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Designing a Curriculum on Sustainable Living Practices

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DESIGNING A CURRICULUM ON SUSTAINABLE LIVING PRACTICES

By

Stefanie Neale

Accepted in Partial Completion
of the Requirements of the Degree
Master of Arts

Kathleen L. Kitto, Dean of the Graduate School

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Chair, Dr. Grace Wang

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Master's Field Project

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Stefanie Neale

May 26, 2017

DESIGNING A CURRICULUM ON SUSTAINABLE LIVING PRACTICES

A Field Project
Presented to
The Faculty of
Western Washington University

In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts

by
Stefanie Neale
Spring 2017

Abstract

This report summarizes the design, implementation, and evaluation of a Sustainable Living Practices course that was offered at Western Washington University (WWU) during Fall 2016. The purpose of this course was to teach students about sustainable living practices, their benefits, and the local resources available that support these practices. Engagement in sustainable living practices minimizes the environmental harm and greenhouse gas emissions produced by a typical consumerism lifestyle. Individuals that believe sustainable living practices are important may not necessarily engage in these behaviors in their own life. This gap between individuals' beliefs and actions is referred to as the Conservation Attitude-Behavior Gap (Leiserowitz et al. 2010). This course was designed to address the Conservation Attitude-Behavior Gap by giving students the opportunity to learn about and engage in sustainable living practices through lectures, assignments, guest speakers, and discussions with their peers. The course was evaluated using the Context, Input, Process, and Product (CIPP) Model, with a focus on how to improve the course both during its implementation and after its completion. The deliverables for this project include the course that was taught in Fall 2016, this final report, and a teaching guide that was created for individuals interested in teaching a course on sustainable living. The findings from the evaluation of the course were incorporated into the teaching guide to improve the course's content.

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Introduction

This report culminates a Master's project at Western Washington University (WWU). The purpose of the research project was to design and teach the curriculum for a 2-credit course titled Sustainable Living Practices. The course was offered through the Department of Environmental Studies as a 2-hour session once per week to students attending WWU during Fall quarter of the 2016-2017 academic year. Twenty-three students enrolled in and completed the course. The goals of the course were to educate students on sustainable living practices, including how to adopt them and the challenges of adopting them, and to identify the local sustainability resources available to students.

This research project sought to answer the question: *How can a curriculum be designed and taught to provide students with knowledge on sustainable living practices that they can use to make choices about their own lifestyles?* The curriculum design was informed by research on environmental education and behavior change. The research component of this project was comprised of two parts. The first was a literature review of curriculum design. This included research on the gap that exists between individuals' attitudes about sustainable living and their willingness to engage in sustainable practices in their lives, which is the gap that this project sought to address. The second part of the research was an empirical analysis of surveys and assignments that students completed while enrolled in the course. The method used to implement this project was the teaching of this course during Fall 2016.

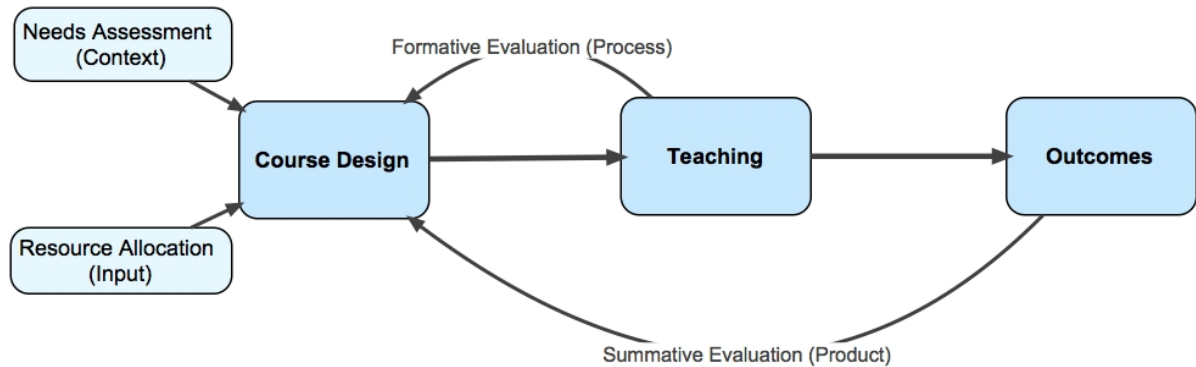
The project deliverable is this final report, which includes a detailed teaching guide for a sustainable living course that can be utilized by other instructors interested in teaching this subject matter to students. The teaching guide incorporates findings from a review of

sustainability and education literature, as well as lessons learned from the implementation and evaluation of the Sustainable Living Practices course. The literature review, methods, and evaluation are discussed in the following sections. The teaching guide for a sustainable living course follows these sections.

Literature Review

The design, implementation, and evaluation of this course were influenced by literature on the Context, Input, Process, and Product (CIPP) evaluation model. This model focuses on ways to improve a program, rather than proving a program's success. The CIPP model is able to account for the changing nature of educational programs, which made it appropriate for this course. Four individual evaluation components comprise the CIPP model. The first component is the Context evaluation, which is used to identify the needs and goals of a program. The second component is the Input evaluation, which determines the resources that will be needed to successfully carry out a program. The third component is the Process evaluation, which identifies program improvements while the program is in progress, allowing the evaluator to make improvements to the program before its completion. This component is the equivalent of a formative evaluation. The final component of the CIPP model is the Product evaluation study, which assesses all outcomes of the program after its completion. This is the equivalent of a summative evaluation (Frye & Hemmer, 2012). The needs assessment in the Context component, and the formative and summative evaluations provided by the Process and Product components, were the most influential in this course. Figure 1 shows a visual representation of where these components were incorporated into the design, implementation, and evaluation of the course. The incorporation of these components is discussed further in the following sections.

Figure 1. Incorporation of CIPP Model into Project Workflow



Before designing this course, the needs assessment of the Context component and the resource allocation assessment of the Input component were used to determine the needs and goals of the course. While this course was being taught, a formative evaluation was used to make improvements to the course while it was in session. A summative evaluation was then used at the end of the quarter to assess the outcomes of the course. The findings of both the formative and summative evaluations were then used to improve the design of the course curriculum. The improved course curriculum is incorporated into the teaching guide.

The curriculum for this class was designed with the purpose of overcoming the barriers that prevent individuals from engaging in sustainable living practices. These barriers and the ways that they were addressed by the course are discussed in the following sections: Barriers to Engaging in Sustainable Behaviors, Overcoming the Barriers to Engaging in Sustainability, and Program Evaluations. These sections also describe how the CIPP model was applied to reach the desired outcomes for the course.

Barriers to Engaging in Sustainable Behaviors

Addressing the barriers to engaging in sustainable behaviors required the application of the Context phase of the CIPP model. This is when a course designer identifies the

problems that the course will address, determines the needs of their target population, and identifies how these needs can be met through the course (Zhang et al., 2011). The problem that this course addressed is the negative environmental impact of human activities. One major component of this is the overconsumption of resources, or the fact that humans are using natural resources at a rate faster than the Earth can replenish. Developed countries such as the U.S. are particularly guilty of overconsuming resources. According to DeGraaf et al. (2014), society has been infected with an “affluenza” that causes individuals to constantly desire more and more goods. In fact, 71 percent of the \$15 trillion economy in the U.S. is spent on consumer goods (DeGraaf et al., 2014).

The prevalence of consumerism in society presents a huge barrier for engaging in sustainability, since sustainable living is in direct opposition to the lifestyle that individuals in the U.S. have grown accustomed to living. Overconsumption not only has negative impacts on individuals, such as creating feelings of depression and anxiety, but it also contributes to environmental problems, such as the depletion and degradation of land and water resources. In addition to this, fossil fuels are often burned in the process of making consumer goods, in the generation of electricity that powers homes and businesses across the nation, and in the transportation sector. Most scientists agree that the greenhouse gasses emitted from the burning of fossil fuels, as well as from the agricultural processes used to generate society’s food, contribute significantly to the rising global temperatures that are causing the climate to change. Climate change is predicted to have irreversible and dangerous impacts on the planet. These predicted impacts vary in severity depending on the amount of greenhouse gas emissions that humans choose to mitigate (IPCC 2014).

In the course design, the problem of overconsumption was addressed through various

topics. Four of these topics- transportation, electricity, food, and water- are resources that are consumed in American society, and their consumption contributes to climate change and environmental degradation. Another topic that was addressed in the course is waste, which is a product of consumption. Both people and the environment could benefit from a society that engages in behaviors that reduce the production of waste and the consumption of transportation, electricity, food, and water; however, research shows that many individuals do not engage in sustainable behaviors. One reason for this is that sustainable living practices require individuals to make changes in their lives. Individuals may view behavior changes as unwanted personal sacrifices, and therefore choose not to engage in them (Clayton & Myers, 2009).

There is also the possibility that individuals lack perfect information on sustainable living practices. Imperfect information occurs when individuals are not given adequate information about the various practices that they can pursue to live more sustainably (and the benefits of doing so), which means that they must seek this information themselves. Obtaining this information can be time-consuming, inconvenient, and confusing. These factors deter individuals from acquiring this knowledge on their own (Bardhan et al., 2014; Kollmuss & Agyeman, 2002). This was further reported in a study of 5,000 undergraduate students at the University of Michigan, which found that the majority of participating students did not use available off-campus energy efficiency resources because they were unaware that they existed. Most of these students expressed that they did not seek this information on their own (Meeri et al., 2012).

Since there is the possibility that individuals are not engaging in sustainable behaviors because they do not know what these behaviors are, it is important to provide education on

this topic. Therefore, the second goal of this project was to encourage students to consider adopting sustainable living practices by providing the knowledge necessary for them to make an informed decision about whether or not they want to incorporate these practices in their own lives. However, research shows that knowledge alone does not necessarily lead to action. Many individuals who do know about sustainable living practices and believe them to be important still report that they do not personally engage in them. Leiserowitz et al. (2010) interviewed 1,001 individuals about the behaviors that they believe to be important and the ones that they personally engage in. They found that approximately 75 percent of the individuals believe it is important to use public transportation, walk or bike instead of driving, unplug electronics, and buy locally grown food. However, more than half of these individuals reported that they do not engage in these behaviors. This gap between beliefs and action is referred to as the conservation attitude-behavior gap. This gap is a more complicated barrier to sustainable living than imperfect information.

Overcoming the Barriers to Engaging in Sustainability

The curriculum for this course was designed to address the two barriers to sustainable living discussed in the previous section - imperfect information and the conservation attitude-behavior gap. The first goal of the project was to provide WWU students with knowledge about sustainable living practices, related to each of the topics of over-consumption- electricity, transportation, waste, food, and water. The purpose of providing students with this knowledge was to address the imperfect or inadequate information that students may have had about environmental problems and sustainable living. However, as Leiserowitz et al. (2010) found, knowledge, even when it is coupled with pro-environmental beliefs, may not be enough to motivate individuals to change their behavior. There are a number of factors

that determine whether an individual will engage in sustainable behaviors. In order for an individual to engage in these behaviors, they must understand environmental problems and their causes; have knowledge of the actions that they can take to reduce their contribution to environmental problems; and perceive that a change in their behavior has the ability to make a difference in the problem (i.e. self-efficacy). The study also found that individuals are more willing to engage in a sustainable behavior if they make a verbal commitment to engage in the behavior (Leiserowitz et al. 2010).

These variables were incorporated into this class by providing students with an understanding of environmental problems (with climate change being the overarching problem), their causes, and the actions that individuals can take to reduce their contribution to these problems. This class included guest speakers who served as examples of individuals making a noticeable difference in their communities by engaging in sustainability, so that students in the class would feel that their actions could also make a difference. The students made written commitments to the sustainable behaviors that they engaged in throughout the quarter, which were visible to their peers and the instructor. These public commitments were meant to encourage students to follow through on adopting their chosen behaviors, because of the powerful role that social norms play in behavior change (Schultz et al. 2007). The power of social norms was also incorporated into the course through peer discussion groups. Peer groups are influential because individuals value the existence of social norms. Individuals often determine how appropriate their own behavior is by comparing it to what is considered “normal” behavior. Individuals want to be as close to the norm as possible (Schultz et al. 2007). By sharing their sustainable living experiences with their peers in groups, students were able to compare their own behavior to that of their peers.

