

Fostering Sustainable Futures: The Contribution of Environmental Education to Sustainability Competencies and Sustainable Lifestyles among Middle Stage School Students

Salma Bano*¹, Dr. Shri Kant Dwivedi²

*¹PhD research scholar, Department of Education, Galgotias University, Greater Noida, U.P., India,

²Prof. Department of Education, Galgotias University, Greater Noida, U.P., India.

*Corresponding Author:

Prof. Dr. Shri Kant Dwivedi*

Email: shrikant.dwivedi@galgotiasuniversity.edu.in

Abstract: As environmental degradation, climate change and resource depletion are growing in scope, education is becoming a key opportunity for change towards sustainable development. The significance of EE in schools is recognized, but there is a lack of clarity regarding its conceptualization as sustainable living skills and sustainable competencies in daily life, especially in Middle Stage (Classes VI – VIII) of the school. In this conceptual paper an integrated framework is presented where EE is the independent variable that affects the Sustainable Lifestyles (sustainable diet, eco-mobility, sustainable consumption, waste management and recycling, energy conservation, water conservation) and Sustainability Competencies (Cognitive, Emotional and Social). The paper is based on the paradigm of Education for Sustainable Development, supported by the Theory of Planned Behaviour, Social Cognitive Theory, Value-Belief-Norm model and Ecological Systems Theory, and concludes that there are indirect relationships between Environmental Education and Sustainable Lifestyles via Sustainability Competencies, and also a direct pathway was identified. Some essential findings and propositions are given, and suggestions to curriculum, pedagogy, teacher preparation and policy are offered at the Middle Stage, especially in the context of the National Education Policy 2020 in India. This publication contains: Environmental Education; Sustainable Lifestyles; Sustainable Competencies; Education for Sustainable Development; Middle Stage Schooling; Adolescents.

Keywords: Environmental Education; Sustainability Competencies; Sustainable Lifestyles; Education for Sustainable Development; Middle Stage Schooling; Adolescents.

Introduction

The twenty-first century is experiencing an unprecedented array of environmental crises – climate change, biodiversity loss, freshwater depletion, and growing waste – which pose a threat to the ecological basis of human health and well-being. The United Nations Sustainable Development Goals, in particular Goal 4 (Quality Education) Target 4.7 (Education for Sustainable Development), Goal 12 (Responsible Consumption and Production) and Goal 13 (Climate Action), acknowledge that education is a key enabler to develop knowledge, values and behaviors that are essential for a sustainable future. In this regard, the school holds a privileged position since it is a socialising institution where habits, dispositions and value orientations are being shaped during formative years. The Middle Stage of schooling – Class VI to VIII, age 11-14 – is a critical period of development, where cognitive growth is especially fast and social awareness is increasingly strong, while habits formed on the way are carried into adulthood. Environmental Education (EE), which was originally defined as a ‘purposeful process that creates awareness, knowledge, skills, attitudes and participation around the environment’, has been promoted as a curricular answer to environmental issues for long time. Yet, much of the literature has traditionally focused on the development of environmental knowledge as the key outcome, while a lack of attention has been paid to how environmental knowledge can be translated into other competencies and sustainable daily practices. Two complementary discourses

have since come to the fore: a competency-based discourse as expressed in UNESCO's description of sustainability competencies that cover cognitive, socio-emotional and behavioural aspects; and a lifestyle discourse that focuses on how values and competencies are manifested in daily lifestyles, including through diet, mobility, consumption, waste management and resource conservation. Although both discourses are quite rich, very little has been done that brings them together within one framework for Middle Stage students. This paper aims to fill this gap by proposing a conceptual framework, "Fostering Sustainable Futures", that visualises EE as an antecedent affecting all six dimensions of Sustainable Lifestyle (behavioural), as well as the cognitive, emotional/social dimensions of Sustainability Competencies, which in turn are seen as a mediating mechanism between EE and sustainable lifestyle practice

Nature and Scope of the Study

This is a conceptual paper and does not provide new empirical data, but rather compiles existing theoretical and empirical studies in order to create a framework that connects the two. It is exploratory, and synthesis-based, focusing on clarifications of the constructs of EE, SC and SL, and articulations of their hypothesised interrelationships in a way that is suited to future empirical testing. The paper is restricted to the Middle Stage (Classes VI–VIII, age range: 11 years – 14 years) of school education in India as per the National Education Policy 2020. Environmental Education is seen as the independent variable, while Sustainability Competencies (Cognitive, Emotional and Social, and Behavioural domains) and Sustainable Lifestyles (sustainable diet, eco-mobility, sustainable consumption, waste management and recycling, energy conservation, and water conservation) are considered as the dependent variables; Sustainability Competencies are also considered as a mediating variable. The paper does not apply to the higher education sector, adult populations or lifestyle dimensions other than those specified

