Hence this final table helped to create four distinguished figures (Q-Sorts) for each of the four groups.

GROUP SCORES WITH CORRESPONDING RANKS

Statement	Group 1		Group 2		Group 3		Group 4	
	Z-score	Rank	Z-score	Rank	Z-score	Rank	Z-score	Rank
1. Lack of preparation time (don't have enough time to prepare material)	-0,05	13	1,47	2	-0,73	22	0,39	11
2. Lack of teaching time (not enough hours available)	0,62	8	1,24	5	-0,46	19	-1,56	24
3. Poor teaching aids (books, other material)	-0,17	16	0,15	10	-2,39	25	1,4	2
4. Heavy workload	0,33	9	0,94	6	-0,67	20	1,91	1
5. Lack of government support	1,44	2	-0,19	16	-0,07	13	-0,77	20
6. Not enough money to support activities (finances)	-0,91	21	1,27	4	0,02	10	-0,72	19
7. Not enough nature around (nothing or very little to show children)	0,02	12	0,04	13	0,03	9	-0,65	18
8. Safety and liability (classes outside) classroom management	0,89	5	0,08	11	0,86	5	1,11	4
9. Problems with transportation	-1,06	23	-0,93	20	1,22	4	0,41	10
10. Class size too big	0,03	11	0,38	9	-0,02	11	0,65	7
11. Class size too small	-0,09	14	-0,8	19	-0,38	18	-0,14	14
12. Testing instead of practical knowledge	0,88	6	0,03	14	0,48	7	-1,18	22
13. Not in the curriculum	-0,51	17	-1,36	24	-0,07	12	1,1	5
14. Lack of support from school administrator	-1,58	24	-2,14	25	-0,2	16	-1,19	23
15. Lack of practical knowledge (working outside of the classroom)	1,33	3	0,06	12	-0,72	21	-0,05	13
16. Lack of EE training	0,81	7	0,74	7	1,31	3	1,35	3
17. Lack of content knowledge (don't know enough about the subject)	0,17	10	-0,01	15	-1,53	24	0,49	8
18. Students not interested in EE	-0,1	15	-1,33	23	-0,16	15	-2,11	25
19. Students don't understand EE	-1,05	22	-0,97	21	-0,07	14	-0,3	16
20. EE is a controversial topic	-0,68	20	0,44	8	0,81	6	-0,38	17
21. Not relevant to what I teach	-0,59	18	-1,18	22	-1,13	23	0	12
21. More important subjects exist	-2,25	25	1,59	1	-0,32	17	0,85	6
23. EE as a stand-alone subject	-0,64	19	-0,46	18	0,37	8	-0,82	21
24. Inappropriate integration of EE within other subjects	1,17	4	-0,43	17	1,41	2	-0,25	15
25. Issues connected to specific settings	1,98	1	1,37	3	2,4	1	0,46	9

STANDARD ERRORS FOR DIFFERENCES IN FACTOR Z-SCORES

	Group 2	Group 2	Group 3	Group 4
Group 1	0,283	0,264	0,297	0,342
Group 2	0,264	0,245	0,279	0,327
Group 3	0,297	0,279	0,31	0,353
Group 4	0,342	0,327	0,353	0,392

FACTOR Q-SORT VALUES FOR STATEMENTS SORTED BY CONSENSUS VS. DISAGREEMENT

Statement Number	Statement	factor 1	factor 2	factor 3	factor 4	Z-Score variance
10	Class size too big	0	1	0	1	0,074
11	Class size too small	0	-1	-1	0	0,077
16	Lack of EE training	1	1	3	3	0,078
7	Not enough nature around (nothing or very little to show children)	0	0	1	-1	0,088
8	Safety and liability (classes outside classroom management)	2	0	2	2	0,151
19	Students don't understand EE	-2	-2	0	-1	0,177
23	EE as a stand-alone subject	-1	-1	1	-2	0,206
21	Not relevant to what I teach	-1	-2	-3	0	0,228
20	EE is a controversial topic	-2	1	2	-1	0,363
14	Lack of support from school administrator	-3	-4	-1	-3	0,501
25	Issues connected to specific settings	4	3	4	1	0,53
15	Lack of practical knowledge (working outside of the classroom)	3	0	-2	0	0,544
12	Testing instead of practical knowledge	2	0	1	-2	0,593
17	Lack of content knowledge (don't know enough about the subject)	1	0	-3	1	0,607
1	Lack of preparation time (don't have enough time to prepare material)	0	3	-2	0	0,641
5	Lack of government support	3	-1	0	-2	0,665
24	Inappropriate integration of EE within other subjects	2	-1	3	0	0,674
18	Students not interested in EE	0	-3	0	-4	0,713
6	Not enough money to support activities (finances)	-2	2	1	-1	0,736
13	Not in the curriculum	-1	-3	0	2	0,786
4	Heavy workload	1	2	-2	4	0,874
9	Problems with transportation	-3	-2	2	1	0,906
2	Lack of teaching time (not enough hours available)	1	2	-1	-3	1,139
3	Poor teaching aids (books, other material)	-1	1	-4	3	1,861
22	More important subjects exist	-4	4	-1	2	2,1