Many factors play a role in an individual's decision to adopt a new behavior, such as the factors discussed by Leiserowitz et al. (2010) and the pressure from social norms. However, an individual that adopts a new behavior may not necessarily continue to engage in that behavior for an indefinite amount of time. For example, a student could choose to engage in a sustainable living practice that they learned in the class for a few days, and then revert to their original behavior. For this reason, students were given assignments that would encourage them to engage in these practices for a longer period of time. According to Ronis, Yates, and Kirscht (1989), repeated behaviors are characterized by two stages: initiation and persistence. Many people will complete the first stage of a repeated behavior, which is to start engaging in a behavior, but they will not remain persistent. An example of this is individuals who make a New Year's resolution to go to the gym. They may go to the gym for the first couple of weeks of the year and then revert to not going to the gym. This is because the initiation of a new behavior is determined by attitudes and beliefs, while the continued engagement in a behavior beyond the initiation stage is determined by habit. Ronis et al. (1989) conclude that a behavior becomes habit after it has been performed at least ten times and at least twice a month. This conclusion was incorporated into the assignments that were given to students during the class, since they were asked to adopt various sustainable living practices for approximately 10 days per practice. These assignments will be discussed in further detail in the methodology section.

Methods

The methods used to implement this project are straightforward: teach the Sustainable Living Practices course at WWU in Fall 2016 and evaluate the course's outcomes. A revised copy of the syllabus based on the findings from the evaluation of the course is provided in the teaching guide. This course was taught with the purpose of achieving the following desired outcomes: By the end of the course, students should:

- Understand the various practices that an individual can adopt to participate in a sustainable lifestyle;
- Be aware of the resources that are available to support sustainable practices;
- Be more engaged in sustainable living practices than prior to participation in the course, as a result of their own decisions to change their behaviors based on what they learned in the course;
- Use critical thinking to apply concepts learned in class to explain the barriers that may prevent an individual from living sustainably.

These desired outcomes were divided into three broader categories, which are shown in Table 1. The first, behavior change, occurred when students engaged in more sustainable living practices as a result of their participation in the class. The second column shows the methods used to achieve the outcome. In this case, experiential learning and discussion groups were used. This outcome was measured by student's' completion of bi-weekly sustainable living papers, as well as their answers on a survey given to them at the beginning and at the end of the course.

The second category, knowledge acquisition, refers to a student's awareness of sustainable living practices and of local resources that support sustainability. Knowledge of

sustainable living practices was provided through readings, lecture, discussion, and guest speakers, while knowledge of local resources was provided more specifically through guest speakers and lecture. This outcome was measured by surveys and review of assignments. The third category is critical thinking. This outcome was achieved when students applied concepts learned in class to explain the challenges of sustainable living, as well as when they came up with possible ways to overcome these challenges. To measure if this outcome was met, bi-weekly papers and final papers written by the students were reviewed. The following sections will explain these methods and measurements in more detail.

Table 1. Desired outcomes, methods, and measurements.

Desired Outcomes	Methods	Measurements
Behavior Change	Experiential learning	Completion of bi-weekly assignments, pre-and post-surveys
	Discussion groups	
Knowledge Acquisition	Sustainable living practices in general: Readings, lecture, discussion, guest speakers	Pre- and post-surveys, bi-weekly and final assignments
	Available resources: Guest speakers	
Critical Thinking	Readings, lecture, discussion, guest speakers, assignments	Bi-weekly and final assignments

Achieving the Desired Outcomes

The methods used to achieve both critical thinking and knowledge acquisition were fairly straightforward. Critical thinking was achieved through readings, lecture, discussion, guest speakers and assignments. Knowledge about sustainable living practices was disseminated to students through readings, lecture, discussion, and guest speakers. Knowledge about the resources available to support sustainable living was disseminated primarily through guest speakers and lecture. There were four guest speakers throughout the quarter. The first of these was the Zero Waste Coordinator from the WWU Office of Sustainability, who was also a student at WWU practicing Zero Waste in her own life. She shared first-hand experiences from her Zero Waste lifestyle with students, including recommendations of local resources to help individuals looking to reduce their waste. The second speaker was the owner of a Bellingham ice cream store. The ice cream in his store is made with whole fruits and vegetables purchased from local farms. He shared with the class the benefits of buying local ingredients for his business.

The third guest speaker was WWU's Sustainable Transportation Program Manager, who was very knowledgeable of various public transportation options. She has also chosen to not own a car in her personal life, so she was able to explain to students what it is like to get around without a car. The final guest speaker was the Dean of WWU's Huxley College of the Environment. He has published research explaining the environmental and social impacts of the tourism industry. During his presentation, he talked to the class about his research on tourism and his personal experiences with alternative transportation. Overall these guest speakers were able to explain first-hand what it is like to practice sustainability through their personal lives and their work, which gave students the opportunity to have specific questions

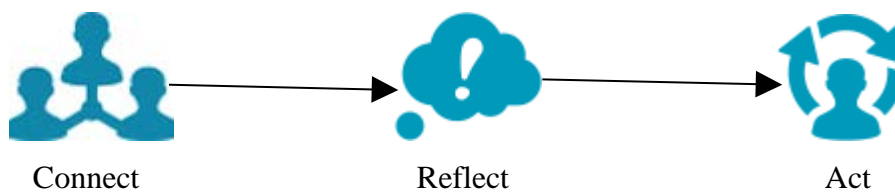
they had about a sustainable living practice answered by someone who was an expert on the topic. The knowledge provided through these guest speakers could not have been as successfully achieved through lecture or assignments.

Two methods were used to encourage behavior change. The first of these was experiential learning. Research shows that students who engage in experiential learning are more willing to engage in sustainable practices (Heinrich et al. 2015). Experiential learning was achieved through four bi-weekly assignments, which required students to choose a sustainable living practice that they did not already engage in and attempt to adopt it for 10 days. They were asked to choose a behavior that they could engage in at least once on each of those 10 days, so that they engaged in the behavior at least 10 times overall. The number 10 was chosen because of an argument made by Ronis et al. (1989) that states that a behavior will become habit after it has been performed at least 10 times. Students wrote a 2-page reflection paper on each sustainable living experience, which included a discussion on any challenges they encountered and how their experience related to concepts learned in class. Students were asked to engage in four sustainable living practices over the course of the quarter.

The other way behavior change was encouraged through the course was with discussion groups. There were many times throughout the quarter that students were divided into groups of 4-5 students. The purpose of these groups was for students to hold each other accountable on the readings and assignments, to encourage each other, and to share challenges with each other. Students were able to report updates on their behavior change assignments to their peers, and got to listen to their peers' updates. Research suggests that social norms can play a powerful role in behavior change (Schultz et al. 2007). Through

these discussion groups, students could compare their own class participation to that of their peers. Ideally, students were more motivated to adopt the behavior changes for their assignments in order to keep up with the social norm of their small group. The discussion groups followed a model used by the Northwest Earth Institute, which is an online institute that provides curricula for various environmental topics. The Institute's model, the connect-reflect-act model (see Figure 2), allowed students to connect with one another through discussions, to reflect on sustainable living, and then to act to make positive changes in their own lives. Ninety-three percent of participants in the Northwest Earth Institute's programs say that this model helped them make personal sustainable changes (Northwest Earth Institute 2016). A number of students in the WWU course also expressed, through their final papers and course evaluations, that their discussion groups were influential.

Figure 2. Connect-Reflect-Act Model (Northwest Earth Institute 2016).



Measurements Used for Evaluation of Outcomes

Assignments

There were four bi-weekly sustainable living papers assigned to students throughout the quarter that asked them to reflect on their engagement in sustainable living practices. There was also a 1,500-word final paper due at the end of the course. This paper asked students to discuss their experience in the class, what they learned, and how they will (or will not) apply this knowledge to their own life. The bi-weekly and final papers measured the

desired outcomes in the following ways:

- Behavior change: It was concluded that if students completed the bi-weekly sustainable living papers that they engaged in new behaviors.
- Knowledge acquisition: This was achieved when students incorporated the concepts that they learned in class into the assignments.
- Critical thinking: This was achieved when students showed that they were able to take the concepts that they learned in class and apply them to new questions and ideas in the papers.

Course Evaluations

WWU requires that each instructor give their students a generic course evaluation form to complete that is used for all WWU courses. There are two sections to this form. The first section uses a Likert scale to measure students' satisfaction with various aspects of the course, such as the challenge level of the assigned work and the ability of the instructor to effectively teach the course content. The second section asks students to provide written responses to three questions. This section asks students what they liked about the course, what they would change about it, and if they have any additional comments. Students' written responses to this second section were used in the summative evaluation of the course.

Pre- and Post-Course Surveys

Ungraded, identical surveys were given to students at the beginning of the quarter and the end of quarter to be used for the summative evaluation of the knowledge acquisition and behavior change outcomes. All 23 students completed the first survey and 14 of these students completed the second survey. These surveys were created and distributed using Qualtrics. Each student virtually signed an agreement to allow their survey results to be used

for this research. These surveys were voluntary, but the students were offered extra credit as an incentive to complete the surveys. Students provided the last five digits of their student identification number on their surveys so that their responses on the pre- and post-course surveys could be matched. The 14 post-course surveys that were completed were matched with the corresponding pre-course surveys to complete the summative evaluation.

Following the CIPP model, the purpose of this evaluation was to identify ways to improve the course (Frye & Hemmer 2012). The questions on the survey were used to determine students' knowledge of environmental problems and sustainable living practices, as well as students' engagement in various sustainable behaviors. The questions addressed all of the topics that were covered in the course- energy, transportation, food, water, and waste. As previously mentioned, the responses on the 14 post-course surveys were compared to the responses on the 14 corresponding pre-course surveys. The responses on the pre- and post-course surveys were organized into charts to better visualize the changes that took place in students' knowledge and behaviors. Changes were identified in students' responses between the two surveys. If the majority of students' responses on a particular question indicated that no change or negative change had occurred, then improvements were made to the course and incorporated into the teaching guide.

Survey Question Examples

A complete list of the survey questions used in this course is provided in Appendix B. Two example questions are provided in this section. Students' responses to the first example question were used to measure how well the knowledge acquisition outcome was achieved. If the students checked that they were aware of more local sustainable resources at the end of the quarter than at the beginning of the quarter, then it was concluded that knowledge

acquisition occurred during the time that the student was enrolled in the course.

Example 1: Which of the following programs, organizations, or concepts are you aware of?

- Bellingham Energy Prize
- Community Food Co-Op
- PSE's HomePrint Energy Assessment
- Community Supported Agriculture (CSA) food boxes
- Sustainable Connections
- City of Bellingham's free water-saving kits
- WWU Zero Waste program
- WWU Resident Resource Awareness Program (ResRAP)
- Microadventures/Staycations
- PSE's Green Power
- FoodPlus! Compost

The responses to the following example question were used to measure how well the behavior change outcome was achieved. If students reported that they engaged in more sustainable living practices at the end of the quarter than at the beginning, then it was concluded that behavior change occurred.

Example 2: How often would you say you engage in the following practices?

	Always	Frequently	Sometimes	Rarely	Never
Use a reusable water bottle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy food in bulk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shop at the farmer's market or co-op	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase products with disposable packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Course Evaluation Results

Formative Evaluation

Two types of evaluation methods were used for this project. The first was a formative evaluation, which took place while the course was in progress. This evaluation was used to find ways to improve the course before the quarter was finished. This type of evaluation was particularly valuable for this course because it was the first quarter it had been taught at WWU and the first quarter that the graduate student leading it had been an instructor, so there were many opportunities for course improvement. The Process component of the CIPP model was used as a tool for evaluating the course while it was in session, which involved reviewing recorded documents of the program's progress and interviewing participants (Frye & Hemmer, 2012). While the course was in session, the instructor reviewed students' assignments to evaluate whether students comprehended the concepts covered in the readings and lectures. The instructor also gave students multiple opportunities throughout the quarter to provide verbal feedback on the course, including their thoughts on the assignments, guest speakers, and lectures. Approximately halfway through the quarter, students were given an optional, anonymous survey to complete that asked for feedback on various aspects of the class.

While review of these assignments revealed that students did not appear to be having issues comprehending the concepts covered in the readings and lecture, the verbal and written feedback given by the students did result in some changes to the course. Near the beginning of the quarter, the instructor announced that students would be divided into small groups. These small groups were intended to be the permanent discussion groups throughout the quarter; however, many students expressed that they would prefer to choose their own

group members so that they could occasionally meet with different students. The instructor allowed students to choose their own groups. In addition, a few students also expressed that they would like to see more challenging reading assignments. The reading assignments initially only required that students write a simple discussion question about the reading. However, to accommodate the request for more challenging assignments, the instructor added research papers and in-depth questions about these papers for students to answer as part of their assignments.

