

# Teacher Training for Sustainable Development of Countries

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## Abstract

Sustainable development has emerged as an urgent necessity. Although it was first limited to environmental issues only, now this idea has been expanded to include a wider range of educational, social and economic sectors. As the influence of human activities has been increasing on the environment, so it is the responsibility of humans to control, prevent and eradicate this continuous decay. Majority of the solutions to check the environmental challenges depend on external control rather than voluntary efforts. Education is the universally accepted remedy to these challenges. Now the education systems emphasize the integration of sustainability principles into teacher training curricula using competency-based frameworks like CSCT (Curriculum, sustainable development, competences, Teacher Training) and UNESCO's Key Sustainability Competencies for developing professional capacities aligned with global sustainability.

Embedding sustainable development across all levels of education should actively influence curriculum design, teaching methodologies and real-world experiences with consequences. To make this vision a reality, there is an urgent need to cultivate a new generation of educators: well-trained, environmentally conscious and equipped to act as master forces of sustainability. Foundation of sustainable future lies in empowering education designs and for that prepare teachers to instil sustainability values in the future generations.

**Keywords:** sustainable development, teacher education, competency-based frameworks, professional development, community engagement.

## Подготовка учителей в целях устойчивого развития страны

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### Аннотация

Устойчивое развитие страны стало острой необходимостью. Хотя изначально эта идея ограничивалась только вопросами окружающей среды, теперь она охватывает более широкий спектр образовательных, социальных и экономических проблем. Поскольку влияние деятельности человека на окружающий его мир растёт, именно люди обязаны контролировать и предотвращать процессы распада. Большинство решений экологических проблем зависит от внешнего контроля, а не от усилий волонтеров. Образование является одним из средств решения этих проблем. В настоящее время системы образования нацелены на интеграцию принципов устойчивого развития в программы подготовки учителей и используют при этом следующие основанные на компетенциях рамки: CSCT (учебная программа, устойчивое развитие, компетенции, подготовка учителей) и ключевые компетенции ЮНЕСКО в области устойчивого развития, что необходимо для совершенствования профессиональных навыков, соответствующих принципам глобальной устойчивости.

Внедрение принципов устойчивого развития на всех уровнях образования окажет значительное влияние на разработку учебных программ, на методики преподавания и практический опыт, что предполагает долгосрочный эффект. Чтобы добиться наилучших результатов, необходимо как можно скорее воспитать новое поколение педагогов: хорошо подготовленных, экологически сознательных и готовых стать движущей силой устойчивого развития. Основой устойчивого будущего является расширение прав и возможностей образовательных проектов и подготовка учителей к тому, чтобы прививать положительное отношение к ценности устойчивого развития будущим поколениям.

**Ключевые слова:** устойчивое развитие, педагогическое образование, компетентностные модели, профессиональное развитие, вовлечение общественности.

### Introduction

Sustainable development is at the central place for tackling the interlinked challenges of the 21st century. Sustainability has now become a key priority with climate change, depletion of resources and widening socio-economic disparities. Education and more specifically teacher training institutions play a transformative role in achieving the sustainability goals. This research intends to explore how teacher training programs, when aligned with competency-based frameworks designs and enriched by experiential learning and continuous professional development (CPD) can foster educators who live and promote sustainable living.

## Objectives of the Study

1. To examine the role of teacher training programmes in promoting sustainable development.
2. To assess the application of competency-based frameworks like CSCT and UNESCO's Key Sustainability Competencies in teacher education.
3. To analyze how professional development and community engagement help to create sustainability-oriented educators.

## Methodology

A systematic, structured and rational search was conducted across leading academic databases, foundational scholarly publications, policy documents issued by national and international organizations. The inclusion criteria focused on the sources aligned with the study's research objectives. The selected literature was subjected to qualitative content analysis, through which key concepts and thematic patterns were identified. This analytical process enabled the recognition of common themes and meaningful insights from diverse perspectives on sustainability in teacher education. The study's key results, interpretative discussion and overarching conclusions has been developed based on the synthesis findings.