## Appendix 7: Detailed Information on Sorts, their Correlations and Factor Scores for Group 1

GROUP 1 SORTS WEIGHT

Q-Sort	Weight
RKVS2	10
UCA2	3,26181
UOR2	2,05985
RKVS1	1,86511
UCBSE1	1,56849
UCA1	1,07964

GROUP 1 SORTS CORRELATIONS

Q-Sort	RKVS2	UCA2	UOR2	RKVS1	UCBSE1	UCA1
RKVS2	100	54	61	63	53	29
UCA2	54	100	58	34	18	58
UOR2	61	58	100	5	33	11
RKVS1	63	34	5	100	34	17
UCBSE1	53	18	33	34	100	6
UCA1	29	58	11	17	6	100

FACTOR SCORES FOR GROUP 1

Statement Number	Statement	Z-score	Sort Values	Raw Sort RKVS2	Raw Sort UCA2	Raw Sort UOR2	Raw Sort RKVS1	Raw Sort UCBSE1	Raw Sort UCA1
25	Issues connected to specific settings	1,983	4	4	4	3	1	0	3
5	Lack of government support	1,442	3	3	3	0	2	0	3
15	Lack of practical knowledge (working outside of the classroom)	1,325	3	3	1	4	0	3	-3
24	Inappropriate integration of EE within other subjects	1,169	2	2	3	2	1	0	2
8	Safety and liability (classes outside) classroom management	0,887	2	1	2	3	1	2	1
12	Testing instead of practical knowledge	0,877	2	2	0	0	4	2	-2
16	Lack of EE training	0,812	1	1	2	1	1	1	4
2	Lack of teaching time (not enough hours available)	0,622	1	2	-1	-1	3	2	-3
4	Heavy workload	0,327	1	0	0	0	2	3	2
17	Lack of content knowledge (don't know enough about the subject)	0,171	1	0	2	0	0	-2	2
10	Class size too big	0,03	0	0	0	-3	3	1	0
7	Not enough nature around (nothing or very little to show children)	0,019	0	1	-3	2	0	-1	-2
1	Lack of preparation time (don't have enough time to prepare material)	-0,049	0	0	-1	1	-3	4	-1
11	Class size too small	-0,091	0	0	0	1	-1	-2	0
18	Students not interested in EE	-0,096	0	1	-3	-2	-1	1	1
3	Poor teaching aids (books, other material)	-0,172	-1	-1	1	2	-3	1	1
13	Not in the curriculum	-0,506	-1	-1	-1	-1	0	0	-1
21	Not relevant to what I teach	-0,585	-1	-1	-2	-3	2	0	0
23	EE as a stand-alone subject	-0,636	-1	-1	-1	0	0	-4	-1
20	EE is a controversial topic	-0,683	-2	-2	1	1	-2	-1	-2
6	Not enough money to support activities (finances)	-0,913	-2	-2	0	-2	-1	-3	1
19	Students don't understand EE	-1,045	-2	-2	-2	-1	-2	-1	0
9	Problems with transportation	-1,057	-3	-3	1	-2	-1	-1	0
14	Lack of support from school administrator	-1,583	-3	-3	-2	-1	-2	-3	-4
22	More important subjects exist	-2,25	-4	-4	-4	-4	-4	-2	-1