While the course was in session, the instructor realized that most students were not taking notes during class because they were not being quizzed on their ability to remember information from lecture. Although notes from lectures would likely have helped students in writing their papers, it was not a requirement for them to incorporate notes into their papers to receive a passing grade. Since there were no exams or quizzes included in the syllabus that was given to the students at the beginning of the quarter (see Appendix A for a copy of the syllabus), the instructor could not add an exam or quiz while the quarter was still in session. Instead, the instructor added two group games to test students' knowledge on concepts learned in class. The first game was sustainable living trivia and the second was sustainable living jeopardy. These games were not graded, but students had the opportunity to win prizes if their group did well in the games. Prizes included extra credit points, LED light bulbs, and reusable grocery bags. The instructor announced to students ahead of time when the games would be taking place and what the prizes would be so that they would have time to take notes if they wanted to do well in the games. There was an immediate increase in the number of students taking notes during lectures after these announcements were made.

Summative Evaluation

The second type of evaluation that was used for this course was a summative evaluation, which took place after the quarter was complete. Following the Product evaluation phase of the CIPP model, the purpose of this evaluation was not to prove something about the course, but to instead identify ways to *improve* the course (Zhang et al. 2011). As discussed in the methods section, this evaluation was done by reviewing feedback provided by students in their final papers and course evaluations, as well as by analyzing their responses on the pre- and post-course surveys. The feedback for this course was overwhelmingly positive. In general, students expressed that the course had increased their knowledge of sustainability and their individual environmental impact, increased their awareness of local sustainability resources, and positively influenced their personal behaviors. Students also provided a number of suggestions for improving the course. The curriculum for this course was changed significantly to reflect the findings from the summative evaluation. The changes made to the course based on the improvements that students suggested in their final papers and course evaluations are explained in detail below. They have also been incorporated into the teaching guide.

Course Meetings

This course met once per week for two-hour sessions. Approximately one-fourth of the students in this course suggested in their final papers that the course could be improved by meeting more frequently. The instructor also agreed that this would significantly improve the course. Meeting only once per week made the lectures feel disjointed. It was difficult for students to connect the ideas from one lecture to another since there was a whole week between them. A few students had a difficult time turning assignments in on time. These

students expressed in their final papers that meeting more frequently would have helped them better remember when assignments were due. To address this suggestion, the curriculum was changed so that the course meets for one-hour sessions twice per week.

Exams

This course did not have any graded exams. However, exams would have provided an incentive for students to pay better attention during lecture and take notes. A few students expressed both verbally and in their final papers that they would be more motivated to take notes if they felt that they would be tested on their notes. The students demonstrated this through their response to being told that there would be in-class games with prizes.

Immediately after the instructor told students that they could earn extra credit points by doing well on an in-class game, there was an increase in the number of students who took notes during lectures. If students knew that they would be graded on the material that they were learning during lectures then this would also provide an incentive for them to take notes, which would improve their ability to retain knowledge. To address this suggestion, the curriculum was changed so that there is one midterm exam and one final exam. The purpose of each exam is to test how well students have paid attention during lecture. It will also give students another opportunity to use critical thinking skills by applying concepts that they learned in class to new questions.

Field Trips

Approximately one-third of students expressed that they thought this course could benefit from some sort of field trip. This activity would give students an opportunity to see and experience first-hand the concepts that they were learning in lecture. Examples of field trips that students suggested included touring a recycling plant and visiting a local farm or

business. To address this suggestion, an activity was added to one of the sessions under the Food module of the teaching guide that suggests that the class take a tour of a local business, such as a farm or a microbrewery. This is only a suggested activity since there may not be opportunities for a tour depending on the location of the course and the funds of the institution.

Group Project

Approximately one-third of students also suggested that this course could benefit from a group project. Students expressed that being part of a group of 23 students that were all adopting sustainable living practices together made their individual actions feel more meaningful. This effect could be amplified by having students complete a group activity together. To address this suggestion, there is a suggestion in the teaching guide to spend one session working on a group project. Examples include working in a garden together or making posters about sustainable living that can be displayed on campus for other students to see.

Small Group Work

A number of students expressed that they enjoyed working in small groups and would like to see more opportunities for this type of work in the course. To address this suggestion, there were a number of suggested small group activities added to the teaching guide. One of these activities is a recycling workshop where students work with their small groups to decide how they would properly recycle a number of miscellaneous items. Another activity requires students to work with their small groups to create a 3-day, zero-waste meal plan that they present to the class.

Grades

Upon completion of this course, students were only able to either receive a pass or fail grade. A couple of students expressed that they would have preferred receiving a letter grade at the end of the quarter. The instructor agreed that this would provide a stronger incentive for students to work harder in the class for their final grade. To address this suggestion, the course has been changed so that students receive a letter grade upon the course's completion.

Survey Results

The other component of the summative evaluation was the analysis of students' responses to the surveys given to them at the beginning and end of the quarter. The questions on the pre- and post-course surveys asked identical questions, other than five questions that were added to the end of the post-course surveys. Both surveys were voluntary. All 23 students completed the pre-course survey, and 14 of these students completed the post-course survey. Since the students in this course were a self-selected group – rather than a randomized sample of individuals – the results of these surveys are not meant to be used to make generalizations about any groups of individuals. Instead, these survey responses are only meant to be used to make statements about the students in this particular course. The responses on the 14 post-course surveys were compared to the responses on the pre-course surveys of those same 14 students to identify any changes that occurred during the quarter. An overview of these changes is provided below. A list of all survey questions is provided in Appendix B.

Knowledge Acquisition: Factual Questions

There were two types of survey questions that measured students' acquisition of

knowledge during the quarter. The first type was factual questions. Ten factual questions asked students about their knowledge of sustainability, climate change, and the environment in general. There were nine multiple-choice questions and one fill-in-the-blank question. Most of these questions asked students to choose the correct numerical value out of four options. Each question had a correct answer, which is shown on the charts below in bold. Students' responses on the pre- and post-course surveys were compared to determine what type of change took place. Positive change occurred if a greater percentage of students selected the correct response on the post-course surveys than on the pre-course surveys; and negative change occurred if a greater percentage of students selected the correct response on the pre-course surveys than on the post-course surveys. Figures 3, 4, and 5 display the results from three of the factual survey questions. The results from all of these questions are displayed in charts in Appendix B.

Figure 3. Responses to Question 7: Approximately what percentage of the U.S. economy (~\$18 trillion) is spent on consumer goods?

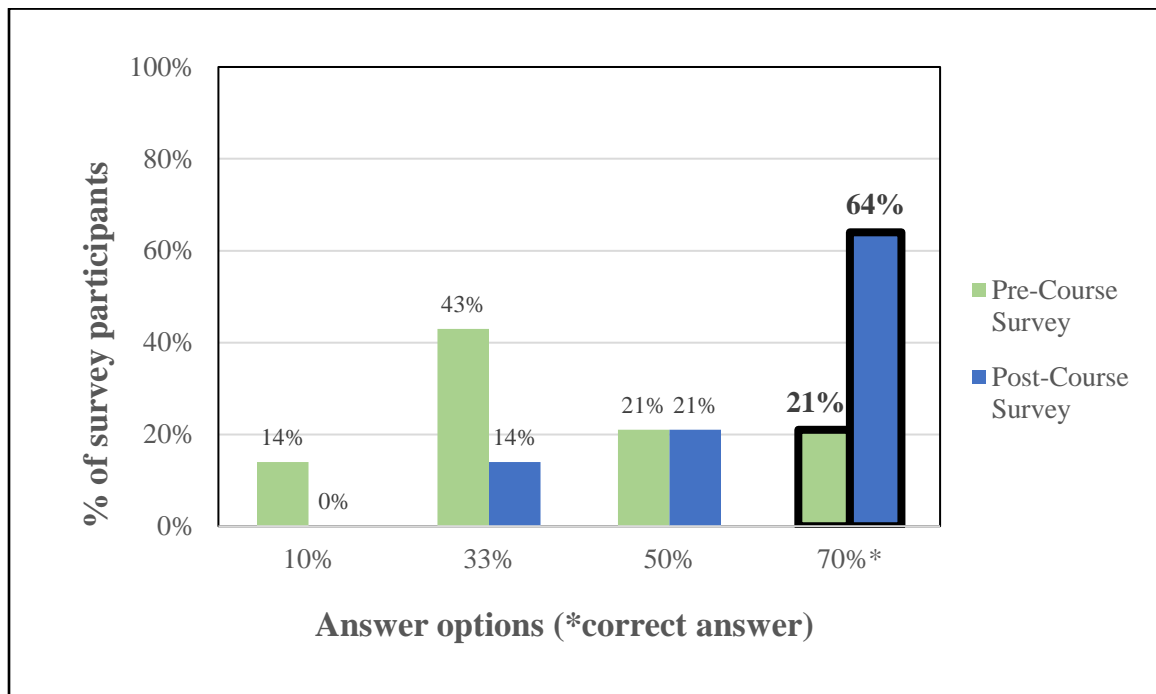


Figure 4. Responses to Question 9: What percentage of the trash produced by an average American is or once was edible?

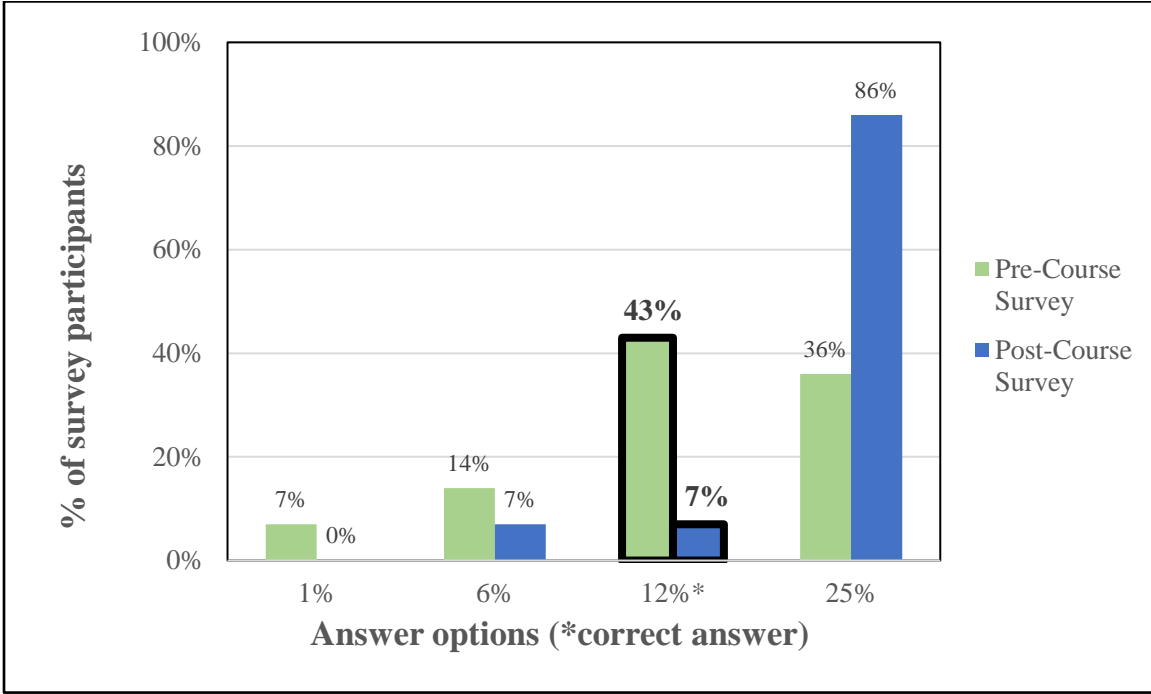
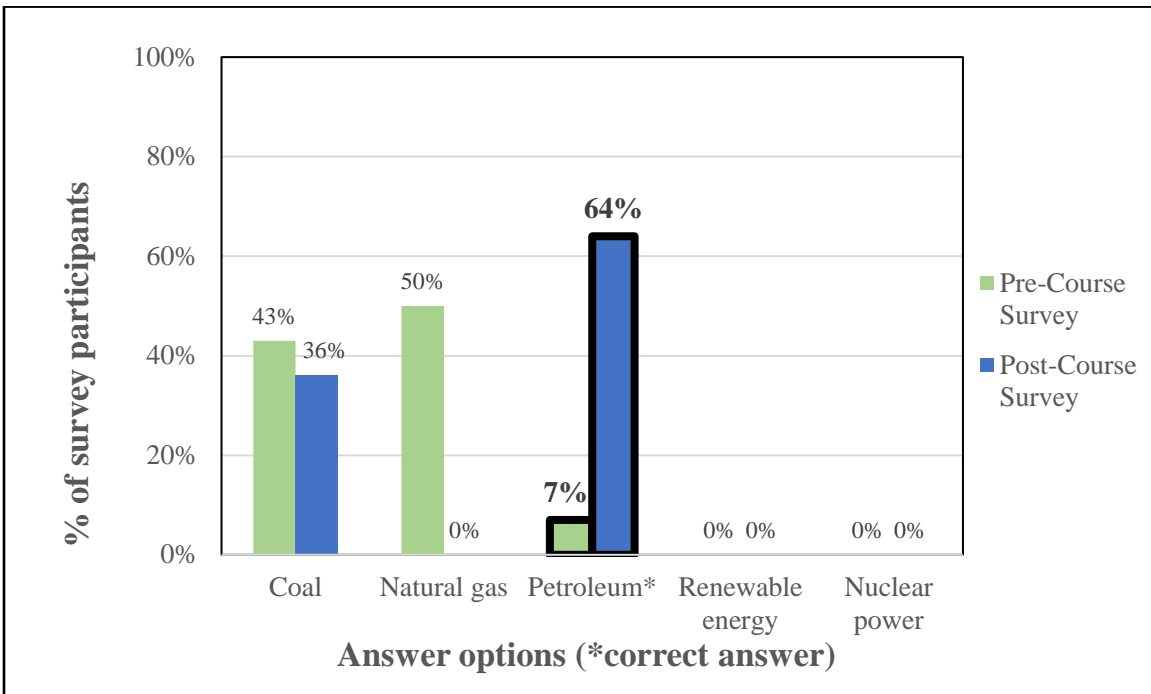


