Reflection and Sustainable Habits: Engaging Students in Carbon Emissions Reductions Across 9 Courses

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Abstract

The project began with ten participating faculty, from many divisions of the school of Interdisciplinary Arts and Sciences incorporating concepts of sustainability into their course syllabi. The curriculum was then used to participate in the campus Carbon Challenge in autumn 2015.

Students were exposed to environmental perspectives in the classroom, and applied the concepts of sustainability in their everyday lives to lose carbon weight. Students reflected on their experience with the changes they made while also tracking carbon "weight loss." The responses were analyzed through document coding to identify themes in the students developing environmental attitudes.

Research Questions

1. What themes are most often expressed in students during their participation in the Carbon Challenge?
2. How do these themes differ over time as students participate in the Carbon Challenge?

Literature Review

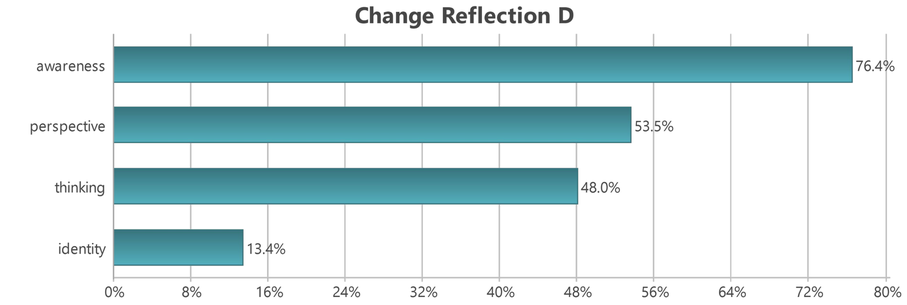
The development, and subsequent analysis, of student reflections about their behavior is based on a body of research that illustrates that experiential learning and critical reflection has transformative learning properties. Reflection allows us to derive meaning from experiences and "…enables us to cor-rect distortions in our beliefs and errors in problem solving" (Mezirow, 1990, p. 1). This becomes evident throughout the progression of the four reflections that students completed during the challenge. As students reflect on their personal carbon impact, and what they feel and learn during attempts to reduce said impact, their understanding of their ability to reduce their carbon footprint is often transformed. When students engage in reflection, they are able to explore motivations and emotions that exist in their experiences and gain new meaning and understanding from the process. With the process of reflection acting as a facilitator, learning is thus achieved through experience. Mezirow argues that "If reflection is understood as an assessment of *how* or *why* we have perceived, thought, felt, or acted, it must be differentiated from an assessment of *how best* to perform these functions when each phase of an action is guided by what we have learned before" (1990, p. 6). During the challenge, students were able to synthesize their experiences and feelings through reflection to determine what behavioral changes would be most effective and efficient in the context of their personal lives. Research indicates that "…reflection becomes an integral element of thoughtful action" and enables students to transform their perspectives by learning through experience (Mezirow, 1990, p. 6). Personal experience validates meaning effectively because it forges a connection between the student and the material being disseminated.

Introduction

Students completed four reflections throughout the project which discussed changes they made in order to reduce their carbon footprint. Reflections were coded for emotions, increased environmental awareness and difficulties with the challenge. The process of reflecting on value assumptions around environmental issues initiates transformative education (Mezirow, 2003). This method of education allows students to become aware of environmental perspectives and be more open to sustainable behavioral changes.