Significance of the Study

There are three points to consider with regard to the importance of this paper. First, the "value-action gap" documented in environmental education research – the gap between environmental knowledge and positive environmental attitudes and behaviour (Kollmuss & Agyeman, 2002) – indicates that intermediate competency constructs, which include cognitive, affective and behavioural components of the EE are better able to provide a complete account of the way in which EE inputs translate into lifestyle outcomes than knowledge alone. Second, the global transition towards competency-based and transformative Education for Sustainable Development (ESD) (UNESCO, 2017; Rieckmann, 2018) requires concepts and models that categorize sustainability competences into cognitive, socio-emotional, and behavioural areas, thereby providing a more sophisticated foundation for designing and evaluating curricula at the school level. Thirdly, the National Education Policy 2020 explicitly refers to the integration of EE and sustainability in the school curriculum, focusing on experiential learning and life skills, thus making the Middle Stage a pivotal period. In designing a curriculum, teacher educator, and policy maker who wants to enhance the sustainability orientation in Middle Stage education can use an integrated conceptual model between environmental education inputs, competency development, and lifestyle outcomes, and can use this model as a foundation for the further empirical research. Fourth, the framework distinguishes between the three domains of Sustainability.

Competencies (cognitive, emotional/social, and behavioural) as well as the six dimensions of Sustainable Lifestyles (social, cultural, environmental, economic, political, and ethical), and explicitly named each of these domains to overcome the common criticism that previous conceptual work used 'sustainable behaviour' or 'competence' as a general, undifferentiated term. This differentiation allows for more nuanced hypothesis to be developed, more specific curricular interventions, and more meaningful assessment of the domains and dimensions in which environmental education makes a difference for Middle Stage students.

Review of Literature

Many studies have explored the link between EE and environmental knowledge, attitudes and behaviours. No single construct, however, has been found to explain behavioural outcomes sufficiently to warrant its use and, in fact, the three constructs—environmental knowledge, attitudes, and a sense of personal responsibility—have been identified as significant, but individually small, predictors of

responsible environmental behaviour through meta-analytic work (Hines, Hungerford, & Tomera, 1987). Recent studies have focussed on the enduring dichotomy between knowledge/attitudes and actual behaviour and explain this mismatch by means of intervening competency constructs, such as internal factors (motivation, values, LOC) and external factors (institutional, economic, and social constraints) (Kollmuss & Agyeman, 2002), justifying the inclusion of intermediate competency constructs in conceptual models. In this perspective, the behavioural domain of Sustainability competences is informed by the “action competence” approach which focuses on the ability and willingness to take well-considered action on socio-environmental issues rather than behaviour change, and aims to combine agency with knowledge, values and respect for the learner’s autonomy (Mogensen & Schnack, 2010). To complement this, research on nature-based environmental education has shown that, when environmental knowledge and connectedness are developed together, through direct, experiential engagement, associations with ecological behaviour are stronger among children than when they are only presented with environmental knowledge (Otto & Pensini, 2017), thus justifying the inclusion of the emotional and social domain. Attitude-behaviour relationship research indicates that the direction is possible to be bidirectional and context dependent, as the participation and experience can sometimes precede and reinforce attitude change (Eilam & Trop, 2012), highlighting the importance of experiential and participatory pedagogies. UNESCO’s definition of key competencies for sustainability highlights competencies in systems thinking, anticipatory, normative, strategic, collaboration, critical thinking, self-awareness and integrated problem-solving competencies, which are central to ESD and have been developed through learner-centred and transformative pedagogies (UNESCO, 2017; Rieckmann, 2018), and hence form the backbone of the tripartite structure of Sustainability Competencies adopted in this framework. In the context of Indian school education, structured opportunities through the establishment of eco-clubs, “Green School” schemes and national campaigns on cleanliness and water conservation have enabled students to participate in lifestyle oriented sustainable behaviours such as waste segregation, water conservation and energy conservation. Conceptual and empirical research systematically connecting these types of efforts to the various lifestyle dimensions of this framework, however, is still relatively limited for the Middle Stage. Combined, the literature reviewed suggests that the influence of EE on lifestyle behaviour is unlikely to be direct and unmediated, that the behavioural domain (self-efficacy/action competence) is likely to be a particularly proximal determinant of behaviour, and that a need exists for there to be frameworks which operationalise sustainable lifestyle behaviours through concrete, age-appropriate dimensions of lifestyle behaviour rather than through generic measures of pro-environmental behaviour – gaps the present framework seeks to address. Developmental and educational psychology also indicate that early adolescence is an ideal time for the beginnings of habit formation, as the Middle Stage student is increasingly able to make decisions for himself, and he is extremely sensitive to the effects of modelling, peer influence and structure in the school environment. The developmental receptivity supports the call for the Middle Stage (not the early or late school years) to be the primary setting for exploring the influence of EE on internal capabilities and on the ways a student lives their daily life that can carry over into senior high schools and beyond.