Figure 5. Responses to Question 12: Which primary energy source is consumed the most in the U.S.?



The figures above show two types of changes. Figures 3 and 5 are examples of positive change, while Figure 4 is an example of negative change. Eight out of ten, or 80%, of the factual questions experienced positive change. This means that a greater percentage of students answered these questions correctly on the post-course survey than on the pre-course survey. It is assumed that students acquired the knowledge necessary to answer these questions correctly by participating in the sustainable living course, since the lectures in the course covered all of the concepts that these questions address. However, since there was no control group used to compare the students in this class to, it is impossible to say with certainty that these students did not acquire this knowledge outside of the class.

When comparing the survey responses that measured knowledge acquisition, it is important to note that these questions were asked on voluntary, ungraded surveys. This means that there was no penalty for guessing the wrong answer, not answering a question, or not completing a survey. Students were specifically asked to not search for the correct answer to these questions in their notes or online, but to instead choose the answer that they thought was best based on the information that they could remember. Therefore, students did not study for these questions as if they would were they given a mandatory, graded exam.

After designing these questions and distributing the surveys, the instructor realized that there are more effective ways to measure knowledge acquisition. Questions that ask students to memorize numerical values do not necessarily demonstrate students' knowledge retention. For example, if a student answered that they believed that 25% of global greenhouse gas emissions can be attributed to the U.S., but the correct answer was 15%, this student likely still understands that the U.S. plays a significant role in the causes of climate change. This is more valuable than knowing the exact percentage of global greenhouse gas

emissions that the U.S. is responsible for. It would be more useful to ask students questions that allow them to use critical thinking skills. The following open-ended questions could be a more effective way to measure students' knowledge acquisition: "What role does the U.S. play in global greenhouse gas emissions? How can the U.S. be a leader in reducing global greenhouse gas emissions?" The teaching guide incorporates this improvement to the knowledge acquisition questions by providing a list of suggested open-ended questions that an instructor could ask students on an exam. There are no suggested questions that ask students to remember a specific percentage.

Knowledge Acquisition: Resource Awareness Questions

The second type of question that measured knowledge acquisition was a question that asked students to select which resources or concepts they were aware of from a list of 11 possibilities. Most of the resources listed in this question are available only at WWU or in Bellingham. These resources assist individuals who want to engage in sustainable living practices. For example, the City of Bellingham water-saving kits provide individuals with free materials – such as low-flow showerheads and kitchen sink aerators – that they can install in their homes to reduce their water consumption. In addition, the FoodPlus! Compost service provides a cheap and easy way for many individuals to reduce the amount of food waste they send to the landfill. Figures 6, 7, and 8 show the percentage of students who indicated that they were aware of a particular concept or resource on both the pre- and post-course surveys.

Figure 6. Percentage of Students Who Indicated Awareness of Sustainability Resources and Concepts (Part 1).

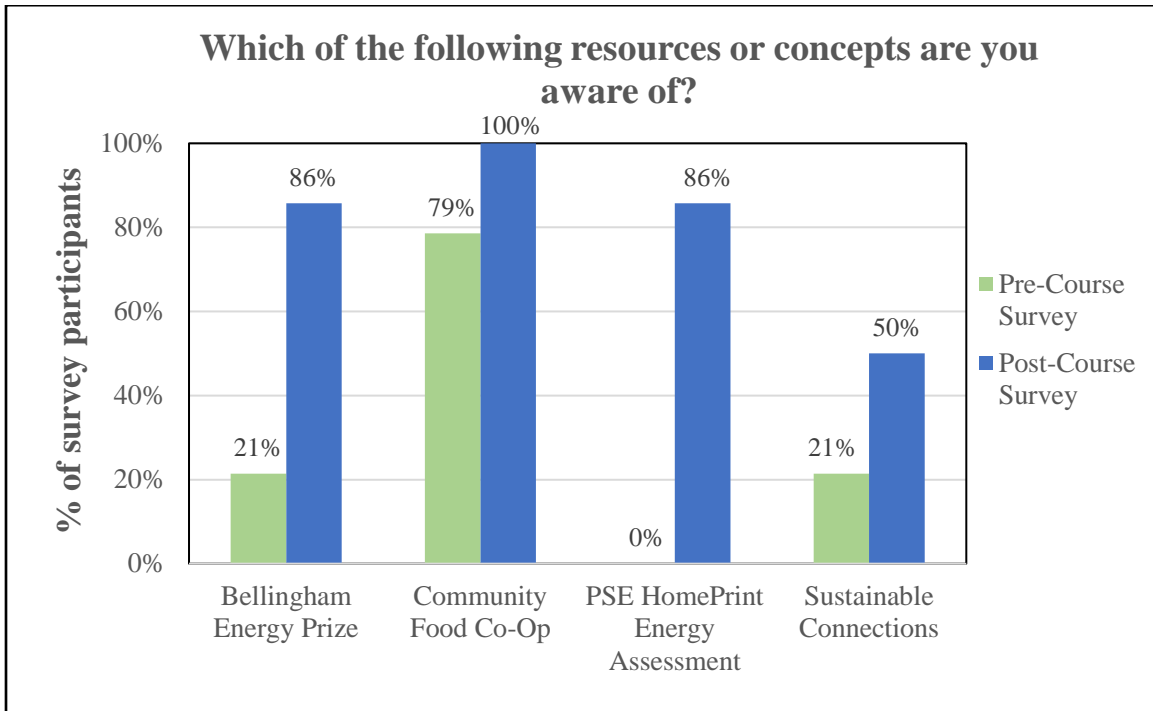


Figure 7. Percentage of Students Who Indicated Awareness of Sustainability Resources and Concepts (Part 2).

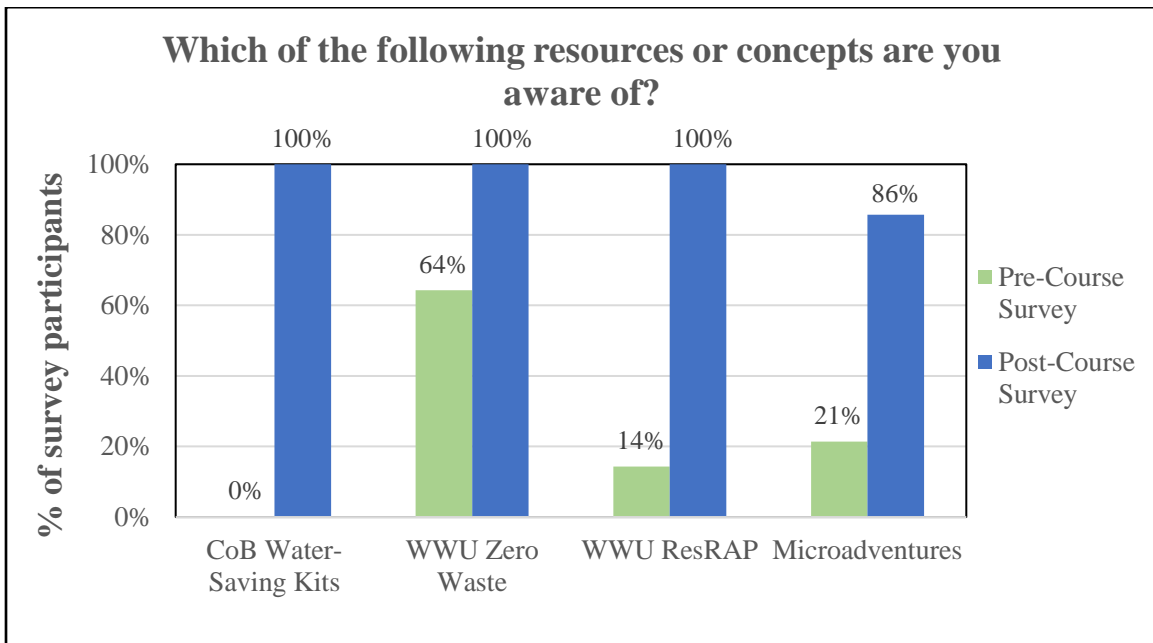
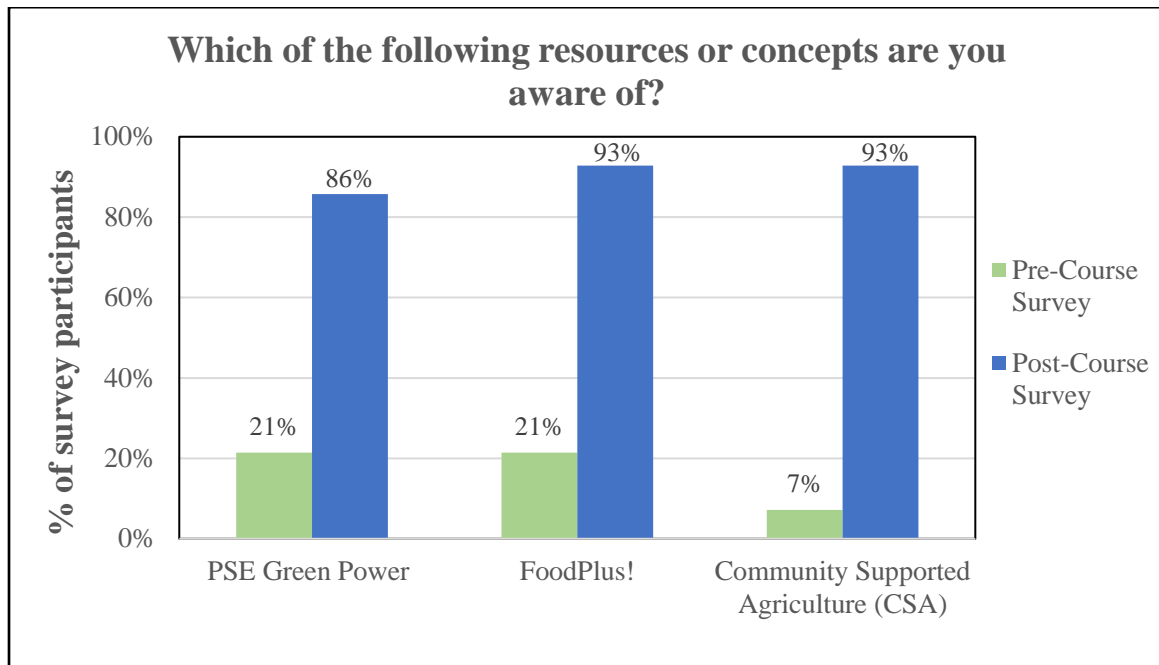


Figure 8. Percentage of Students Who Indicated Awareness of Sustainability Resources and Concepts (Part 3).