## Appendix 8: Detailed Information on Sorts, their Correlations and Factor Scores for Group 2

APPENDIX X: GROUP 2  
SORTS WEIGHT

Q-Sort	Weight
UWE1	5,96715
RPU2	2,24232
UWE3	2,10464
UOR1	1,583
RPU1	1,38075
UCBSE2	1,31547
UOR3	-1,02505
UCBSE3	0,72768

APPENDIX X: GROUP 2 SORTS CORRELATIONS

Q-Sort	UWE1	RPU2	UWE3	UOR1	RPU1	UCBSE2	UOR3	UCBSE3
UWE1	100	45	61	52	37	23	-36	12
RPU2	45	100	44	19	44	28	-17	18
UWE3	61	44	100	27	43	20	-17	23
UOR1	52	19	27	100	22	13	-24	13
RPU1	37	44	43	22	100	39	-9	8
UCBSE2	23	28	20	13	39	100	-3	1
UOR3	-36	-17	-17	-24	-9	-3	100	-11
UCBSE3	12	18	23	13	8	1	-11	100

FACTOR SCORES FOR GROUP 2

Statement Number	Statement	Z-score	Sort Values	Raw Sort UWE1	Raw Sort RPU2	Raw Sort UWE3	Raw Sort UOR1	Raw Sort RPU1	Raw Sort UCBSE2	Raw Sort UOR3	Raw Sort UCBSE3
22	More important subjects exist	1,588	4	3	1	3	1	2	4	-2	-2
1	Lack of preparation time (don't have enough time to prepare material)	1,474	3	2	4	0	4	1	2	-2	1
25	Issues connected to specific settings	1,371	3	3	3	3	0	2	-1	0	-1
6	Not enough money to support activities (finances)	1,275	2	4	-1	2	2	0	0	1	2
2	Lack of teaching time (not enough hours available)	1,235	2	2	3	1	-1	2	1	-3	3
4	Heavy workload	0,944	2	1	1	2	-2	4	3	-3	0
16	Lack of EE training	0,735	1	1	0	1	2	3	-1	0	4
20	EE is a controversial topic	0,435	1	2	-1	0	2	-1	-2	-4	-4
10	Class size too big	0,377	1	0	0	-1	3	1	3	0	1
3	Poor teaching aids (books, other material)	0,147	1	0	1	4	-1	-4	-2	-1	2
8	Safety and liability (classes outside) classroom management	0,08	0	1	-3	1	1	-1	1	1	0
15	Lack of practical knowledge (working outside of the classroom)	0,063	0	0	2	0	1	1	-3	2	0
7	Not enough nature around (nothing or very little to show children)	0,044	0	1	2	-2	-1	-2	2	2	-2
12	Testing instead of practical knowledge	0,031	0	0	1	1	-1	0	1	4	1
17	Lack of content knowledge (don't know enough about the subject)	-0,008	0	-1	2	0	1	0	0	1	1
5	Lack of government support	-0,186	-1	0	-2	-1	3	-2	0	-1	-1
24	Inappropriate integration of EE within other subjects	-0,431	-1	-1	-1	-1	0	1	-1	-1	-1
23	EE as a stand-alone subject	-0,464	-1	-3	0	2	0	3	2	3	-1
11	Class size too small	-0,795	-1	-1	0	-3	-3	0	-1	0	0
9	Problems with transportation	-0,934	-2	-1	-2	0	-3	-1	-3	1	0
19	Students don't understand EE	-0,971	-2	-3	0	-1	-2	-2	0	-2	2
21	Not relevant to what I teach	-1,179	-2	-2	-1	-2	0	-1	-4	0	-3
18	Students not interested in EE	-1,333	-3	-2	-4	-3	0	-3	-2	-1	3

## Appendix 9: Detailed Information on Sorts, their Correlations and Factor Scores for Group 3

Q-Sort	Weight
UCA3	2,76602
RKVS4	2,48457
RKVS3	2,41719
RSI3	2,26913
RSI1	1,05773

GROUP 3 SORTS CORRELATIONS

Q-Sort	UCA3	RKVS4	RKVS3	RSI3	RSI1
UCA3	100	45	36	25	24
RKVS4	45	100	64	39	16
RKVS3	36	64	100	33	36
RSI3	25	39	33	100	14
RSI1	24	16	36	14	100