Objectives of the Study

The following are specific objectives of this conceptual paper

- To examine Environmental Education as a separate variable affecting on Sustainable Lifestyles and Sustainable Competencies in Middle Stage school students.
- To identify the cognitive, emotional and social and behavioural areas which make up Sustainability Competencies.
- To define the six dimensions – Sustainable diet, eco-mobility, Sustainable consumption, Waste management and recycling, Energy conservation, Water conservation – as Sustainable lifestyles.
- To analyse theoretical approaches that underpin the intended relationships between EE, Sustainability Competencies and Sustainable Lifestyles.
- To hypothesize a conceptual model and develop propositions that can be empirically tested.
- To provide recommendations for curriculum, pedagogy, teacher preparation and policy at the Middle Stage of schooling.

Conceptual Framework

Environmental Education (Independent Variable)

Since the Belgrade Charter (1975) and the Tbilisi Declaration (1977), EE has been described as a process that takes place throughout the individual's life and leads to awareness, knowledge, skills, attitudes, motivation and commitment to take action in search of environmental solutions. In the school setting, EE at the Middle Stage can be considered as three interconnected inputs: curricular via embedding the concepts of EE in various subjects including science, social studies and language education; co-curricular and experiential via eco-clubs, nature camps, school gardens and waste audits; and pedagogical in the form of inquiry, participatory and reflective teaching and learning approaches as against pure didactic transmission. Environmental Education for this framework is defined as the independent variable, which is expected to have a positive effect on students' internal competencies and the way students live their daily lives, and is interpreted as the quality, intensity and pedagogical value of the inputs related to EE.

Sustainability Competencies (Mediating Variable)

The term sustainability competencies are used to describe competencies that consist of knowledge, skills, attitudes, and values that enable people to confront sustainability challenges in a holistic way (UNESCO, 2017; de Haan, 2006; Rieckmann, 2018). The framework is structured in terms of Sustainability Competencies as three related domains, as outlined in **Table 1**.

Table1. Sustainability Competencies – Conceptual Domains

Domain	Key Components	Brief Conceptual Description
Cognitive Domain	Systems thinking; critical thinking; anticipatory/futures thinking	Knowledge and understanding of sustainability issues, their causes, interconnections, and long-term consequences
Emotional and Social Domain	Connectedness to nature; empathy; values clarification; collaboration and communication	Affective and interpersonal capacities, including concern for nature, others, and future generations, and the ability to work with others
Behavioural Domain	Self-efficacy; action competence; civic engagement	Sense of agency and willingness/capability to initiate and sustain pro-environmental action, individually and collectively

Sustainable Lifestyles (Dependent Variable)

Sustainable lifestyles are daily living habits, including consumption, mobility and consumption of natural resources – that aim to reduce the environmental impacts while maintaining individual and collective wellbeing (UNESCO, 2014). Sustainable lifestyles are best realised by actions in the Middle Stage students' zone of influence in their homes, their schools and their community. This is done within this framework, which specifies six dimensions, as summarised in Table 2.