Of all of the survey questions, the responses to this question show the most obvious trend. Each resource or concept experienced an increase in student awareness by the end of the course. One hundred percent of students were aware of four of the 11 resources or concepts on the post-course survey. This includes the City of Bellingham water-saving kits, which 0% of the students were aware of at the beginning of the quarter. At least 86% of survey participants were aware of 10 of the 11 concepts or resources on the post-course survey. This includes Puget Sound Energy’s (PSE) HomePrint Energy Assessment, which 0% of students were aware of at the beginning of the quarter. The one resource that did not experience a significant increase in awareness is Sustainable Connections. Only one lecture briefly mentioned this resource, whereas more time was spent in class discussing the other resources and concepts; therefore, it is not surprising that students were more aware of the

other 10 resources and concepts by the end of the quarter.

Behavior Change Questions

To measure behavior change, students were asked to describe how often they engage in 18 living practices. Students could choose from five options to describe their participation in each practice. For the first 13 practices, students could select that they engage in a practice “never”, “sometimes”, “about half the time”, “most of the time”, or “always”. For the remaining five practices, they could choose that they engage in it “a few times per year or less”, “once every month or so”, “a few times per month”, “a few times per week”, or “everyday”. The desired outcome for 14 of these practices was an increase in student engagement by the end of the quarter. Figures 9, 10, and 11 visually represent three of these practices. There were four unsustainable practices where the desired outcome was less engagement after the course. Figure 12 displays the responses to one of these practices.

Figure 9. Survey Participant Responses to “How Often do you Buy Organic Food?”

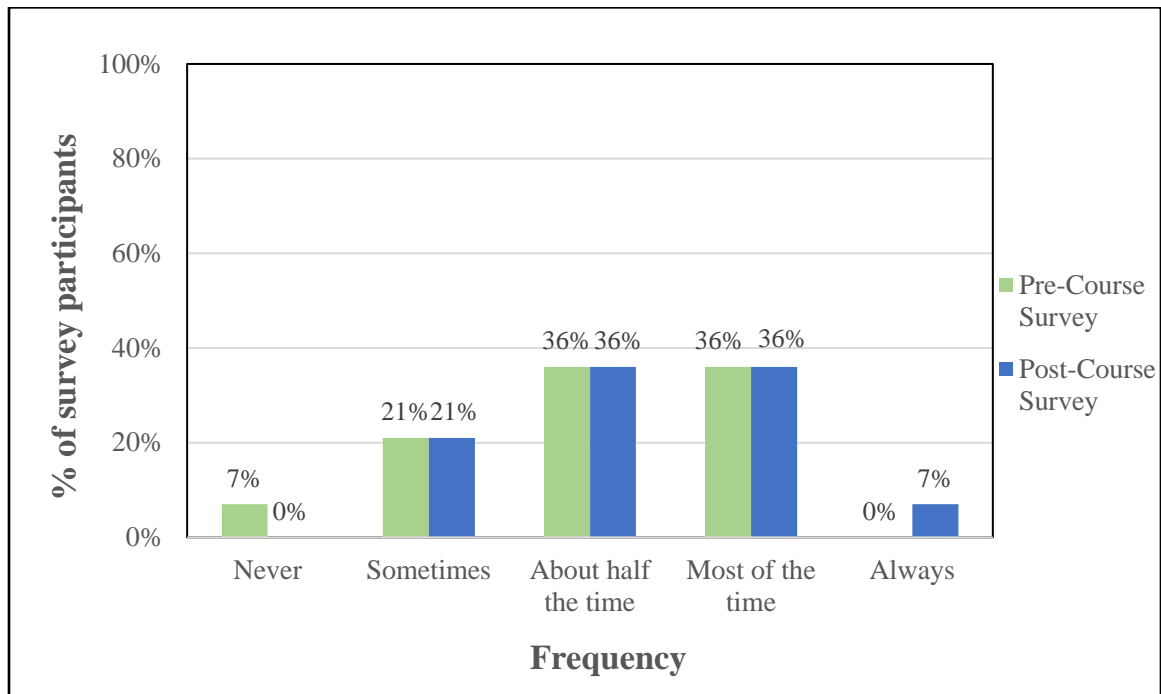


Figure 10. Survey Participant Responses to “How Often do you Recycle Plastic, Glass and/or Paper Goods?”

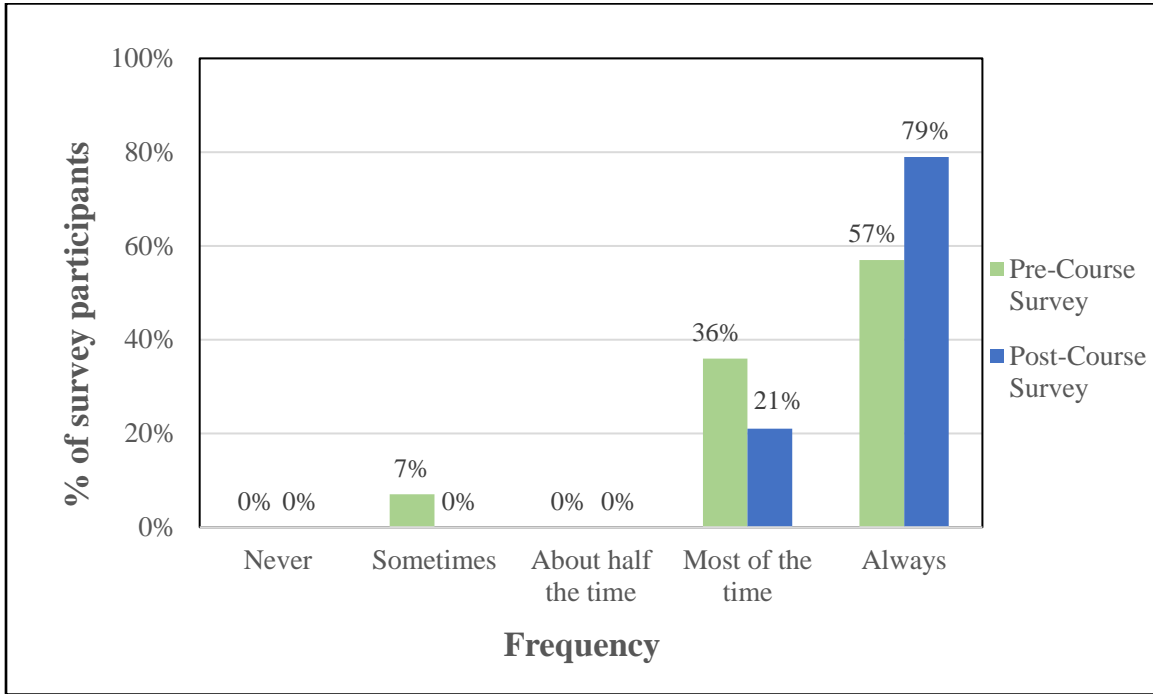


Figure 11. Survey Participant Responses to “How Often do you Turn off the Faucet While Brushing your Teeth?”

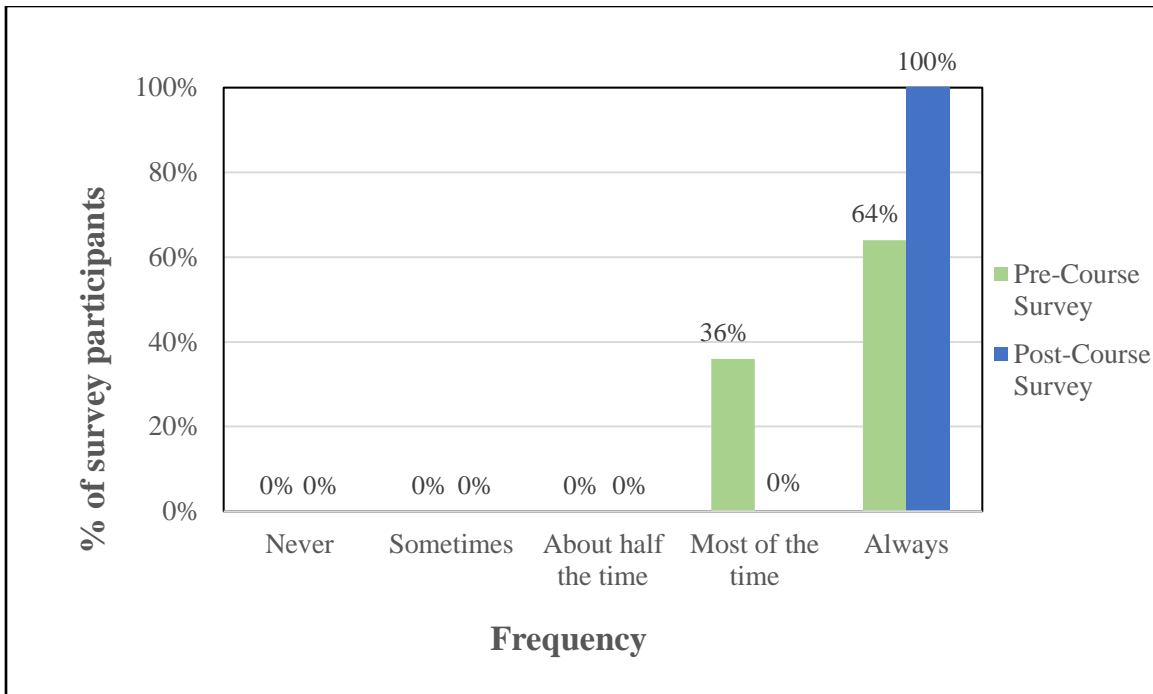
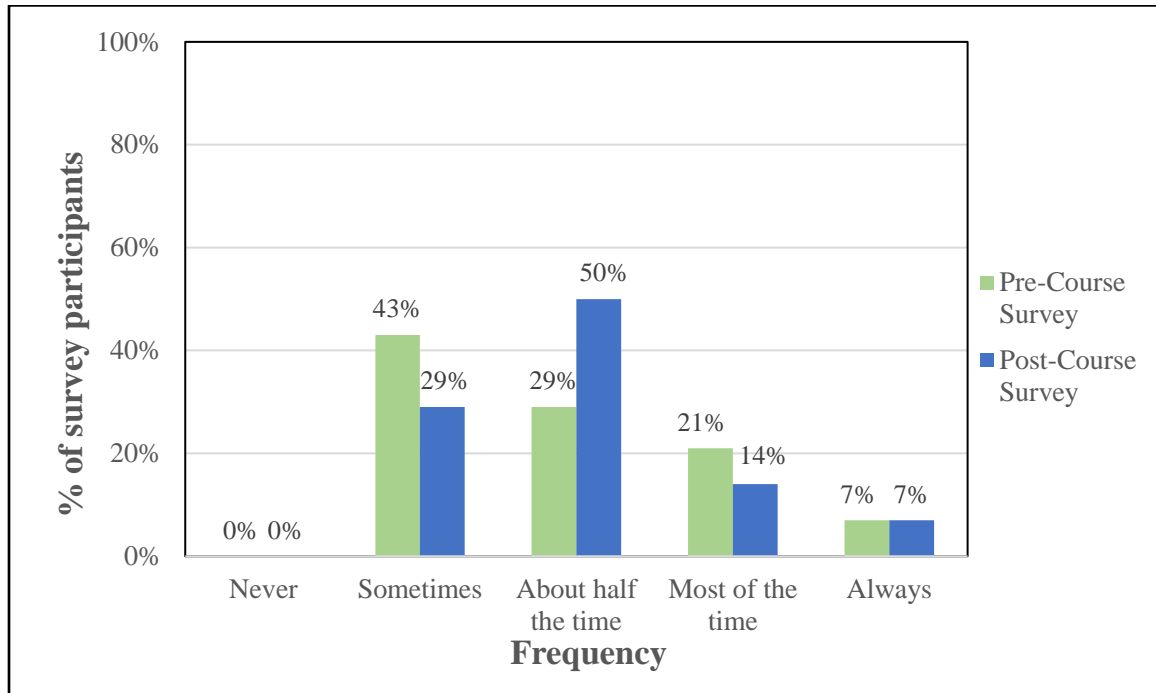


Figure 12. Survey Participant Responses to “How Often do you Purchase Items with Disposable Packaging?”