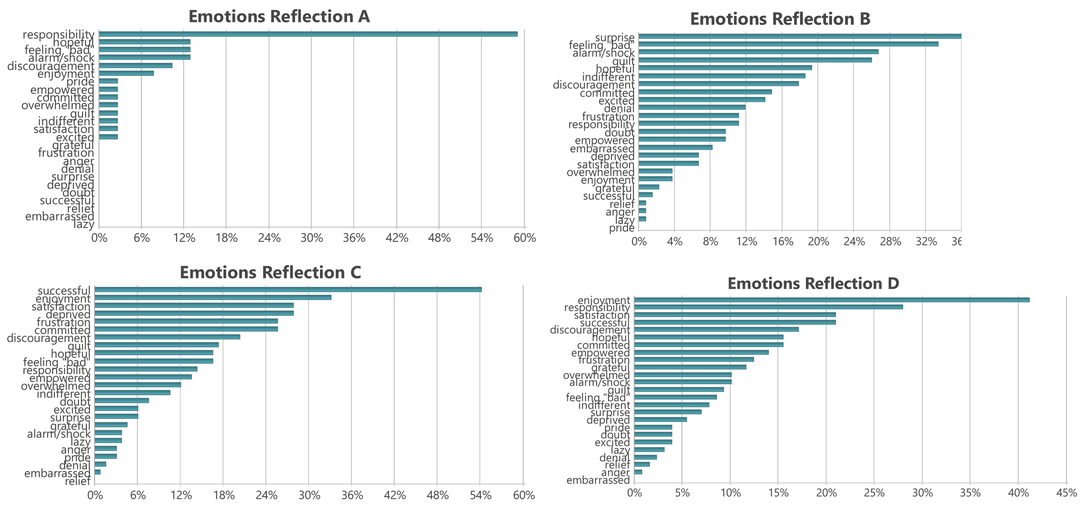
- The purpose of researching student responses is to analyze their understanding of the environment and sustainability, their willingness to change and how the Carbon Challenge shaped their attitudes of sustainable behaviors and practices.

Results Of Student Learning



This figure represents students' thought processes as they were exposed to environmental problems and their carbon footprints.

Frequent Emotions Expressed During Challenge



Reflection A students were asked: what do the words "environment" and "sustainability" mean to you, as well as what helped to shape these perspectives? Reflection occurred before class introduction about various environmental problems. In reflection B, students discussed thoughts and emotions that arose when they saw their carbon footprint and how they plan to participate in the carbon challenge. In reflection C, students were exposed to environmental documentaries and asked what challenges or successes have they faced. Students also discussed their thoughts and emotions at this stage in the challenge. In reflection D students responded to the same questions in reflection A and asked to reflect on their experiences and insights associated while participating in the carbon challenge.

Methods

Of the ten Interdisciplinary Arts and Science classes, eight course's responses were coded using an analysis tool for qualitative data. Reflections were coded for common themes pertaining to:

- Hot topics of environmental degradation
- A student's' emotion to new information or changes of behavior
- Influencing educational background for environmental issues
- Selected behavioral changes
- The development of a conceptual environmental perspective

A coding system was established through both deductive and inductive methods. Initial meetings produced a preliminary coding system that was evaluated, restructured, revised, and enhanced during preliminary stages of coding. Regular meetings were held to assess intercoder reliability and determine what changes in the coding system should be made to account for emerging themes and patterns in student reflections, as well as make adjustments in predicted codes. Additional intercoder reliability was established using the coding software, MAXQDA, to analyze the frequency of each code in a sample of reflections coded by both researchers. This analysis produced intercoder reliability of 89.06 percent.

Conclusion

Not only did students gain a more comprehensive understanding of their own carbon impact, but, through experience and reflection, were able to identify behavioral changes that would be most effective in the context of their personal lives. While some students expressed feelings of failure, engaging in reflection helped them to identify what individual or structural barriers inhibited their ability to reduce their carbon footprint. These results indicate that many students experienced a change in awareness and perspective of environmental issues, as well as their personal contribution to those issues in the form of carbon emissions. Continued research could benefit from exploring the tensions surrounding students who felt empowered by this change in awareness and those who expressed that individual actions made no difference in the context of a global problem.

References

Mezirow, J. (1990). How critical reflection triggers transformative learning. In J. M. &. Associates (ed.), *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory learning* (pp. 1--20) . San Francisco, USA: Jossey-Bass .

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