Table 2. Sustainable Lifestyles – Conceptual Dimensions

Dimension	Brief Conceptual Description
Sustainable Diet	Preference for locally sourced and seasonal foods, reduced reliance on processed/packaged foods, and minimisation of food waste
Eco-mobility	Adoption of walking, cycling, public transport, and carpooling over exclusive reliance on private motorised transport
Sustainable Consumption	Mindful purchasing prioritising durability and reuse, avoidance of single-use plastics, and reuse/repurposing of items such as stationery, books, and clothing
Waste Management and Recycling	Segregation of waste at source, participation in recycling and composting, and application of the 3R (reduce, reuse, recycle) principle
Energy Conservation	Switching off unused lights, fans, and appliances; use of energy-efficient devices; awareness of renewable alternatives
Water Conservation	Judicious use of water in daily activities, awareness of water-saving practices such as rainwater harvesting, and addressing water wastage

Theoretical Foundations

Sustainability Competencies are revealed as a mediating construct, based on the Education for Sustainable Development paradigm (UNESCO 2017) which places competencies for Sustainability (systems thinking, critical thinking, anticipatory thinking, collaboration, and self-awareness) at the heart of learning outcomes and promotes learners' capacity for transformative action. The Theory of Planned Behaviour (Ajzen, 1991) suggests that behaviour is a function of intention, which is influenced by attitudes and subjective norms, and perceived behavioural control—which is a more proximal determinant of behaviour—is similar to the behavioural domain. Social Cognitive Theory (Bandura, 1986) highlights self-efficacy and observational learning as factors influencing behaviour and the behavioural domain as a proximal factor in Sustainable Lifestyles, with experiential environmental education serving as a means of developing self-efficacy. The emotional and social domain is in support of the Value-Belief-Norm theory (Stern, 2000) that suggests a causal chain of personal values, beliefs regarding environmental consequences, and a sense of moral obligation to act. Finally, Bronfenbrenner's Ecological Systems Theory (1979) is used to place development within nested systems (family, school, community and wider culture) indicating

that although the independent variable in this study is the school-based EE, the other factors of family and community are also important in shaping the translation of EE competencies to lifestyle behaviours as discussed further under Suggestions.

Proposed Conceptual Model

On the basis of the conceptualisations above, this paper presents a conceptual model (Figure 1) in which Environmental Education is an independent variable, Sustainability Competencies (cognitive, emotional/social and behavioural) is a mediating variable and Sustainable Lifestyles (six dimensions in Table 2) is the dependent variable. There are three pathways specified in the model: Path A: Environmental Education to Sustainability Competencies; Path B: Sustainability Competencies to Sustainable Lifestyles and Path C: Environmental Education to Sustainable Lifestyles. Sustainability Competencies are conceptualised here as playing a mediating role, with the direct effects (Path C) on Sustainable Lifestyles being relatively small and indirect effects (Path A and B) being relatively large, as would be expected by the ESD competency framework, the Theory of Planned Behaviour, and the Value-Belief-Norm theory, which all stress the importance of internal competencies and self-efficacy as mediating factors between EE and SL.

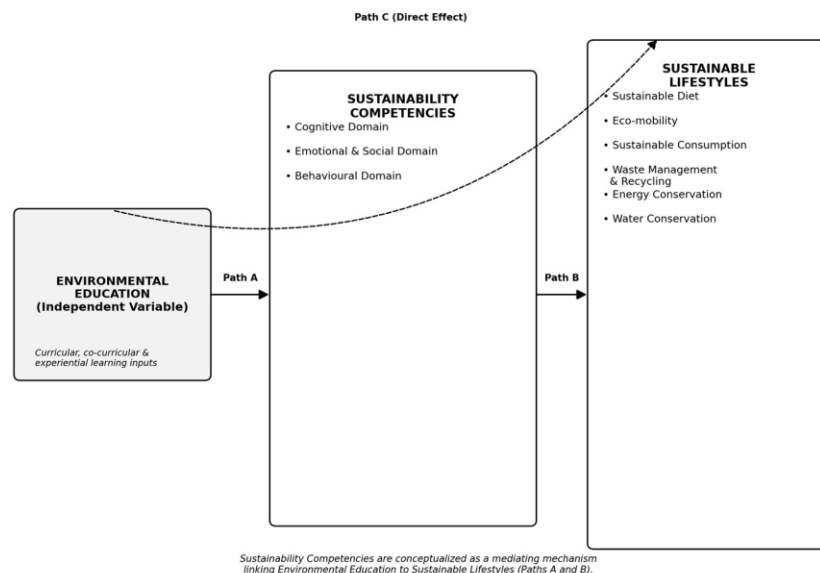


Figure 1. Proposed conceptual model depicting the relationships among Environmental Education, Sustainability Competencies, and Sustainable Lifestyles

The conceptual model is deliberately formulated as a model suitable for empirical testing with structural equation modelling, which would enable the estimation of Path A, B, and C at the same time, as well as the indirect (mediated) effect of EE on Sustainable Lifestyles through Sustainability Competencies. This would also allow for the three competency domains and six lifestyle dimensions to be analyzed as separate latent or observed variables and for determining which dimensions and domains are most strongly impacted by EE, and which pathways (direct or mediated) have more explanatory weight for the Middle Stage students