## Theoretical Framework

### *Sustainability in Education*

The integration of sustainability into education represents a paradigm shift that calls for new content and a systemic transformation in how education is delivered. Sterling (2001) argued that fragmented thinking, competition and short-term objectives of education are promoting unsustainable values. He introduced the concept of "sustainable education" and brought a change in educational philosophy to promote holistic thinking, interdependence and the cultivation of social values with ecological sustainability. Tilbury (2011) said that sustainable education should involve students in teaching learning process and develop the capacity to solve actual problems of daily life. It was further added that Education for Sustainable Development (ESD) should be an agent that runs through all subjects at all the levels of education and should not be limited to a particular curriculum only. Wals and Corcoran (2006) found that when school leaders and teachers are following environmental sustainability principles in their routine both formally and informally, the whole community of school become aware in a better way.

Slurs (2008) mentioned in his study of cross-national evaluation of ESD implementation in teacher education that countries with a systematic approach to sustainability in education like integration in policy, teacher training programs and school management achieved better outcomes. Mogensen and Schnack (2010) found that schools engaging with sustainability as a core value rather than a subject showed deeper student engagement and greater community involvement, in a meta-analysis of ESD programs across Europe. These findings recommend the importance of reframing educational aims and processes and not only modifying curricula. Further, Global Education Monitoring Report Team (2014) recognized that traditional educational models are not appropriate to overcome the sustainable development challenges. Barth et al. (2007) further pointed the role of universities in fostering competences for sustainable development by creating interdisciplinary process and learning experiences with well-developed specific technical knowledge as well as civic responsibility. The students and teachers will be more aware ethically.

For the attainment of sustainability, the goals, methods and basic structure of education based on the reforms in curriculum content are necessary for ESD as suggested by these studies. Another study conducted by Evans et al. (2017) as a global survey of various institutions for the training of teachers found that sustainability is significantly recognized as an urgent and important concern but it is still lacking in the policy integration of teacher training.

### **Teacher Training an important factor in advancing sustainable development**

In order to integrate sustainable development into the educational system, teacher education is essential. The behaviour of the future generations can be influenced by teachers who teach sustainability and also develop the skills of literacy for sustainability, action competence and changed behaviour by demonstrating real life scenario. The teacher education is an important actor for sustainable development to meet the challenges related to environment, society and economic aspects. Teachers serve as role models and catalysts for change influencing the attitudes, actions and skills of coming generations. Thus, attaining the goals for Sustainable Development especially the goal SDG 4.7, which is specifically meant for equipping teachers with knowledge, values and skills necessary for sustainability.

### **The Role of Teacher Education in Promoting Sustainability**

The foundation for preparing teachers to incorporate sustainability into their teaching methodology and practices by the year 2030 is essential framework for teacher education. These teachers should teach and develop a healthy lifestyle necessary for world citizenship, respecting diverse culture, maintaining global peace through non-violent approaches, instilling faith and work for human rights promoting gender equality, social justice and eradication of poverty.

These programs enable future teachers to:

- gain knowledge of sustainability principles
- critically evaluate their role in promoting sustainable attitudes
- Integrate interdisciplinary teaching strategies
- Solve real life sustainability problems

According to UNESCO (2017) sustainability in teacher training programs ensures that educators promote values such as equity, justice, environmental awareness and global citizenship. Ferreira et al. (2015) found that for Sustainability in Education for pre-service teacher education programs requires a systemic perspective by emphasizing two main factors knowledge of change strategies and the development of leadership capacities.

According to Cebrián et al. (2012), conducted a study on UK based pre-service teachers who were trained through special pedagogy for sustainability and found that they were using inquiry-based approach and involving participatory learning, which are more closely related to the ESD goals.

Santone et al. (2014) recommended philosophy of sustainability, relevant content knowledge, sustainability-oriented pedagogy, authentic assessment and continuous professional growth as the five major components for integrating sustainability into teacher education framework which equip future teachers to foster sustainability in school practices.

Barth and Rieckmann (2012) highlighted the importance of competence development in teacher education, suggesting that fostering systems thinking, anticipatory thinking, and collaboration skills enhances teachers' ability to address sustainability in a cross-curricular manner. It was also revealed that students taught by instructors who had

received ESD training were having more awareness for environment issues, inquisitive approach and reflective behaviour for sustainability through their meta-analytic research by Boeve-de Pauw et al. (2015).

