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BLENDED LEARNING FOR DELIVERING TRANSFORMATIVE SUSTAINABILITY CURRICULA

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ABSTRACT: Blended learning has emerged as a powerful instructional model that combines face-to-face teaching with digital learning technologies to create more flexible, engaging and personalized educational experiences. This study examines the effectiveness of blended learning in delivering transformative sustainability curricula within Sri Lankan higher educational institutions. The research aims to assess how this approach promotes key competencies of Education for Sustainable Development (ESD), including critical thinking, systems thinking and learner empowerment. A quantitative data method was used for surveys administered to students in higher education settings. The results indicate that blended learning enhances student engagement, fosters deeper understanding of sustainability issues and encourages active, reflective and collaborative learning. However, challenges such as unequal access to digital tools, limited teacher training, and institutional readiness were identified as key barriers. The study highlights the need for a context-specific framework to support the integration of blended learning in sustainability education. By aligning educational practices with the principles of transformative learning and the objectives of Sustainable Development Goal 4.7, this research offers practical insights and policy recommendations to strengthen the role of blended learning in creating informed, responsible and sustainability-conscious citizens.

Keywords: blended learning, sustainability education, transformative learning, education for sustainable development, higher education learning

1 INTRODUCTION

Blended learning (BL) is an effective approach to passive knowledge engagement of a massive number of students, which also increases learning outside the traditional face-to-face learning environment. BL, an educational approach that integrates traditional face-to-face instruction with digital technologies, has gained increasing attention for its potential to reshape teaching and learning. BL has increasingly been utilized in higher education as it has the advantages of both traditional and online teaching approaches(Anthony et al., 2022). Additionally, BL is currently trending among institutions due to its positive impact on student motivation and performance(Ibrahim & Nat, 2019).

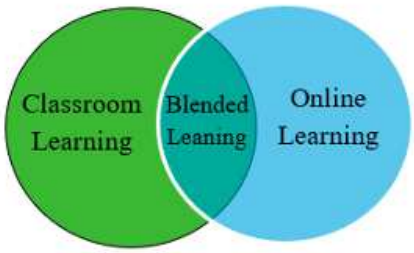

Figure 1. Blended Learning

As shown in Figure 1 the image illustrates the concept of blended learning through a Venn diagram that combines two key educational approaches such as classroom learning and online learning. On the left side, the green circle represents traditional classroom learning, where students are physically present with a teacher, engaging in face-to-face instruction. On the right, the blue circle symbolizes online learning, characterized using digital platforms where learners interact with content and instructors remotely via devices such as laptops and desktops. At the center, the overlapping orange section represents blended learning, which integrates elements from both approaches. This middle area highlights the combined benefits of physical classroom engagement and the flexibility of online learning, aiming to create a more effective and personalized educational experience. The visual emphasizes how blended learning bridges the gap between traditional and digital methods, supporting enhanced learning outcomes. BL encompasses not only physical spaces but also a variety of digital, informational, social and conceptual spaces that are intertwined in the creation and use of a BL environment(Shaya et al., 2025). The phrase blended learning was previously associated with classroom training toe-learning activities(Anthony et al., 2022). Currently, blended learning (BL) is trending among higher education institutions (HEIs) around the globe. Despite its popularity, no model exists that describes the motivation that affects instructors' opinions and beliefs regarding online learning(Ibrahim & Nat, 2019). Blended learning has been growing in popularity as it has proved to be an effective approach for accommodating an increasingly diverse student population whilst adding value to the learning environment through incorporation of online teaching resources(Alammary et al., 2014) The advantage of blended learning is that it offers a solution for in-service teachers to pursue further studies during their busy schedules(Lim & Wang, 2018). The students can join online learning as well as visit physical classes(Faustino & Kaur, 2021). The concept of blended learning cannot be defined precisely as different scholars put different content into the term, though all re-searchers agree that blended learning is an integrated learning experience that is controlled and guided by an instructor whether in the form of face-to-face communication or his/ her virtual presence. Technological innovation is expanding the range of possible solutions that can be brought to bear on teaching and learning. Whether we are primarily interested in creating more effective learning experiences, increasing access and flexibility, or reducing the cost of learning, it is likely that our learning systems will provide a blend of face-to-face and computer mediated experiences. Future learning systems will be differentiated not based on whether they blend but rather by how they blend. This question of how to blend is one of the most important we can consider as we move into the future(Bryan & Volchenkova, 2016). Innovations in blended learning models involve the use of advanced technologies and modern teaching strategies to enhance flexibility, engagement, and personalized learning(Mulenga & Shilongo, 2024) The study aims to evaluate the effectiveness of blended learning models in delivering transformative sustainability curricula within the Sri Lankan higher educational system. This study aims to achieve three two objectives:

