# An Analysis of Teachers' Competencies for the Implementation of Education for Sustainable Development (ESD) at Primary Level: A Mixed Method Approach Observational Study

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**Abstract:** The purpose of this research is to provide a detailed analysis of skills that the teachers at primary schools have to master to make the Education for Sustainable Development (ESD) successful at the primary level. The sample data consisted of 30 teachers of semi-government and private primary schools of Multan in Pakistan who were subjected to a quantitative evaluation through the use of questionnaires. In the study, they are going to find out what schemes, competencies and skills are needed, as well as what knowledge can be called upon to motivate sustainability among young learners. The factors that are addressed in the study are how teachers whose family background and moral values contribute to their capacity to inculcate concepts of ESD in their classrooms. It also evaluates how the educators approach the subject of teaching using ESD in their dedicated lesson plans and what the obstacles during the implementation process of ESD could be. The paper concludes that although there are strong intentions of putting in place ESD, the efforts are disappointing due to inadequate formal training on ESD, the interactivity of students, diversity, and curriculum match-up.

**Key Words:** Education for Sustainable Development, Teachers' Competencies, Sustainability

## Introduction

Education for Sustainable Development (ESD) is to highlight sustainability in the academic work of young people by joining environmental, social, and economic aspects of learning (Kioupi & Voulvoulis, 2019). The Rio de Janeiro Earth Summit, which the United Nations (UN) introduced ESD (1992), and then the UN Committee on Sustainable Development set out guidelines for implementing these concepts in schools worldwide (1996). ESD was once again recognized as important in 2002 when the UN General Assembly (2005-2014) introduced the United Nations Decade of Educational Development for Sustainability.

Today, when global issues such as climate change, the loss of biodiversity, and inequality are at their highest, the significance of education in supporting sustainable societies is at its peak. ESD is an approach promoted by UNESCO which trains learners to manage all kinds of issues in society, environment and economy (UNESCO, 2012). Recognized by the United Nations as part of the foundation of the Sustainable Development Goals. Because of ESD, individuals learn to reassess how things are done and support positive changes for the good of the world. Although ESD applies to all school levels, using it in primary education matters more (Manuel & J. Paulo Davim, 2019). Primary schools play a key role in forming how young students act and think, so teachers become important in preparing them for sustainability (Ärlemalm-Hagsér & Sandberg, 2011). Promoting sustainable development starts at the primary level, mainly because of the importance of education there (Lamanauskas & Malinauskienė, 2024). Carrying out ESD

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effectively depends on how knowledgeable and skilled educators are in sustainability, various ways of teaching, and promoting thinking, empathy, and problem-solving. Education for Sustainable Development (ESD) heavily relies on the involvement of teachers. They are expected to possess a set of skills needed to make students aware of and advocate for sustainability, which is beneficial to the future of all people (Pegalajar-Palomino et al., 2021).

Both the CSCT model and the ECE framework stress that educators should have systems thinking, reflect on ethics, and engage students in finding solutions to sustainable issues (Rieckmann & Barth, 2022). Despite these methods, ESD pedagogical approaches on how to effectively introduce the concept of ESD to children at the primary level have not been researched widely. This paper aims to bridge this gap by comprehending the applications of ESD in primary schools and the challenges that teachers encounter with these approaches. Understanding of these instruction methods is extremely significant to enhance the means of enhancing the effectiveness of ESD for the generations to come (Rieckmann & Barth, 2022).