### **Special features for Sustainable development in Teacher Education**

#### *Pedagogical Integration with Curriculum*

Sustainable development-based curriculum should be developed including novel pedagogy values that guide teaching and learning and promote rethinking of the concepts taught in the class which are associated with sustainability. A bondage of economic and social concerns should be developed from different contents as part of interdisciplinary approach.

#### *Interdisciplinary Curriculum Design*

To draw a connection between ecological, social and economic themes across different subject areas interdisciplinary approach in curriculum design is must. It helps to breaks down the disciplinary boundaries and encourages systems thinking for better understanding the sustainability issues. Wals and Corcoran (2012) also mentioned in their research findings that creating learning environments with a sustainability focus requires multidisciplinary education. Their research in European teacher education institutions revealed that programs which embedded interdisciplinary sustainability themes saw greater student engagement and increased critical awareness of global issues. The University of Gothenburg (Sweden) is an example for redesigning its teacher education program including climate justice, food security and urban sustainability across disciplines. It also showed improved preparation on the part of student teachers to deal with sustainability issues (UNESCO, 2020).

#### *Experiential Learning*

Field visits, community projects and school-wide sustainability initiatives with active participation provides experiential learning. It enables pupil-teachers to move from theoretical concepts to live experiences and fostering deeper understanding. Sterling et al. (2013) concluded that experiential learning projects of sustainability significantly improved pre-service teachers' confidence and competence in teaching ESD. In India, the Azim Premji University incorporated local community projects into its teacher education program. Under these projects, student teachers work with rural schools on sustainability issues and gain practical knowledge with stronger social-emotional engagement (Azim Premji Foundation, 2019).

#### *Reflective Practices*

Reflection helps the teachers to critically analyze their own values, attitudes and teaching methods. This introspection is helpful for understanding the ethical dimensions of sustainability. Zeichner and Liston (2013) in their longitudinal study of U.S. teacher education programs emphasized that reflective teaching is a transformative process and also found that structured reflection helped teachers to integrate sustainability principles with their own personal values and beliefs. Tools such as sustainability attitude scales, ethical reasoning tasks and autoethnographic narratives have been successfully used to prompt reflective thinking on sustainability.

#### *Inclusion of competence-based framework*

It is significant to incorporate seven competencies framed by UNESCO ranging from systems thinking to problem solving for the teacher education programs for sustainable

education to be carried to the school education to achieve various goals. Barth et al. (2007) found by conducting a study in various countries that the result of training was better by including these competencies in the training programs of teachers.

### Need of Competencies based framework in Teacher Education

It was observed that environmental issues are growing complex and having adverse effect on human beings. It was necessary to create awareness and educate people through special education immediately. For this we need a well-trained generation of teachers who are trained for sustainable education, UNESCO has rightly recommended that seven competencies framework should be included in the system of teacher training for various countries. Many authors have studied the effect of these competences on the education system and students. Mochizuki and Fadeeva (2010), focused in their study that the networks in various regions of Asia which included these competences into their teacher training education found that these teachers and teacher educators gave better results by providing effective education. Rieckmann (2012) conducted a study across European institutions and confirmed that UNESCO's competencies are playing a core role in achieving sustainability education outcomes, especially systems thinking, critical reflection and anticipatory thinking.

### Group Aspects of Competencies

#### *The CSCT Framework*

The CSCT framework developed through European collaboration (de Haan, 2006), offers a comprehensive model for integrating sustainable development into teacher education. It emphasizes three core areas of competence:

- **Content Competence:** Knowledge of sustainable development topics (e.g., climate change, social justice, biodiversity).
- **Pedagogical Competence:** Ability to apply learner-centred, participatory methods.
- **Normative Competence:** Capacity to reflect on values and make ethically sound decisions. This framework encourages interdisciplinary thinking and practical action, making it especially relevant for preparing teachers to be facilitators of change. A study by Riess and Mischo (2009) showed that pre-service teachers trained under the CSCT model developed stronger environmental attitudes and were more confident in teaching sustainability themes across subjects.