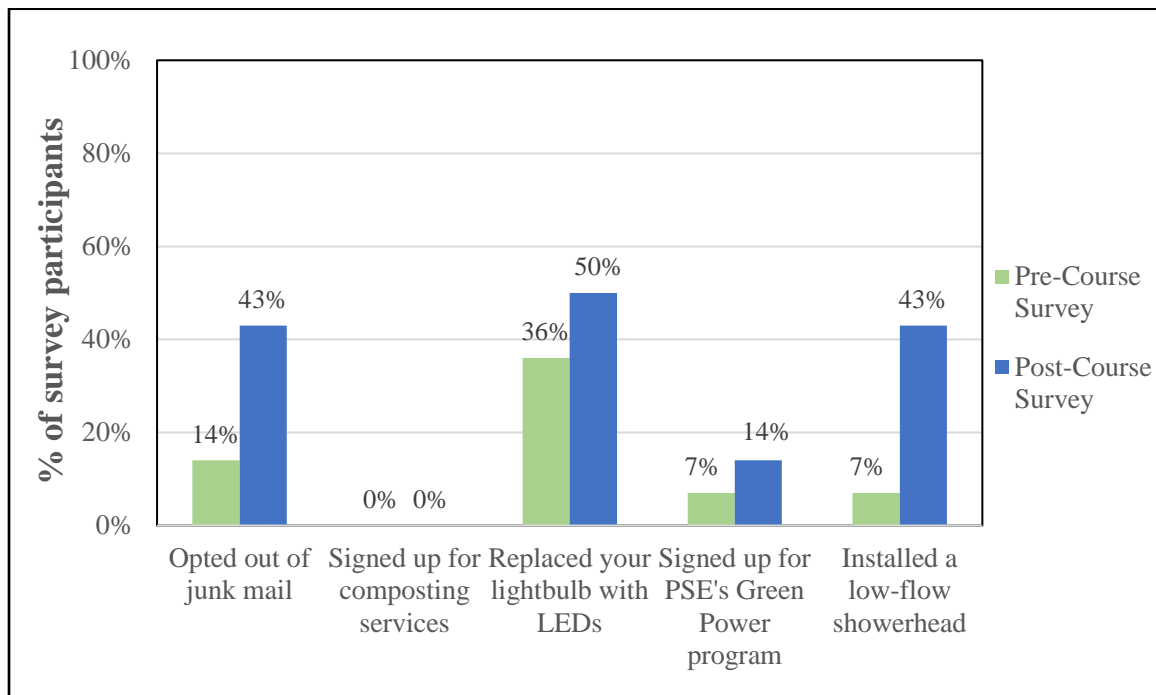


The change in engagement in sustainable living practices from before to after the course varies, depending on the practice. As shown in Figure 9, for example, there was minimal change in the frequency at which students buy organic food. Figures 10 and 11 show that there was a significant increase in the frequency at which students recycle and turn off the faucet while brushing their teeth. Since recycling and conserving water are both sustainable practices, it was desirable to have students participate in these practices more often after the course. Figure 12 shows that there was also an increase in the frequency at which students purchase items with disposable packaging. Since this is an unsustainable practice, it was undesirable for students to participate in the practice more often after the course.

Additionally, one question on the survey asked students which sustainable actions

they had completed. Students could choose from five actions. These selections included “opted out of junk mail”; “signed up for composting services”; “replaced your lightbulbs with LEDs”; “signed up for PSE’s Green Power program”; and “installed a low-flow showerhead”. These actions were chosen because they all help an individual engage in a more sustainable lifestyle, so the desirable outcome was to have more students complete these actions by the end of the quarter than at the beginning. Figure 13 shows students’ responses to this question on the pre- and post-course surveys. A greater percentage of students had completed four of the five actions by the end of the quarter than at the beginning. None of the students had signed up for composting services either before the quarter or afterwards. A number of factors could explain this. For example, students may not have composting services available where they live.

Figure 13. Survey Participant Responses to “Which of these Actions have you Completed?”



As with knowledge acquisition, it is assumed that students' participation in the course had some influence on their engagement in sustainable living practices. The information that they were exposed to during the quarter – through either lectures, group discussions, readings, or guest speakers – may have changed their perception about each of these practices and led them to change their behaviors. For the practices that students participated in less often at the end of the quarter, it is possible that students started the class with the perception that these practices had a worse impact than what they learned about in class. There are other possibilities that could explain why students' responses changed, such as changes in a student's financial situation or their access to resources. For example, if a student moved during Fall quarter from a home with composting services to one without these services, then they may have stopped composting as a result.

Course Reflection Questions

There were five additional questions on the post-course survey that were not on the pre-course survey. These questions asked students whether they thought that their participation in the class had changed their engagement in and knowledge of sustainable living practices. Students were also asked whether they would recommend the class to a peer and what suggestions they had for improving the class. These questions were designed to help the instructor get a better idea of the students' perception of the overall effectiveness of the course. Figures 14, 15, and 16 show the results to these questions.

Figure 14. Responses to Question 22: Do you feel that your knowledge of sustainable living practices has increased as a result of your participation in this class?

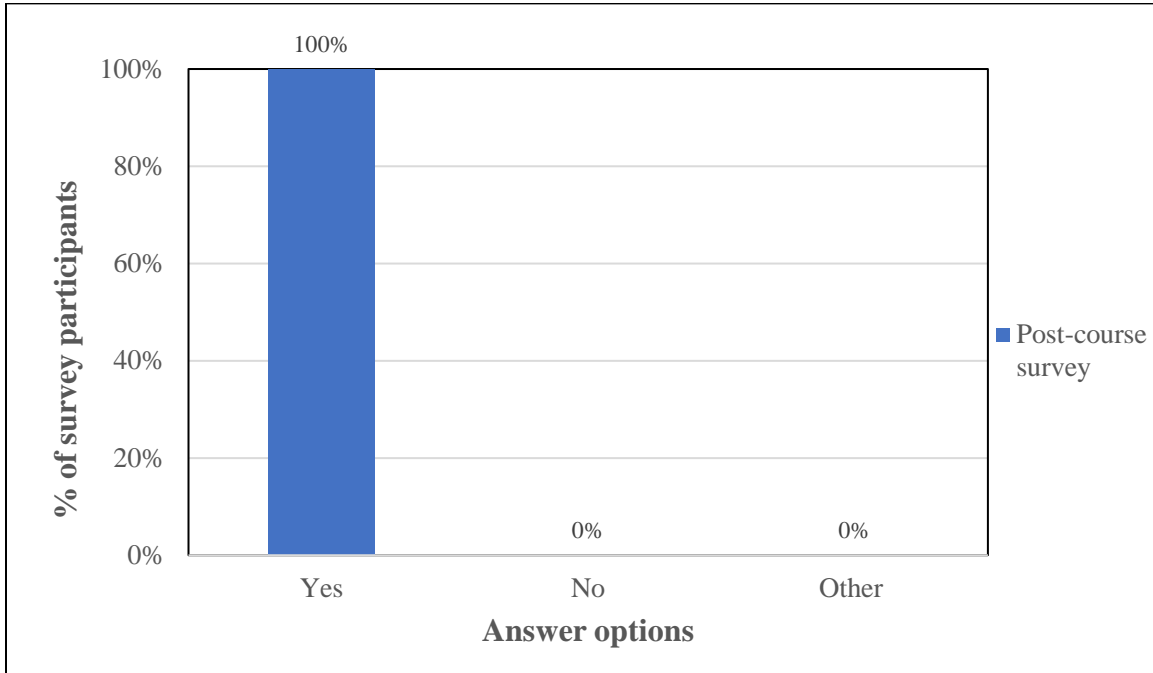


Figure 15. Responses to Question 23: How would you say your engagement in sustainable living practices has changed as a result of participating in this class?

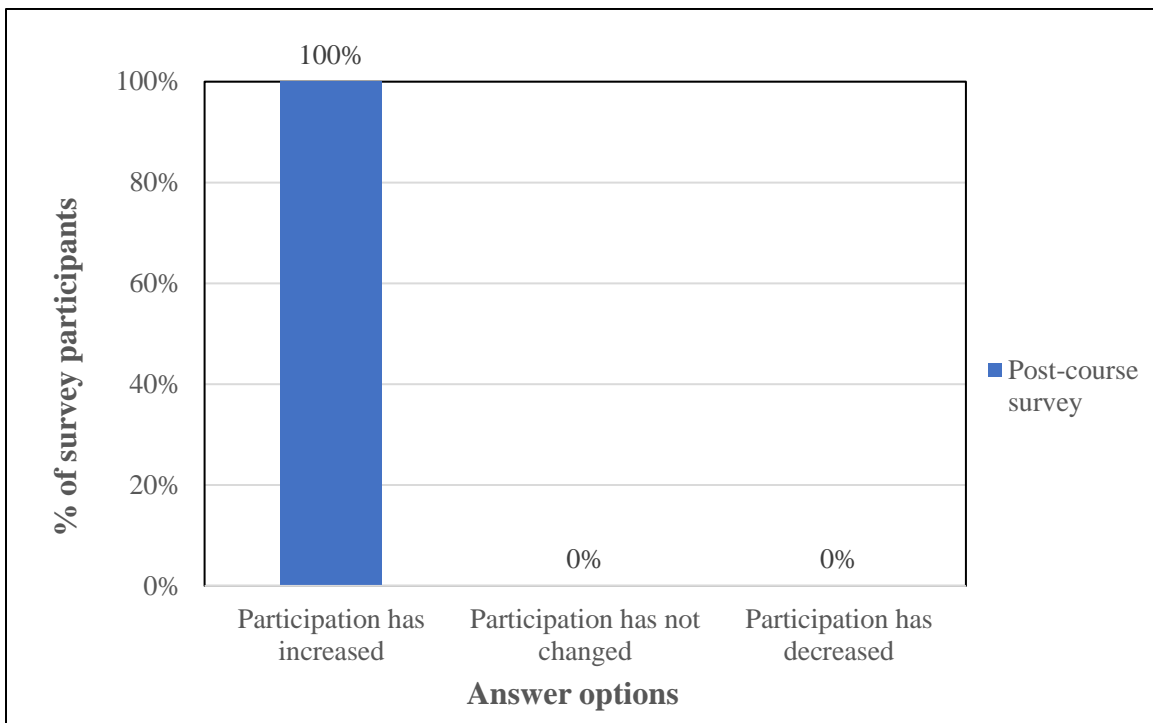
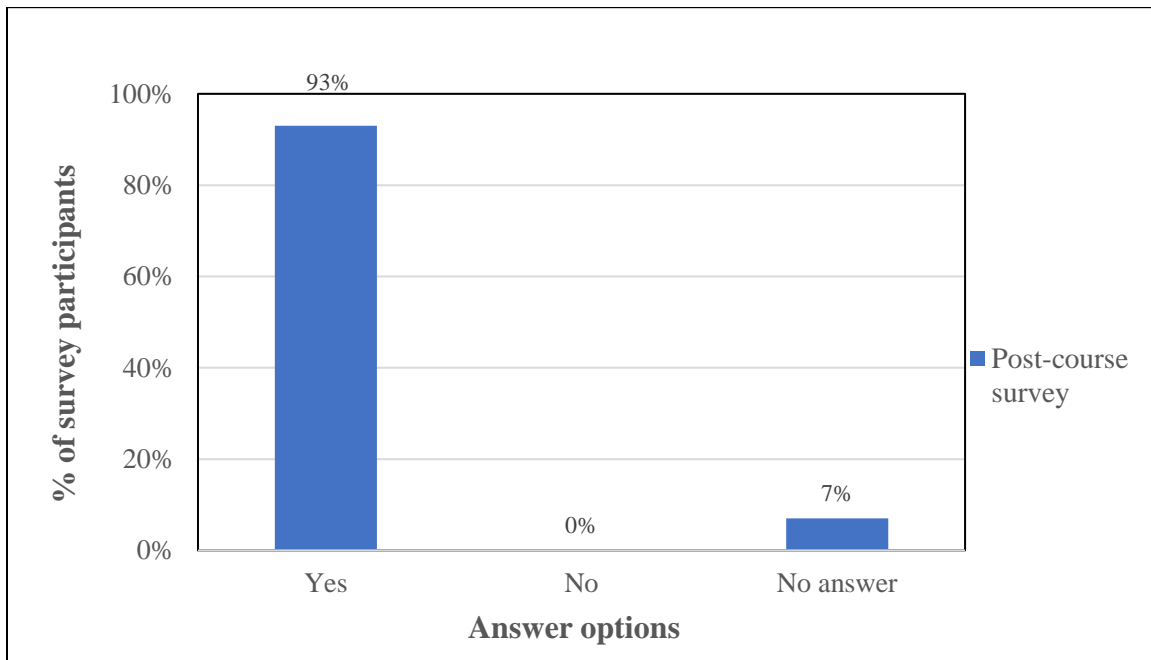


Figure 16. Responses to Question 25: Would you recommend this class to a peer?