## Background of the study

The concept of ESD is crucial because it addresses an under-explored area and requires highly competent teachers for its integration in primary education. Global issues such as climate change, the loss of biodiversity, and inequality are at their highest; the significance of education in supporting sustainable societies is at its peak. Promoting sustainable development starts at the primary level, mainly because of the importance of education there (Lamanauskas & Malinauskienė, 2024). Knowing about poverty, inequality, and climate change from an early age creates a generation of world citizens who realize the world is connected and are encouraged to help solve worldwide problems. We make future generations responsible, they will have the knowledge and skills to address the sustainability issue of tomorrow (Imran et al., 2024). Still, carrying out ESD effectively depends on how knowledgeable and skilled educators are in sustainability, various ways of teaching, and promoting thinking, empathy, and problem-solving. Education for Sustainable Development (ESD) heavily relies on the involvement of teachers. They are expected to possess a set of skills needed to make students aware of and advocate for sustainability, which is beneficial to the future of all people (Pegalajar-Palomino et al., 2021). Through the concept of sustainability, teachers are able to cover these problems in an extremely varied topic, including science, geography and even social studies (Holfelder, 2022). Those teachers who recognize how education affects society are well-equipped to be leaders outside their classrooms as well. Teachers are encouraged to join up with fellow teachers and community leaders to support making policies that ensure sustainability education is taught everywhere (Ferguson et al., 2021). There is not a single ESD framework included in the curriculum; teachers have difficulty deciding what should be included and how to assess it (Hung & Pan, 2025). Both the CSCT model and the ECE framework stress that educators should have systems thinking, reflect on ethics, and engage students in finding solutions to sustainable issues (Rieckmann & Barth, 2022). The insights gained will be valuable for policymakers, educators, and curriculum developers by providing a clearer understanding of how primary educators can effectively embed ESD principles into their teaching practices. By identifying the most significant teachers' competencies and overcoming existing challenges, this research can guide the creation of educational environments that support the development of sustainable behaviors in young learners.

## Literature Review

Many Research studies have shown the importance of the implementation of Education for Sustainable Development. ESD is considered a relevant aspect of education in most countries (Kioupi & Nikolaos Voulvoulis, 2019). ESD enables students to have the skills and expertise to confront major issues that occur in the world. Moreover, teachers' competencies aim at assisting the students to approach issues concerning sustainability in a positive manner (Kioupi & Voulvoulis, 2019). To teach ESD, an individual must be critical thinkers, engage in systems thinking, demonstrate empathy, collaborate effectively with others, be ethical, and utilize the CSCT and ECE frameworks. These theories state that effective learning occurs when we consider and combine all three of these dimensions (Vare et al., 2019).

In addition to that, studies show that the methods based on students learning through doing and self-evaluation allow them to refine their critical thinking and problem-solving abilities (Riess et al., 2022). Furthermore, the readiness of teachers plays a major role in the achievement of ESD in primary schools. Many teachers feel that they do not have

the right training or resources to include sustainability in their teaching. Furthermore, teacher education rarely deals with ESD-related skills, generating a big difference between school policy and what is practiced in the classroom (Noor Hamwy et al., 2023).

The integration of ESD runs into many problems, such as not enough time in the curriculum, not having enough resources, and schools and teachers not getting the right kind of help. In many primary schools, people talk more about taking care of the environment, but don't really focus as much on social and economic issues. Furthermore, problems with having enough resources and enough help from school leaders make it harder for teachers to use ESD the way it's meant to be used (Abo-Khalil, 2024). The Competency Framework for ESD from UNESCO explains that, to support ESD, educators need to focus on systems thinking, collaborating with peers, and thinking about the future. Nevertheless, there is not much research that looks directly at primary teachers' ability to meet the new requirements. UNESCO-commissioned experts highlight that ESD should focus on teamwork, exchange of opinions, being involved in the whole structure, creating new solutions, and encouraging active learning (Rieckmann & Barth, 2022). Focusing on the development of ESD skills is now accepted and recognized. All in all, competence means having a combination of knowledge, skills, understanding, values, attitudes, and desires that help a person act effectively in life, in a certain field. ESD focuses on teaching learners about sustainability and provides them with the knowledge and skills they need to contribute to sustainable development. Although debates have mainly revolved around how ESD is taught and what should be included through policies, the role of teachers is now being noticed more often. Teachers perceive and carry out ESD as part of their teaching activities. Pedagogically, to use ESD competencies well, teachers need to change from regular chalk-and-talk lessons to more interactive, cross-subject, and active learning for critical thinking, group work, and solving problems students might come across in actual life. It has been recommended that student teachers be given special courses, a curriculum that includes sustainability, and opportunities for practical learning to acquire competency. Education for Sustainable Development (ESD) is seen as an important way of teaching people about how to take care of social, economic, and environmental issues so that they can become better and responsible citizens. Literature often points out how education plays a key part in affecting what people think, value, and can do, all of which matter for helping to maintain the environment. ESD not only educates children mentally but also helps them grow emotionally, morally, and physically, which is important for young students to learn and pick up values.

