

Abstract

This research design explores the effectiveness of Education for Sustainable Development (ESD) policies and their impact on students' actions. The main question I will examine is: How do ESD policies impact students' actions to behave more sustainably outside of school? ESD is education that implements sustainable practices in various subjects, curriculums, and on campus. However, there is very little empirical evidence that measures the effectiveness of ESD. The existing studies are cross-sectional and do not provide information on what is happening in the schools. I examine these studies in my literature review. Then I propose a field experiment be conducted at VCU and a survey after to measure the impact on students' actions. I hypothesize that when an institution is strongly committed to ESD, the students are significantly more likely to act sustainably outside of school.

Literature Review

I will analyze how Education for Sustainable Development (ESD) policies influence students in this literature review. ESD has been gaining interest in recent years as a way to mitigate climate change. The central research question is: How do ESD policies impact students' actions? The term "Sustainable" refers to the idea and application of addressing the needs of the present without risking the ability of future generations to meet their own needs, not limited to environmental factors. "ESD" refers to education that promotes sustainable development in various subjects, curriculums, and in their facilities. The effectiveness of ESD initiatives is often called into question because there is no unified framework for ESD programs, it can be adapted in any way. ESD programs vary by climate, geography, and country. They can be difficult to implement in curriculums. We will address these challenges to find out if ESD is effective and the best way to pursue it.

Several studies have found ESD to be effective. **Moreno Pires, S., Mapar, M., Nicolau, M., Patrizi, N., et al. (2022)** implemented the same ESD course in four universities across Europe and found that after completing the course 89% of students made an effort to live more sustainably 76% of students considered engaging in sustainability practices within the campus, and 72% considered pursuing a sustainability-related career. **Olsson, D., Gericke, N., Boeve-de Pauw, J. (2022)** concluded that based on a survey of Swedish students in 9th and 10th grade, their willingness to act sustainably increased after teachers implemented ESD in their classrooms. Unlike the first study, this study was longitudinal, not cross-sectional, and teachers had developed their own ESD lesson plan instead of following one framework.

Coertjens, L., Boeve-de Pauw, J., De Maeyer, S. et al. (2010) noted in a cross-sectional study that ESD was effective at improving students' knowledge of the environmental, economic, and social perspectives of sustainable development. However, it did not significantly improve the students' ability to act sustainability. Students from schools emphasizing environmental learning had shown to have more positive environmental attitudes, though the effect was also small. **Olsson, D., Gericke, N., & S-N. Chang Rundgren (2015)** found there were negative effects on

9th-grade students' sustainability consciousness (knowledge, attitude, and behavior about sustainability) after conducting a survey of schools that taught UN DESD (a Swedish ESD program) and Swedish schools that didn't teach ESD. They also found that ESD had a very small but positive effect on 6th-grade students' sustainability consciousness. The article implies that Sweden's UN DESD program needs to be improved, that even the best ESD schools in Sweden have limited ability to influence students, and the negative results show ESD impacts young people differently.

Alcántara Rubio, L (2020) did not find a significant increase in students' sustainable behaviors when conducting their case study on graduate students in Spain. In **Fang et al. (2018)**, the correlation between environmental knowledge and behavioral intention was extremely weak for Taiwanese university students. Both studies suggest that this is because the universities were not committed to sustainability and did not adequately train their instructors on ESD.

So, what makes some ESD programs effective and others not? Other than differences in culture, climate, geography, etc, **Msengi, et al (2018)** explain that successfully implementing ESD requires improved academic infrastructures, relevant faculty priorities, and institution-wide awareness of sustainable practices. **Brinkhurst, et al (2011)** states that faculty and staff members are critical leaders in efforts to achieve lasting progress toward campus sustainability, so there must be greater attention on how to support their efforts. Findings in **Suriyankietkaew & Hallinger (2018)** suggest that instructors need to approach ESD holistically and implement it school-wide.

The effectiveness of ESD policies in higher education is affected by a combination of contextual factors, like grade levels, gender, program differences, and cultural beliefs. However, these studies suggest that a crucial factor is institutional support. I hypothesize that when ESD programs are supported institution-wide, they are likely to significantly impact students' sustainable actions.

Methodology / Data

The scope of this research is to assess the impact of education for sustainable development (ESD) program on students' actions. The study will be a longitudinal study concentrated on year 1 students at VCU. Making it a longitudinal study will also increase the external validity, allowing us to capture a wider array of responses as well as examine the long term effects of ESD. Additionally, having the study include students from various majors gives a broader perspective of how ESD affects students and makes it more generalizable.

The treatment group will take a comprehensive ESD class that takes a holistic approach, addressing environmental, social, and economic aspects of sustainability. The class will be conducted in a building with sustainable features (solar panels, recycling machines, motion detector lights, low flow toilets, windows and plants in each classroom, etc.). There will also be an alternative treatment group, in which students take the same ESD class but in a building with

little sustainable features. The control group will follow the standard curriculum without any explicit emphasis on sustainability and will not be exposed to the building with sustainable features.

The purpose of having the class address environmental, social, and economic aspects of sustainability is to provide students with a comprehensive understanding of sustainability that goes beyond just environmental concerns. The reason for having it be in a building that is sustainable is so we can see if it reinforces the importance of sustainable practices by providing a physical example of how sustainable features can be applied in real life. Additionally, having an alternative treatment group allows us to see whether or not educational content alone is most effective.

The students will be randomly assigned to the treatment and control groups to improve internal validity. Additionally, before the ESD program begins a survey will be administered to all groups. This survey will include questions assessing students' current understanding, attitudes, and behaviors regarding sustainability. This study is specifically focused on how ESD impacts students actions, so the survey will emphasize actions students took to live more sustainably before completing the class. Having a pre-implementation survey gives us a baseline comparison and addresses individual differences, increasing internal validity.

Examples of pre-experiment survey questions:

1. List specific sustainable behaviors you currently practice in your daily life, if any.
2. How frequently do you engage in actions that promote sustainability in your personal and academic life? (Not at all, somewhat, frequently, very frequently).

After the experiment, another survey will be administered to all groups. This is to measure the immediate changes. The study will also conduct follow-up survey after one year to measure any long term effects.

Example of immediate survey questions:

1. How likely are you to continue engaging in sustainability-related activities after completing the class?

Example of follow up survey questions:

1. Have you been taking more sustainable actions in your life since taking the course? (Not at all, somewhat, strongly, very strongly).

This research focuses on evaluating the impact of an Education for Sustainable Development (ESD) course on year 1 students at VCU, using a longitudinal approach across different majors. The ESD class that will be conducted in a sustainable building, aims to provide an understanding of environmental, social, and economic sustainability, with an alternative treatment group to assess the influence of educational content independent of the physical setting. Randomization and a pre-experiment survey increases the internal validity. Immediate and follow-up surveys will help measure short-term and long-term effects. This study will help us understand the immediate outcomes of ESD on students' actions and the lasting influence of sustainability education, in hopes that we can efficiently implement sustainability at VCU. It will also contribute to the advancement of sustainable practices in higher education.

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