Students were unanimous in their responses to the questions in Figures 14 and 15. 100% of students believe that their knowledge of sustainable living practices increased as a result of their participation in the course, and that they participate in more sustainable living practices than they did before they took the class. Of the fourteen students who completed the post-course survey, 13 answered that they would recommend this class to a peer. One student did not provide an answer to this question.

Conclusion

Since the students in this course do not represent a randomized sample of individuals, the survey results cannot be used to make conclusions about any individuals other than those that were in this course. Overall the survey results show that this class likely did influence students' behaviors and knowledge. The course reflection questions on the post-class survey indicate that 100% of students who completed the survey felt that this class increased their knowledge of and engagement in sustainable living practices. The review of course

evaluations and final papers also indicate that students were very satisfied with the course and its influence on their lives. Since the goal of the CIPP Model used to evaluate this course is to identify ways to improve the course, the analysis of the course evaluations and assignments completed by students was used to improve the course in a number of ways. Some improvements include adding graded exams, giving students more opportunities to work in small groups, increasing the frequency of class meetings, and possibly adding a group project or field trip to the course. The lessons learned from the evaluation of this course and the instructor's experiences teaching the course have been incorporated into the teaching guide that follows this report. The purpose of this teaching guide is to make the content of this course accessible to any individual who is interested in teaching a similar class on sustainable living practices.

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Appendix A

Course Syllabus

Huxley College of the Environment, Western Washington University

ENVS 297I (CRN 44252): Sustainable Living Practices

Fall 2016 - 2 credits

Location: Communications Facility (CF) 226

Time: Tuesdays, Thursdays 10-10:50am

Prerequisites: None

Course Overview

Research shows that although many individuals consider various sustainable practices to be important- such as composting, using public transportation, buying local goods, and reducing energy use- the majority of these individuals do not actually engage in these practices. In this course we will explore some of the reasons behind why a gap exists between the attitudes about sustainability and the adoption of sustainable behaviors. We will seek to answer the question: Why might it be difficult for an individual to incorporate sustainable practices into their lifestyle even if they believe these practices to be important? We will look for this answer in readings and discussions, as well as through assignments that require engaging in selected practices and documenting the experience.

This course will also provide students with examples of sustainable living practices that an average individual can adopt (i.e. we won't focus on large investments like a solar panel array), including practices that are relevant to the Bellingham area. Students will learn about these practices through readings, lecture, guest speakers, and assignments. The course will be divided into various topics of sustainability, such as waste, food, water, energy, and transportation. Much of the learning that takes place in this course will be through discussion with peers. Students will connect with one another in groups and then together will reflect on the readings, guest speakers, and their own experiences.

Learning Objectives

At the end of this course you should be able to:

- o Understand various practices that an individual can adopt to enjoy a more sustainable lifestyle.
- o Explain why a gap may exist between an individual's attitude about sustainability and their engagement in sustainable practices.
- o Understand which local resources are available to help an individual minimize their environmental impact in their daily life.

Text

You are not required to purchase a textbook for this course. Selected readings will be posted on Canvas each week.

Expectations

a) Attendance, readings, and participation

It is very important that you complete all of the required readings before each class so that you are able to contribute to class and group discussions. This course relies heavily on discussion as a way to connect, learn from, and reflect on ideas and assignments with your peers. Your participation in discussions is a significant part of your grade. It would be unfair to your peers if you did not complete the readings before class and were unable to contribute to group discussions. To ensure that all students are completing the readings, you will be required to complete at least one assignment each week that shows you have read the required readings. There will also be various, short assignments to submit on Canvas periodically.

b) Sustainable living papers (3 total)

Three times throughout the quarter, you will be asked to choose a new sustainable living practice that you learned about in class- and do not already engage in- to temporarily adopt for approximately 10 days. You will submit a 2-3 page paper (double-spaced) that documents and reflects on your experience with each new practice. You will also be expected to talk about your experiences and papers in class. These are not meant to be difficult papers, but rather a chance for you to reflect on how your own experiences relate to the readings, guest

lectures, or class discussions (when applicable). You will not be graded on your ability to successfully adopt the practice. Your paper should address the following questions:

- Which practice did you choose to adopt?
- Why did you choose this practice? What are the benefits of adopting it?
- What challenges did you encounter during this experience?
- What might make this practice easier to adopt?
- How did your experience relate to ideas mentioned in class discussions, readings, and/or guest lectures?

c) Exams

There will be short midterm and final exams given near the middle and end of the quarter. The purpose of these exams is to test how well you have paid attention to and understood the concepts shared in class.

d) Final paper

You will submit a final paper (approximately 1,000 words, double-spaced, 12 pt Times New Roman) that discusses your experience in this class, what you learned, and how you will (or will not) apply it to your own life. You should draw upon the readings, class discussions, and lectures in your paper.

e) Surveys

There will be a survey given at the beginning of the quarter that will ask questions to help the instructor better understand students' living practices, knowledge of sustainability, and awareness of local resources. You will receive a grade for completing the survey, but your individual responses will not be graded.

Grading

The grade for this course will be comprised of the following components:

- a) Sustainable living papers (30% - 10% per paper)
- b) Final paper (10%)
- c) Attendance, readings, and participation in weekly discussions and assignments (35%)
- d) Midterm exam (10%)

e) Final exam (15%)

Grade Cutoffs

A 92.5, A- 90.0, B+ 87.5, B 82.5, B- 80.0, C+ 77.5, C 72.5, C- 70.0, D+ 67.5, D 62.5, D- 60.0, F

This is a pass/fail class. Any grade at least 70% or above is considered a passing grade. One thing I would change is to make this a graded course.

Sickness and other Emergencies

If you miss an assignment due to sickness or a family emergency, you may complete the assignment at a later time. Please inform me as soon as possible if you need an extension due to an emergency or sickness. Since our class only meets 10 times during the quarter, it is important that you make it to class every week. If you miss class due to sickness or an emergency, **and** you contact me, I will give you the option to make up the class with an assignment. Classes missed for other reasons will result in a deduction from your attendance and participation grades.

Western encourages students to seek assistance and support at the onset of an illness, difficulty, or crisis.

- For a medical concern or question, contact Student Health 650-3400.
- For an emotional or psychological concern or question, contact the Counseling Center 650-3400.
- For a health and safety concern, contact University Police 650-3555.
- For a family or personal crisis or emergency, contact Dean of Students 650-3450.

Cell phones and Laptops

Cells phones must be put on silent and stowed away during class. Laptops may be used when appropriate (i.e. to look something up related to a discussion you are having about a class topic or to take notes). If the use of your laptop is clearly unrelated to class and is distracting other students, participation points may be taken away.

Academic Honesty

You are expected to be familiar with, and to follow, the University's policies on academic

integrity as set forth in the WWU Academic Dishonesty Policy and Procedures. All policies related to academic integrity apply to in-class and take home projects, assignments, exams, and quizzes. Students may only collaborate on assignments with permission from the instructor. Allegations of alleged academic dishonesty will be investigated. Sanctions for academic dishonesty can include failing grades and/or suspension from the university.

Reasonable Accommodation Policy

WWU provides reasonable accommodation to the known physical, sensory, or mental limitations of qualified students. To request accommodation students should contact the WWU DRS office. It is open Monday through Friday, from 8 am to 5 pm. and located in Old Main 120. They may be reached at drs@wwu.edu or 360.650.3083.

Canvas

To access Canvas you will need your Universal ID and Password. You can access the site after you have logged into your MyWestern account. Any login or Canvas inquiries should be directed toward the ATUS help desk at 650-3333. E-mail sent through Canvas will go to your WWU email account. If you don't use your WWU account, please have your messages forwarded to the account that you do use. Please check your WWU email account daily for course materials, assignments, and announcements.

Appendix B

Sustainable Living Class Pre-Class Survey Questions

Demographic Information

Please write the last five digits of your W#: _____

1. Select the type of housing that you currently live in:
 - On-campus dormitory or apartment
 - Off-campus apartment
 - Off-campus house or duplex
 - With parent(s) or guardian(s)
 - Other (please specify): _____

2. What year are you in college?
 - Freshman (first year)
 - Sophomore
 - Junior
 - Senior
 - Other (please specify): _____

3. Please write your age: _____

4. Why did you choose to take this class? (Select all that apply)
 - I want to reduce my environmental impact
 - I needed some more credits in my schedule
 - I want to learn more about sustainability
 - Other (please specify): _____

Factual Questions

Note: Please be honest when answering the questions on this survey. If you are not sure about the answer to a question, then take your best guess. There is no penalty for answering a question incorrectly. You are not expected to know the answers to all of these questions. Ideally, you will be more familiar with the concepts mentioned in these questions by the end of the quarter. **(Correct answers are bolded).**

5. Which of the following sectors do you believe produces the most greenhouse gas emissions in the U.S.?

- Agriculture
- Transportation
- Industry
- Electricity**¹
- Commercial/Residential

6. Roughly what percentage of the world's carbon dioxide emissions does the U.S. produce?

- 5%
- 15%**²
- 25%
- 50%

7. About how much of the U.S. economy (~\$18 trillion) is spent on consumer goods?

- 10%
- 33%
- 50%
- 70%**³

8. How many pounds of trash does the average American produce daily?

- 1
- 3
- 5**⁴
- 7

9. What percentage of the trash that Americans produce is or once was edible?

- 1%
- 6%**

¹ EPA (2017). [Greenhouse Gas Emissions](#). U.S. Environmental Protection Agency.

² EPA (2017). [Global Greenhouse Gas Emissions Data](#). U.S. Environmental Protection Agency.

³ Degraaf, J., Wann, D., & Naylor, T. (2014). *Affluenza: How Overconsumption is Killing Us and How to Fight Back*. Berrett-Koehler Publishers.

⁴ Bloom, J. (2011). *American Wasteland*. Cambridge, MA: De Capo Lifelong Books.

- 12%**⁵
- 25%

10. Roughly how much of the food produced in the world is wasted or lost annually?

- 1/5
- 1/4
- 1/3**⁶
- 1/2

11. Three-quarters of the Earth's surface is covered with water. How much of that water is drinkable?

- Less than 1%**⁷
- Between 1-5%
- More than 5%

12. Which primary energy source is consumed the most in the U.S.?

- Coal
- Natural gas
- Petroleum**⁸
- Renewable energy
- Nuclear power

13. What is the biggest energy user in the average home?

- Lighting
- Space heating/cooling**⁹
- Heating water
- Refrigeration
- Electronics

14. In relation to food, what does GMO stand for?

Answer: Genetically Modified Organism¹⁰

⁵ Bloom, J. (2011). *American Wasteland*. Cambridge, MA: De Capo Lifelong Books.

⁶ FAO (2017). *Key Facts on Food Loss and Waste You Should Know!* Food and Agriculture Organization of the United Nations.

⁷ Mullen, K. (2012). *Information on Earth's Water*. National Ground Water Association.

⁸ EIA (2016). *U.S. Energy Facts Explained*. U.S. Department of Energy.

⁹ EIA (n.d.). *Energy Consumption in Homes by End Uses*. U.S. Energy Information Administration.

¹⁰ Non-GMO Project (2016). *GMO Facts*. Non-GMO Project.

Sustainable Living Questions

15. How familiar do you feel you are with sustainable living?

- Extremely familiar
- Very familiar
- Moderately familiar
- Slightly familiar
- Not familiar at all

16. How much of a priority is living sustainably to you?

- A great deal
- A lot
- A moderate amount
- A little
- None at all

17. What do you believe are the greatest barriers to living sustainably?

- Money
- Time
- Misinformation
- Information overload
- Other (please specify): _____

18. How often would you say you engage in the following practices?

	Never	Sometimes	About half the time	Most of the time	Always
Use a reusable water bottle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shop at the farmer's market or co-op	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat local food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat organic food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recycle plastic, glass, and/or paper goods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Purchase products with disposable packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy food in bulk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn off lights when I leave the room	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn the faucet off while brushing my teeth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy things I don't need	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a reusable mug	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bring a Tupperware to restaurants to package leftovers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How often would you say you do the following?

	A few times a year or less	Once every month or so	A few times a month	A few times a week	Everyday
Use public transportation (i.e. bus or train)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy new clothes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy used clothes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat meat products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ride my bike or walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Which of the following programs, organizations, or events are you aware of?