Hence, studies show that more people agree that teaching kids about sustainability right from the start can really help them learn and think about it throughout their lives. While pre-service teachers know ESD is important, they also need a more well-rounded and practical way to get the environmental, social, and economic ideas into their lessons. Enhancing teacher training and using more hands-on, practical ways of teaching will be important to help primary schools around the world teach and promote good development practices (Lamanauskas & Malinauskienė, 2024). It follows the main idea of existing ESD competence models that promote the integration of sustainability throughout academics and teaching methods. The models urge the use of a holistic system that covers the mental, emotional, and behavioral aspects of sustainability. Globally, ESD is seen as an important way to guide students in gaining the knowledge, skills, attitudes, and values that help bring about sustainability. However, even though ESD is essential, it takes time and effort to implement in school settings and is primarily limited by teachers taking responsibility to incorporate sustainability into their classroom instructions. By understanding the challenges that teachers have to go through to apply an ESD, it could be made more successful and enjoyable for schools.

## Statement of the Problem

Education for Sustainable Development (ESD) is acknowledged across the globe as needed for promoting sustainable futures; its integration into primary education remains a significant challenge. The effective implementation of ESD pedagogies is vulnerable to obstacles like a lack of curricular support, limited resources, and inadequate teacher training. Inadequate preparation of teachers tends to stimulate critical thinking, good social interaction and the ability to make decent decisions as far as sustainability is concerned among students.

### Significance of the Study

This study is significant because it addresses an under-explored area in the integration of ESD in primary education. The insights gained will be valuable for policymakers, educators, and curriculum developers by providing a clearer understanding of how primary educators can effectively embed ESD principles into their teaching practices. It will identify the most significant teachers' competencies and ways to overcome existing challenges. Moreover, the study ultimately provides insights into how teacher training and curriculum development can be improved to support sustainable education at the primary level.

### Research Objectives

1. The following research objectives were used in this study:
2. To analyse the teachers' perception of the knowledge of ESD and its integration.
3. To explore teaching strategies used by primary-level teachers for the implementation of Education for Sustainable Development (ESD) in their lessons.
4. To identify the competencies required by primary teachers to implement ESD.
5. To examine the challenges faced by teachers in implementing ESD.

### Research Questions

1. The following research questions were addressed in this study:
2. What is the understanding of teachers about the concept of ESD and its integration in the classrooms?
3. What are the competencies required by primary school teachers to effectively implement Education for Sustainable Development (ESD)?
4. What are the teaching strategies used by primary-level teachers for the implementation of Education for Sustainable Development (ESD) in their lessons?
5. What are the challenges that primary school teachers face in implementing ESD in their teaching practices?

## Research Methodology

The current research study's vital objective is to analyse the teachers' competencies in implementing Education for Sustainable Development at the primary level. The researcher adopted a quantitative method, a descriptive research design, to achieve a comprehensive understanding of the analysis of teachers' competencies for the implementation of Education for Sustainable Development at the Primary level. The research employed a structured questionnaire framework involving primary school practitioners from different semi-government and private institutions of Multan, and carried out purposive sampling. A questionnaire had been distributed via Google Forms to get individual responses. The target population for this study consisted of 30 teachers of Primary-level practitioners of Pak-Turk Maarif International Schools & Colleges, Multan Campuses, Exclusive School System, Konya School System and Multan Public School. The total sample accounted for thirty primary school teachers. Researchers used purposive sampling techniques to draw samples from the targeted population.

**Table 1**

| School's Name | Frequency |
|---|---|
| Multan Public School, Girls Campus | 5 |
| Konya School System Multan | 5 |
| Exclusive School System Multan | 5 |
| Pak-Turk Maarif International Schools & Colleges Multan Campus | 15 |
| Total | 30 |

## Data Analysis and Discussion

The data was analysed in SPSS (Statistical Package for Social Sciences) using several statistical methods. The researcher applies descriptive statistics by means of factors which include Frequency, Percentage and Mean.

**Table 2**

*Demographic Characteristics of the Respondents (Gender) in the Study*

| Gender | Frequency | Percentage (%) |
|---|---|---|
| Male | 2 | 6.6 |
| Female | 28 | 93.3 |
| Total | 30 | 100.0 |

Table 2 shows that there were 30 instructors. It is seen that about 93.3% (n=28) of the participants were female, while the remaining 6.6% (n=2) of the respondents were male. This shows that a greater part of the participants were female.