Findings

Conceptual analysis presented above leads to following basic conclusions, which can be presented as propositions, to be empirically tested in the future

1. There is a positive relationship between EE and students' Sustainability Competencies in the Middle Stage in general and in the cognitive domain (systems thinking, critical thinking and

- anticipatory thinking), the emotional and social domain (connectedness to nature, empathy, values clarification and collaboration) and the behaviour domain (self-efficacy, action competence).
2. The 2nd finding states that Sustainability Competencies are positively related to Sustainable Lifestyles in all the six dimensions, which are: sustainable diet, eco-mobility, sustainable consumption, waste management and recycling, energy conservation and water conservation
 3. Among the Middle Stage school students there is a mediation between EE and SL through Sustainability Competencies, which suggests that, for most students, the translation of environmental learning inputs into sustainable living practices is mainly at the level of internal competences
 4. In addition to the indirect impact of EE on Sustainable Lifestyles via Sustainability Competencies, EE also has a direct positive impact on this dimension, especially with the behavioural-engagement inputs (eco-clubs, waste-management drives).
 5. The behavioural domain of the Sustainability Competencies is likely to directly affect Sustainable Lifestyles, most strongly than the cognitive and emotional/social domains, as it is most closely linked to behavior
 6. The associations between EE and SL are likely to be stronger in dimensions rooted in collective-action in the school compared to the household decision dimensions, such as, for example, sustainable diet and eco-mobility. Altogether, these findings establish Sustainability Competencies as the conceptual link between the environmental learning and sustainable everyday practice and highlight direct and dimension-specific pathways of influence that deserve differentiated attention in the design of the curriculum and policies

Suggestions

Explicit learning goals related to systems thinking, empathy and connectedness to nature and self-efficacy/action competence should be integrated throughout the Middle Stage, across all subjects, including science, social science and language education, and not be limited to a separate, content-centred unit focused on environmental topics. Pedagogically, the school should focus on experiential learning, participatory learning and inquiry-based learning, such as the creating of an eco club, school garden, waste audit and project-based learning and relationship to the six lifestyle dimensions, because these are more effective in developing the emotional/social and behaviour domains shown to be critical links to sustainable lifestyle outcomes. Teacher education programmes need to equip teachers with the ability to design and implement competency-based EE, to evaluate EE results in terms of knowledge, emotion/social and behaviour domains of Sustainability Competencies (not only knowledge), and to model sustainable behaviour for teachers in accordance with the theory of observational learning that was emphasized by Social Cognitive Theory. Assessments should be built reflecting these competency areas and the six lifestyle dimensions and be utilized for monitoring at school level of the eco-club and other sustainability projects at school. The proposed framework is in line with the emphasis on experiential learning, life skills and integration of sustainability in the school curriculum in the National Education Policy 2020 and can be incorporated into the state curriculum frameworks, eco-club guidelines, textbook development at the Middle Stage of the curriculum, and monitoring frameworks that connect participation in school sustainability initiatives with measurable competency indicators and lifestyle indicators. Schools should build a stronger school-family-community relationship (such as take-home tasks related to house water use, house energy audit, etc.), which can help extend the impact of school-based environmental education in the family context, and in line with the principles of Ecological Systems Theory, many lifestyle behaviours are significantly influenced by the choices made at the household level. Empirical studies in the future should use structural equation modelling and longitudinal designs to test the proposed paths and the mediation of Sustainability Competencies, as well as moderating factors such as socio-economic status, location, school type, and the regional environmental context, and the creation of instruments for the competency domains at an age appropriate level. Lastly, the propositions are conceptually framed and based mainly on the Indian Middle Stage context within the National Education Policy 2020 and must be understood as a starting point for the contextual validation

Conclusion

This paper introduced an integrated conceptual framework – “Fostering Sustainable Futures” – which conceptualizes EE as an important antecedent of Sustainable Competencies (cognitive, emotional and social, and behavioral domains) and Sustainable Lifestyles (sustainable diet, eco-mobility, sustainable consumption, waste management and recycling, energy conservation, and water conservation) among Middle Stage school students where EE is mediated by the Sustainable Competencies. The framework provides theoretically supported foundation for future empirical research and as well for curriculum, pedagogical and policy work for cultivating environmentally competent and sustainability-oriented youth – as a contribution to the overall aim of cultivating sustainable futures

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