FACTOR SCORES FOR GROUP 3

Statement Number	Statement	Z-score	Sort Values	Raw Sort UCA3	Raw Sort RKVS4	Raw Sort RKVS3	Raw Sort RSI3	Raw Sort RSI1
25	Issues connected to specific settings	2,395	4	3	4	4	4	1
24	Inappropriate integration of EE within other subjects	1,408	3	2	3	2	2	0
16	Lack of EE training	1,306	3	1	2	3	3	-1
9	Problems with transportation	1,224	2	-1	2	3	3	3
8	Safety and liability (classes outside classroom management)	0,857	2	4	2	1	-4	4
20	EE is a controversial topic	0,812	2	3	1	0	0	2
12	Testing instead of practical knowledge	0,479	1	1	0	2	0	0
23	EE as a stand-alone subject	0,366	1	0	1	0	1	1
7	Not enough nature around (nothing or very little to show children)	0,032	1	1	0	-1	1	-2
6	Not enough money to support activities (finances)	0,017	1	2	-2	-2	2	0
10	Class size too big	-0,023	0	0	-1	-1	2	0
13	Not in the curriculum	-0,067	0	0	0	0	0	-1
5	Lack of government support	-0,07	0	-2	3	1	-1	-3
19	Students don't understand EE	-0,072	0	0	1	-1	-1	1
18	Students not interested in EE	-0,161	0	-1	1	0	-1	0
14	Lack of support from school administrator	-0,202	-1	-1	0	-2	1	2
22	More important subjects exist	-0,317	-1	2	-2	0	-2	-1
11	Class size too small	-0,375	-1	0	-1	-1	0	-1
2	Lack of teaching time (not enough hours available)	-0,455	-1	-1	-1	1	-1	-2
4	Heavy workload	-0,666	-2	-2	-3	2	-2	2
15	Lack of practical knowledge (working outside of the classroom)	-0,715	-2	-2	-1	1	-3	1

## Appendix 10: Detailed Information on Sorts, their Correlations and Factor Scores for Group 4

GROUP 4 SORT WEIGHTS

Q-Sort	Weight
RSI2	8,23999
UWE2	1,89941
RKVS5	-1,39795

GROUP 4 SORTS CORRELATIONS

Q-Sort	RSI2	UWE2	RKVS5
RSI2	100	46	-35
UWE2	46	100	-7
RKVS5	-35	-7	100

FACTOR SCORES FOR GROUP 4

Statement Number	Statement	Z-score	Sort Values	Raw Sort RSI2	Raw Sort UWE2	Raw Sort RKVS5
4	Heavy workload	1,905	4	4	2	-1
3	Poor teaching aids (books, other material)	1,399	3	3	1	-1
16	Lack of EE training	1,354	3	3	2	1
8	Safety and liability (classes outside) classroom management	1,107	2	2	3	0
13	Not in the curriculum	1,102	2	2	0	-4
22	More important subjects exist	0,848	2	2	1	1
10	Class size too big	0,646	1	1	1	-2
17	Lack of content knowledge (don't know enough about the subject)	0,494	1	0	3	-3
25	Issues connected to specific settings	0,461	1	1	2	2
9	Problems with transportation	0,411	1	1	0	0
1	Lack of preparation time (don't have enough time to prepare material)	0,386	0	1	-1	-1
21	Not relevant to what I teach	0	0	0	0	0
15	Lack of practical knowledge (working outside of the classroom)	-0,05	0	0	-2	-2
11	Class size too small	-0,14	0	0	0	2
24	Inappropriate integration of EE within other subjects	-0,247	0	-1	1	-1
19	Students don't understand EE	-0,297	-1	-1	-1	-3
20	EE is a controversial topic	-0,379	-1	0	-4	0
7	Not enough nature around (nothing or very little to show children)	-0,653	-1	-2	4	3
6	Not enough money to support activities (finances)	-0,716	-1	-1	-1	3
5	Lack of government support	-0,766	-2	-1	-3	1
23	EE as a stand-alone subject	-0,823	-2	-2	0	0
12	Testing instead of practical knowledge	-1,177	-2	-2	-3	1
14	Lack of support from school administrator	-1,189	-3	-3	-1	-2
2	Lack of teaching time (not enough hours available)	-1,563	-3	-3	-2	2
18	Students not interested in EE	-2,114	-4	-4	-2	4