**Table 3**

*Knowledge and understanding of Education for Sustainable Development (ESD).*

| Statement | Level | Frequency | Percentage (%) | Mean |
|---|---|---|---|---|
| I have a strong knowledge and understanding of Education for Sustainable Development (ESD). | SD | 0 | 0 | 4.07 |
| | D | 0 | 0 | |
| | N | 5 | 16.7 | |
| | A | 18 | 60 | |
| | SA | 7 | 23.3 | |
| | Total | 30 | 100.0 | |

Table 3 illustrates that 60% (n=18) of respondents agreed with the statement, while 23.3 % (n=7) of respondents strongly agreed with the statement. So, the mean of the data is approximately **4.07**, which indicates that most of the participants agreed with the statement.

**Figure 1**

*Which of the Following Teaching Strategies Do You Use for the Implementation of Education for Sustainable Development (ESD) into Your Lessons?*

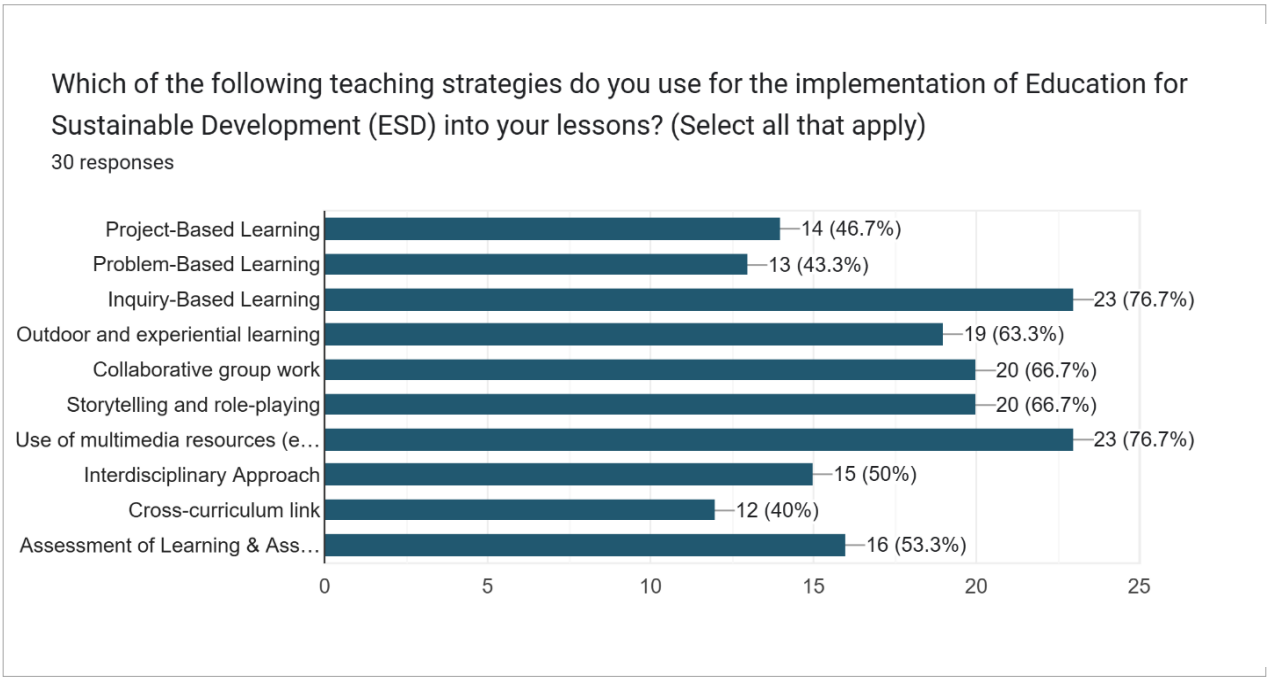


Figure 1 shows that among the strategies listed, participants were asked to select more than one strategy. Inquiry-Based Learning and the Use of Multimedia Resources were the most popular, with 23 respondents (76.7%) using each

of these methods. These results indicate that these strategies are widely adopted by educators aiming to integrate ESD into their teaching practices.