#### *UNESCO'S Key Sustainability Competencies*

UNESCO (2017) outlined a set of **Key Competencies for Sustainability**, which serve as a foundation for effective education development (ESD). These include:

- **Systems Thinking Competence:** Understanding complex interactions between natural and human systems.
- **Anticipatory Competence:** Evaluating possible future scenarios and preparing accordingly.
- **Normative Competence:** Understanding and reflecting on sustainability values and principles.
- **Strategic Competence:** Planning and implementing sustainable interventions.
- **Collaboration Competence:** Working effectively with others to achieve common sustainability goals.
- **Critical Thinking Competence:** Questioning norms, practices, and opinions to consider sustainability in decision-making.
- **Self-awareness and Integrated Problem-solving.**

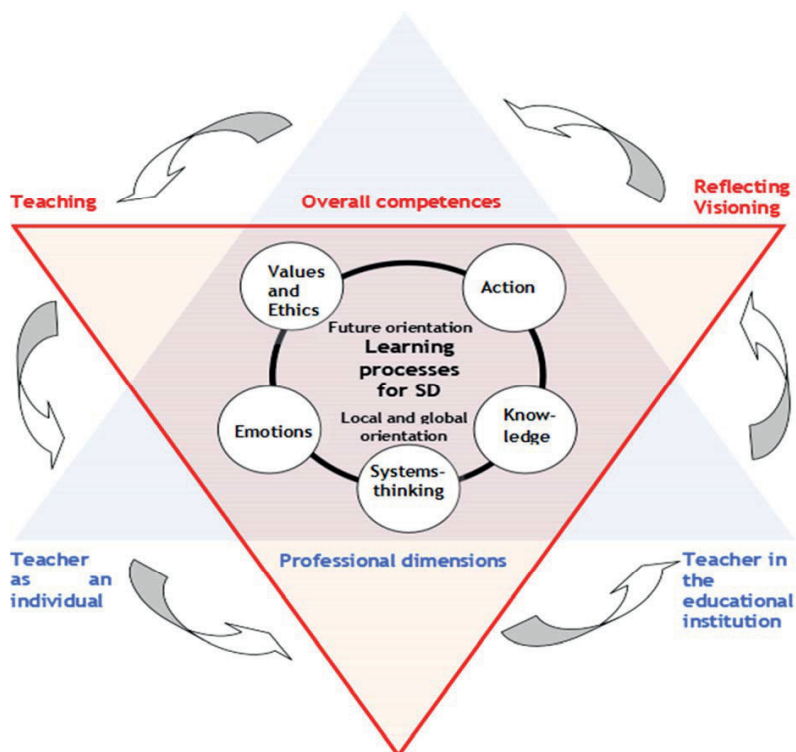


Figure 1. Basic competencies for teacher training  
Source: CSCT Handbook

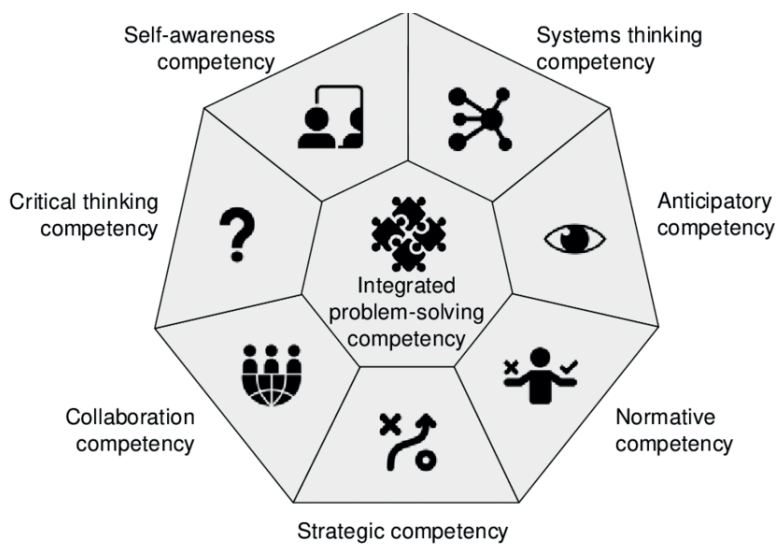


Figure 2. UNESCO Key Competencies



UNESCO recommended that these competencies are not to be taught separately but should be applied to the curriculum and pedagogy for the specific training of teachers being prepared for sustainable education. Wiek et al. (2011), said that these competencies are critical in this time to be included for the teaching professionals to meet the challenges of sustainability, UNESCO further recommended strongly for its member states to introduce these competencies in the teaching learning curricula so that the program of education for sustainable development can be achieved by the year 2030.