- Examine how sustainability concepts are integrated into blended learning approaches in higher education institutions in Sri Lanka

- Investigate students' experiences and perceptions of blended learning approaches in sustainability education
- Identify the benefits and challenges faced by students in adopting blended learning for ESD

2 METHODOLOGY

This study adopted a quantitative research method to evaluate the effectiveness of blended learning models in delivering transformative sustainability curricula in higher educational institutions in Sri Lanka. The quantitative approach was chosen to systematically collect measurable data from a large sample of students, enabling statistical analysis of their experiences, perceptions and learning outcomes related to sustainability education in a blended learning environment. The primary data collection method was a structured questionnaire survey administered to students from higher education institutions that currently implement blended learning strategies. The questionnaire was designed to assess students' understanding of sustainability concepts, their engagement with blended learning platforms and the extent to which they developed transformative learning competencies such as critical thinking, systems thinking and collaborative problem-solving.

The survey instrument included multiple sections such as demographic information, access and use of blended learning tools, exposure to sustainability-related content, learning outcomes and perceived effectiveness of blended instruction. Responses were measured using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." A total of 70 students were selected through stratified random sampling across higher education institutions. The sample ensured gender balance and representation across different academic disciplines. Data collection was carried out over a period of four weeks through online survey forms, depending on student access to digital resources. The collected data were analyzed using descriptive methods. The analysis was conducted using the Microsoft excel 365.

3 RESULTS AND DISCUSSION

The quantitative survey yielded valuable insights into how blended learning supports transformative sustainability education. Analysis of responses revealed that nearly 90% of students agreed that blended learning helped them better understand sustainability concepts such as environmental conservation, resource management and climate change. Out of that 78% indicated that the use of digital tools and multimedia content made learning more engaging and relatable. When asked about the development of transformative competencies, nearly 72% felt that the blended learning experience improved their critical thinking skills, particularly through assignments and projects that required reflection on real-world sustainability issues. Nearly 69% reported increased systems thinking ability, as they were exposed to case studies, simulations and online discussions that highlighted interconnections among environmental, social and economic dimensions. Around 74% of respondents agreed that they became more motivated to act in their institutes after participating in blended sustainability modules. However, challenges were also identified. Nearly 10% of students indicated limited access to reliable internet or digital devices,

which occasionally hindered their learning. Additionally, nearly 40% of students believed that not all teachers were equally skilled in using online platforms effectively, which affected the overall learning quality.

The findings suggest that blended learning is a highly effective approach to delivering sustainability education that is both transformative and learner centered. It supports active engagement, promotes reflection, and allows for contextual understanding of key elements of transformative learning. The strong correlation between the use of blended learning tools and improved sustainability competencies aligns with global research advocating for digital-enhanced ESD strategies. However, the disparities in digital access and educator readiness remain significant barriers to scaling up this approach. The study highlights the importance of continuous professional development for teachers and investment in IT (Information Technology) infrastructure to ensure equitable learning opportunities.

Moreover, the evidence shows that blended learning can serve as a bridge between traditional classroom learning and real-world sustainability action. By enabling students to explore complex problems interactively and collaboratively, it fosters deeper learning and civic responsibility. To achieve its full potential, blended learning must be embedded within a broader institutional and policy framework that values sustainability as a core educational goal.

4 CONCLUSION

This study investigated the potential of blended learning models to effectively deliver transformative sustainability curricula within the Sri Lankan education system. The findings clearly demonstrate that blended learning enhances student engagement, facilitates deeper understanding of sustainability concepts and supports the development of key transformative competencies such as critical thinking, systems thinking and social responsibility.

Through quantitative analysis of student responses, the research established that blended learning encourages more flexible, interactive and reflective learning experiences essential characteristics of Education for Sustainable Development (ESD). Students appreciated the use of digital tools, real-world case studies and multimedia resources that helped contextualize sustainability challenges and solutions. However, the study also highlighted significant barriers, including unequal access to digital infrastructure and varying levels of teacher proficiency in using technology effectively.

The research concludes that while blended learning holds strong promises for fostering transformative sustainability education, its success depends on several enabling factors. These include targeted teacher training, investment in digital infrastructure and curriculum frameworks that integrate sustainability holistically. By aligning educational practices with SDG 4.7, this research contributes to the broader goal of cultivating a generation of informed, empowered and responsible citizens capable of contributing to a sustainable future. The proposed framework and insights from this study offer valuable guidance for educators, policymakers and institutions seeking to transform sustainability education through innovative, inclusive and context sensitive approaches.

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