**Figure 2**

*Which Competencies Do You Believe are Required for Effectively Teaching ESD?*

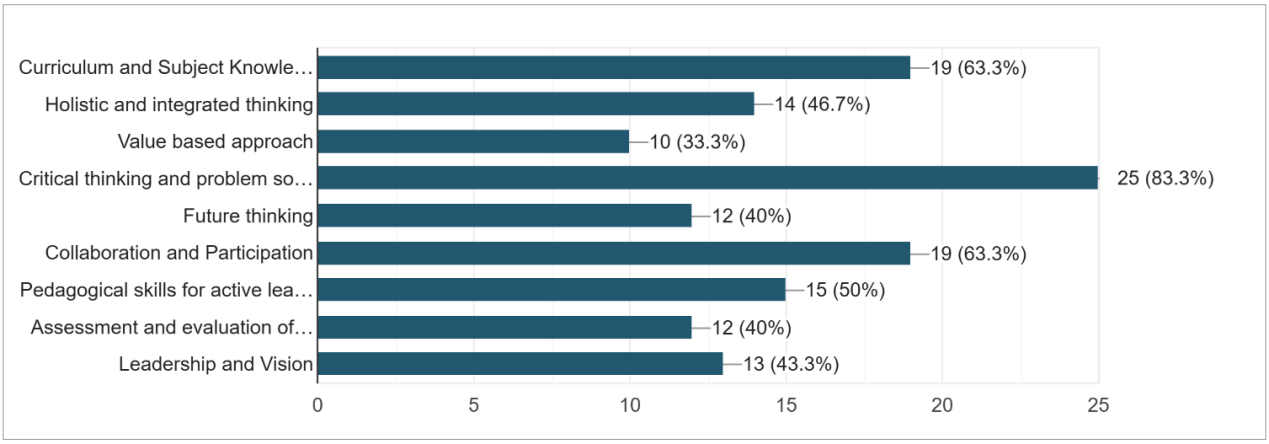


Figure 2 sheds light on the essential abilities that respondents deem necessary for incorporating ESD into their teaching practices. Among the listed competencies, participants were asked to select more than one competency, which indicates that Critical Thinking and Problem Solving stand out as the most valued competencies, with 25 respondents (83.3%) selecting them.

**Figure 3**

*What Challenges Do You Face in Implementing Education for Sustainable Development (ESD) in Your Classroom?*

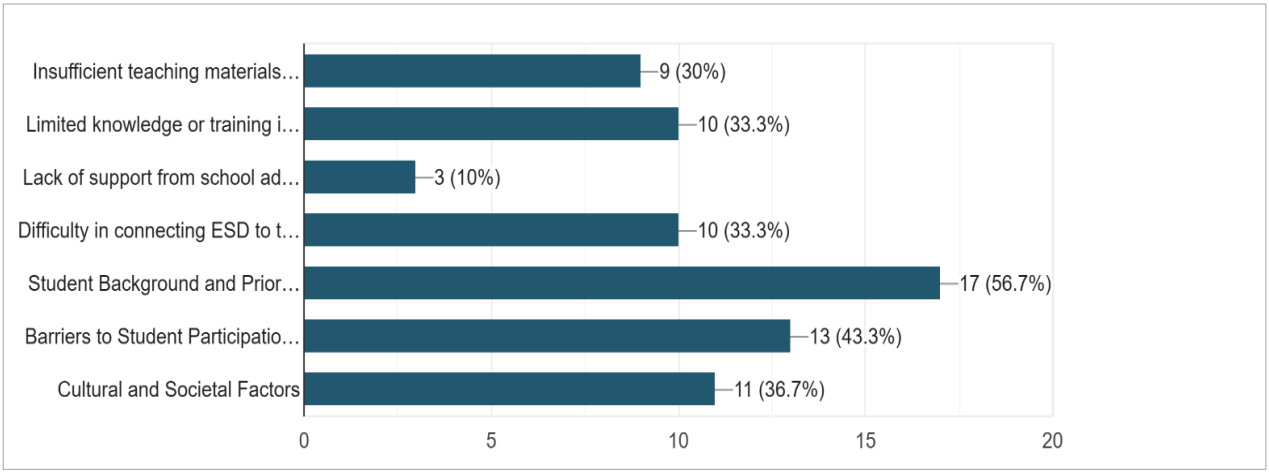


Figure 3 outlines the challenges that educators face when implementing Education for Sustainable Development (ESD) in their classrooms. The most reported challenge was Student Background and Prior Knowledge, selected by 17 respondents (56.7%). This indicates that many educators feel that students' lack of prior knowledge or the diversity in their educational journey is a problem.