### **Continuous Professional Development and Community Engagement in developing Sustainable Educators**

Beyond curriculum, sustainability in education demands such teachers who possess the teaching skills, positive attitudes and special training necessary to encourage and set an example of sustainability-oriented behaviour so that sustainable development and environmental issues should reflect in their day-to-day behaviour. To cover all the teachers pre-service and in-service training programs should be framed and implemented through the respective policy framework.

### **Contribution of in-service training program for developing competencies model**

It is necessary for every teacher to know and develop the sustainability competencies through their personal efforts of continuous professional learning. Various agencies should also conduct different courses for in-service teachers. It should be made mandatory for in-service teachers and ensure that not a single teacher is left out. CPD focus interdisciplinary approaches and fostering critical thinking and problem-solving skills. Key Competencies developed through CPD (UNESCO, 2017): Systems thinking competency, Anticipatory competency, Normative competency, Strategic competency, Collaboration competency, Self-awareness and integrated problem-solving. Pavlova and Huang (Chandler) (2013) in her study of vocational teachers in the Asia-Pacific region emphasized that CPD enable teachers to understand complex sustainability issues and lead to significantly improved integration of sustainability themes into instruction and enhance learner engagement. A UNESCO project trained over 500 educators in ESD methodologies and their post-training evaluations showed a 65% increase in the use of sustainability-related content and teaching strategies (UNESCO, 2020).

#### *Community Engagement: Learning Beyond the Classroom*

Community engagement promotes sustainability education by going beyond classroom learning with real-world issues. Teachers engaging with local communities create practical knowledge, manage social and environmental challenges and foster civic responsibility in the students. Evans et al. (2017), in a study of sustainability-focused schools in the UK reported that schools engaged in community-based projects show increased integration of ESD principles in classroom instruction and teachers reported more empowered and supported in their sustainability teaching. The "Haritha Vidyalayam" (Green School) project initiated by government of Kerala, (India) integrates community members into school greening initiatives. and provide understanding of local environmental challenges.

Also, CPD and structured community engagement jointly presents a holistic model for sustainability in education. When teachers actively engage in community activities, education becomes a holistic path for maintaining sustainability. Their teaching learning goes beyond theory and gives teachers a real-life experience as professional development workshops with field visits and collaborative projects with NGOs. Tilbury and Wortman



(2004) outlined an integrated model of CPD and community engagement in Australian schools. Their study highlighted those teachers exposed to this blended mode were more likely to adopt innovative pedagogical approaches and incorporate sustainability deeply into the curriculum.

### **Indian Policies for sustainable Education**

National Education Policy (2020): Indian education systems were formed and revised at regular intervals especially since independence in 1947. Various policies were framed which focused on the upgradation of national curriculum and teacher training curriculum by establishing curriculum forums tentatively after every five years. Various revisions made by these forums included special needs and themes to be achieved. But recently NEP 2020 was framed by central government having special features of integrating various disciplines and flexibility in the system. This policy has a special mention for integrating education for sustainability through the following main features:

- Including this theme into the school curriculum, adopting a multidisciplinary and holistic approach to include environmental science, civic responsibility and ethical education.
- It also focuses on the local as well as global issues to meet environmental challenges.
- There is a strong provision to adopt various vocations related to environment preservation, sustainability, organic farming, water management, renewable energy, waste management etc.

Another policy named Samagra Shiksha Abhiyan (SSA) which is also sponsored by central government and meant for the improvement of school education by developing construction of eco-friendly school buildings, rain water harvesting, SWACH BHARAT (clean India) and green India. This scheme promotes community participation and inclusive education for the promotion of equity including differently abled students.

Scheme named Unnat Bharat Abhiyan (UBA) is also declared by Ministry of Education linking higher education institutions with the people living in rural areas. The students and community people jointly work for sustainable development at local level. This scheme provides green technologies which promote sustainability in agricultural processes and related professions like dairy, fishery and promotion of renewable energy.

National Action Plan on Climate Change (NAPCC) - Mission on Education was another program given by government of India to provide strategic knowledge for climate change by including climate literacy, capacity building, resilience strategies and promotion of research in the area of environmental conservation.

### **Major Findings of the Study**

#### *Education for sustainable development*

Instead of providing new information the existing curriculum should be moulded to relate to the environmental education.

#### *Training of teachers for Sustainable Education*

UNESCO competence-based framework should be adopted in teacher training programmes to develop skills, knowledge and values to meet environmental related challenges.

*Integrating sustainability into teacher training*

It requires reforming curriculum design and pedagogical strategies where interdisciplinary approaches; experiential learning and reflective practice could be incorporated.

*Regular professional development*

It is very essential for in-service teachers to enhance their competencies so that they can also demonstrate a behavioural change for sustainability education in their day-to-day life. Self-learning by teachers and the role of agencies is very important for professional development of these teachers.

*Community Engagement*

Role of teachers is very important for engaging community to enrich sustainability education. It helps the teachers as well as the community. CPD and community engagement together provides a comprehensive model of sustainability education by concentrating on pedagogical innovations with real life experiences.

**Discussion**

*The Paradigm Shift Argument*

The paper emphasizes the necessity of a paradigm shift in education, not merely including sustainability as a subject in radically reorienting educational practices but also consistent with the systemic change necessary to address complex global challenges.

*Pivotal role of teacher education*

By emphasizing the development of appropriate competencies and values in educators, it highlights those educators are an important change agent.

*Significance of integrated approaches*

Different approaches like competency-based training, experiential learning, interdisciplinary curriculum design and reflective practices in integration work effectively for sustainability education in teacher preparation.

*Frameworks based on Competencies*

A practical based draft for teacher education program is provided by the frameworks of UNESCO's Key Sustainability Competencies and CSCT, as these frameworks are an organized way for establishing learning objectives and reframing curricula that specifically include the specific knowledge, abilities and attitudes required for sustainability. Application of these frameworks are further highlighted by their alignment with international education policies.

*The Combined Effects of Community Engagement and CPD*

The study highlights that community engagement and continuous professional development (CPD) when combined, together work best. Community involvement provides teachers with real-world scenario and hands-on experience, while CPD ensures ongoing training and to adapt and modify the existing conditions. Community engagement and CPD Together create a more powerful Path for educators to place sustainability at the heart of their teaching.

## Limitations

### *Implementation Challenges*

Although the paper recommends the integrated approaches, but a thorough analysis of the practical implementation problems would be helpful. For example, community involvement and experiential learning demands a significant investment of time, experience and finances. These obstacles should be addressed properly to take the maximum advantage of integrated approaches.

### *Contextual Variations*

Examples from various international contexts are drawn in this study. However, it would work effectively if the specific adaptation strategies at different cultural, socio-economic and educational system are followed.

### *Positive association between teachers' practices and ESD*

A number of studies quoted in the text recommends positive correlation between teacher practices and ESD teaching, so more valid and useful techniques are needed to explore having a long-lasting impact on teachers and pupils regarding sustainability.

### *Teacher Beliefs and Values*

Though the paper mentions reflective practices, further exploration to actively penetrate and possibly turn around the pre-service teachers' beliefs and values about sustainability would be beneficial, as the personal values of teachers affects their teaching behaviour.

### *The Evolving Nature of Sustainability*

The concept of sustainability itself is constantly evolving. Empirical and experimental research is needed to solve the existing challenges faced by the educational institutions, teachers, students and related community and it needs lot of finances, manpower and efforts which is a critical concern.

## Conclusion

Teacher education plays a major role in the sustainable education system. Well-designed and forward-looking teacher preparation programs train the teachers with sustainable knowledge, critical thinking skills to make meaningful actions. These competencies help teachers to integrate sustainability into their teaching and also encourage them to live by its values in their professional and personal lives. In this way, teachers become role models and change agents who shape the values and attitudes worldviews of the future generations. At a time when the world faces critical environmental, social and economic challenges, education and particularly the preparation and continuous development of teachers emerges as a powerful driver of change. Training and professional development of teachers has become a vital catalyst for change. Teachers are no longer seen merely as conveyors of subject content, but as key architects of a sustainable future who inspire civic responsibility, ethical reasoning, and ecological awareness among students. To promote education for sustainable development, a competency-based teacher training program tuned with the global issues can only prepare a strong community of teachers and teacher educators to achieve the environmental goals.

The Concluding concepts highlight that the foundation of a truly sustainable future lies in empowering education designs and for that prepare teachers both at pre-service and in-service level not only to teach sustainability but to embody it.

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