## Conclusion

It comes to the conclusion that the level of understanding of Education for Sustainable Development (ESD) among primary educators is mostly good, and a lot of teachers tend to introduce the topics of ESD in their lessons. Nevertheless, a substantial fraction of educators have not been trained specifically on ESD, and this restricts their level of participation in sustainability actions. Notwithstanding this divide, there is evidence of the dedication to sustainability teaching on the part of teachers, as is manifested in how they teach. The cooperative types of approach, such as Inquiry-

Based Learning, multimedia resources, and the works of groups, are normally applied. These are perceived to be interesting and are useful in imparting the concepts of sustainability, and even stories are used as a way of imparting a pragmatic idea. Teachers in primary schools are keen on adopting ESD, yet they are usually limited in their capacity because of the lack of harmony with the curriculum, problems in engaging students and a lack of formal training. Specific training, curriculum changes and institutional support are effective ways of meeting these challenges to enhance the process and influence of ESD in the primary school. The research also talks about the problems of student involvement, particularly because of unequal background knowledge, cultural distance and lack of involvement. Such are also compounded by our curriculum limitations.

The results reveal that educators are eager, and that this desire must be developed with adequate investment in terms of policies and resources. It will be able to result in a more successful implementation of ESD.

## Discussion

The research explored the capabilities of teaching the implementation of Education for Sustainable Development (ESD) in private schools, predominantly in the primary schools. The knowledge level of the teacher concerning ESD is good, and it meets the findings of the past studies that reported the positive attitude of teachers to sustainability education. Nevertheless, not all educators have specific ESD training, which also restricts the degree of implementation, giving way to specific professional development. The priorities of teachers are related to critical thinking and the development of problem-solving skills, which are also the global trends concerning the focus on these skills as a means of effective ESD. Yet, a moderate focus is placed on future-oriented leadership as well as value-based education and future thinking, which indicates that holistic competency development might have areas that lack attention. Inquiry-based learning, multimedia resources and collaborative group work are widely used, as well as the practices, which are known to be the most effective within sustainable education. Nevertheless, the applications of interdisciplinary approaches are less prevalent, and this fact has signified the necessity of improved integration of the curriculum. The paper has a very strong sense of the influence of family and moral values in defining the effectiveness of ESD; hence, the sentiment that community and culture contexts are seriously critical in dictating sustainability education results is true. It implies that families and local communities should be engaged in ESD work. Some barriers were determined, including the little background knowledge and motivation by the students, as they are common and are observed in literature. This indicates the significance of colour instruction and variety of instruction schemes to meet the needs of different learners.

## Recommendations

The recommendations to enhance the education of the Sustainable Development (ESD) in primary schools are based on the results of the research:

- Regular and targeted professional development programs should help teachers to have appropriate knowledge and feel empowered in relation to ESD.
- To provide teachers with the support to integrate ESD themes throughout different subjects on a regular basis, the teachers need to be motivated and encouraged to do so with the help of dedicated resources and curriculum guidelines.
- The family background and moral values have a great influence on ESD, therefore the schools should engage the families and communities in establishing a favorable situation to endure sustainability learning.
- Other programs like Inquiry Based Learning, Multimedia Resources, Group work and Experiential Learning are already in place. These should be encouraged further through the training of the teachers and the provision of resources.
- An emphasis on critical thinking, problem solving, knowledge of the curriculum and collaboration should be imparted in training programs in order to become a competent teacher of ESD.
- Differentiated instruction and motivational strategies should be employed to meet the needs of students with different knowledge levels and to make students interested in the topic of sustainability.

- Allowing students to contribute to sustainability-related choices will enhance the level of their involvement and make ESD more effective as teachers provide them with the necessary powers.
- Encouraging teachers and students to have a positive mind towards sustainability will enhance overall effectiveness of ESD work.
- By enhancing that which is transdisciplinary and the need to ensure learning life-long, it will facilitate effective comprehensive sustainability education in all subjects.
- This will be achieved through developing partnership with the communities living in the area and this will enhance learning activities and give the learning a real world scenario related to ESD.

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