- Bellingham Energy Prize*
- Community Food Co-Op*
- PSE's HomePrint Energy Assessment*
- Community Supported Agriculture (CSA) food boxes*

- Sustainable Connections*
- City of Bellingham's free water-saving kits*
- WWU Zero Waste program**
- WWU Resident Resource Awareness Program (ResRAP)**
- Microadventures/Staycations
- PSE's Green Power*
- FoodPlus! Compost*

21. Check any of the following actions that you have completed:

- Opted out of junk mail
- Signed up for a compost bin through SSC (if living off campus) *
- Replaced your lightbulbs with LEDs
- Signed up for PSE's Green Power program*
- Installed a low-flow shower-head
- Other (please specify): _____

*These resources may not be available outside of Bellingham, Washington

** These resources may not be available outside of Western Washington University

Reflection Questions (Post-Course Survey Only)

22. Do you feel that your knowledge of sustainable living practices has increased as a result of your participation in this class?

- Yes
- No
- Other (please specify): _____

23. How would you say your engagement in sustainable living practices has changed as a result of participating in this class?

- I participate in more sustainable living practices than I did before taking this class
- I participate in the same amount of sustainable living practices as I did before taking this class
- I participate in less sustainable living practices than I did before taking this class
- Other (please specify): _____

24. Which practices do you engage in now that you did not engage in before taking the class?

25. Would you recommend this class to a peer?

Yes

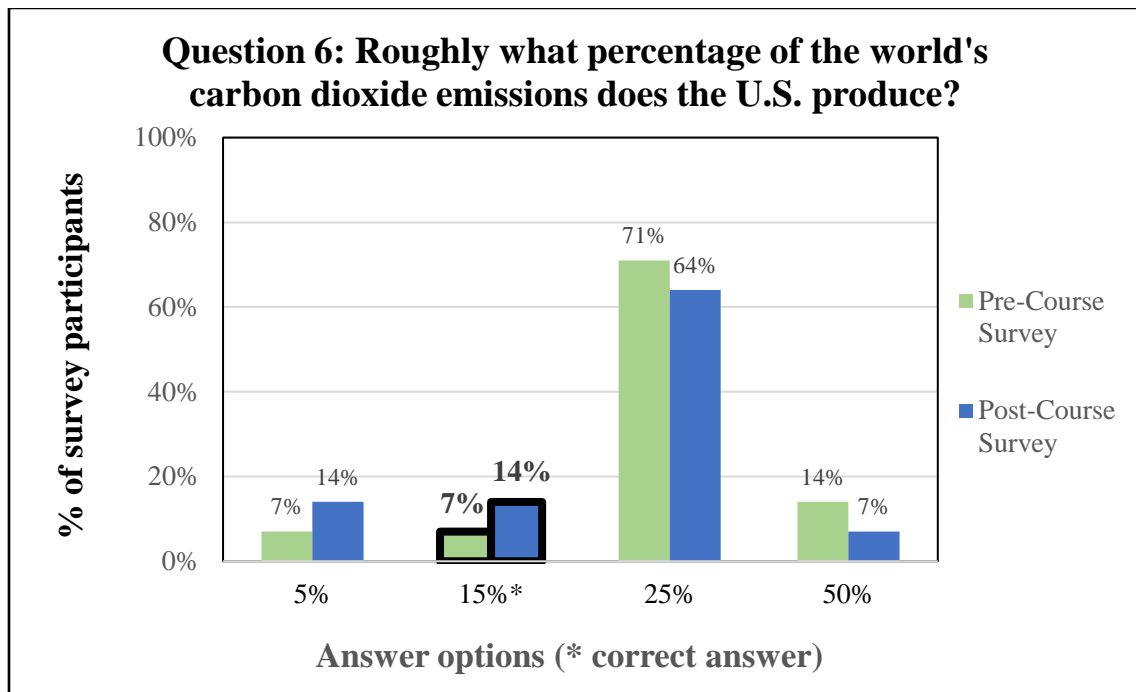
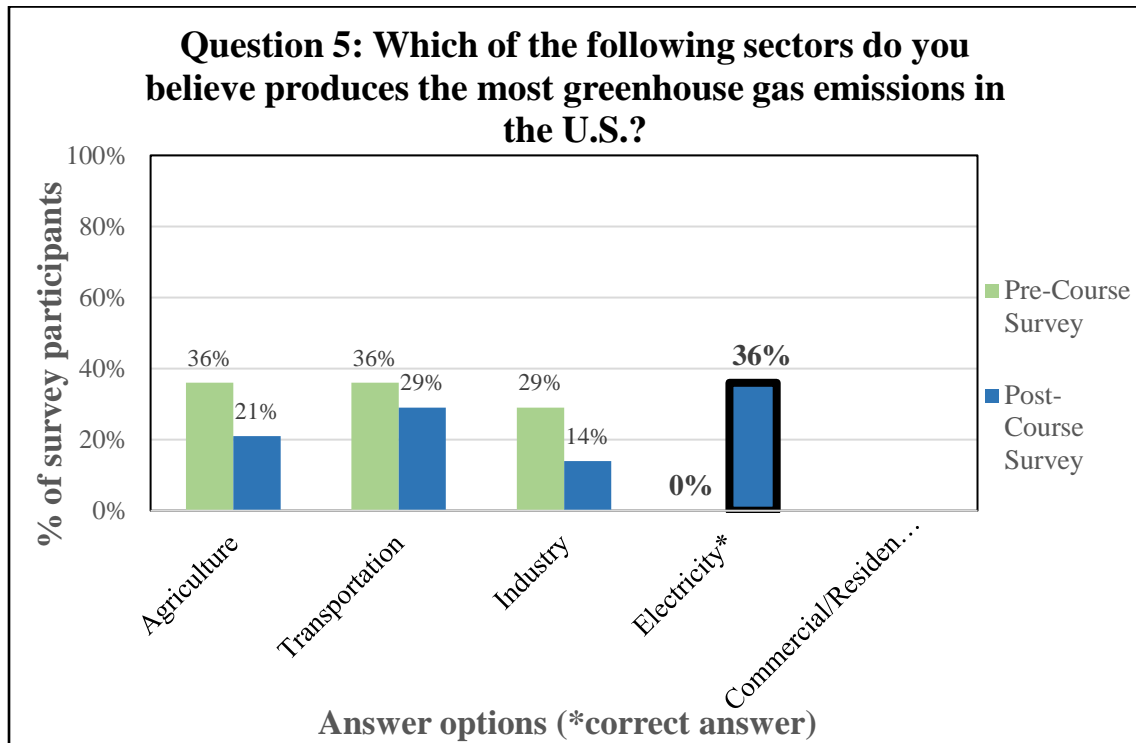
No

Other (please specify): _____

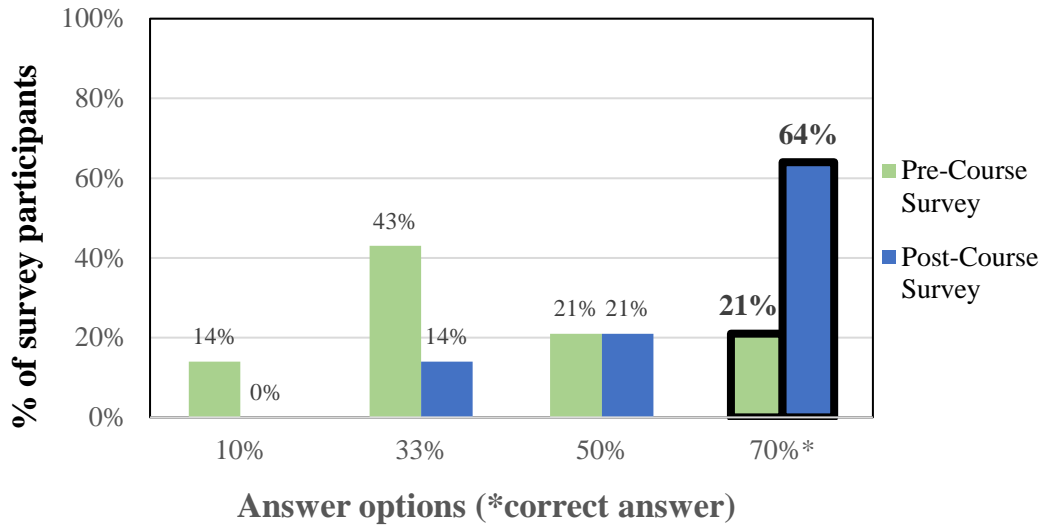
26. Please write any suggestions you have for how this class could be improved:

Survey Results

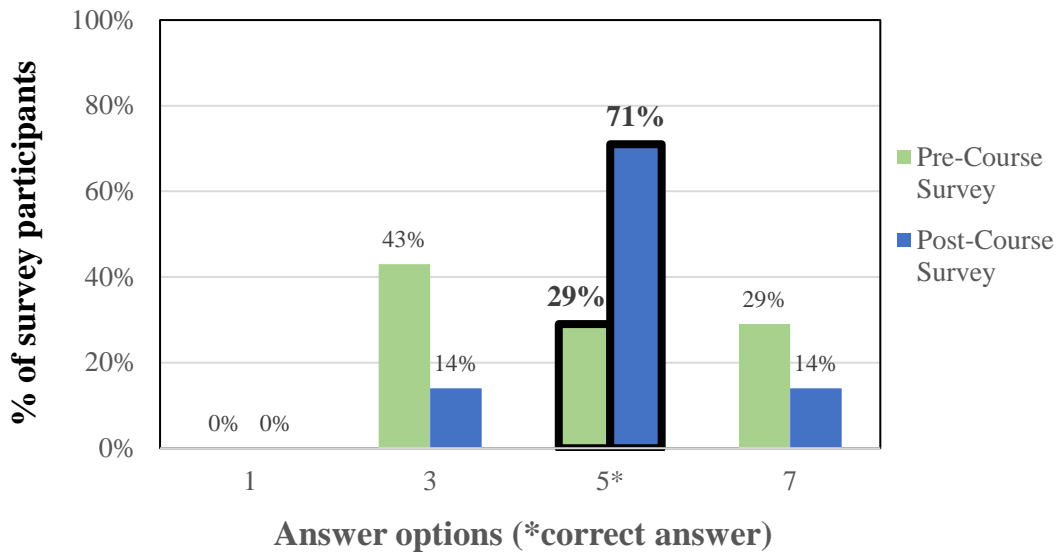
Factual Questions



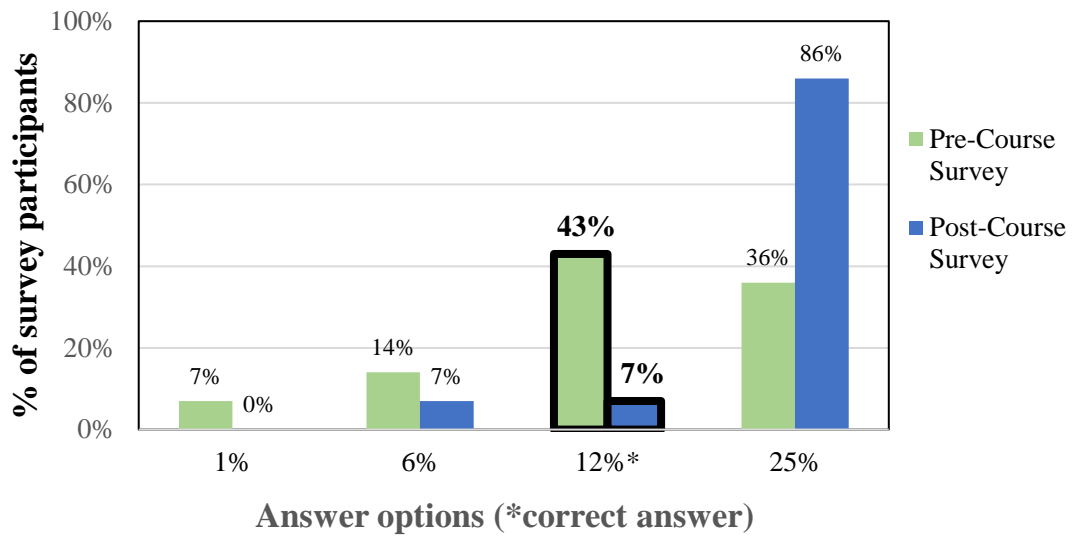
Question 7: About how much of the U.S. economy (~\$18 trillion) is spent on consumer goods?



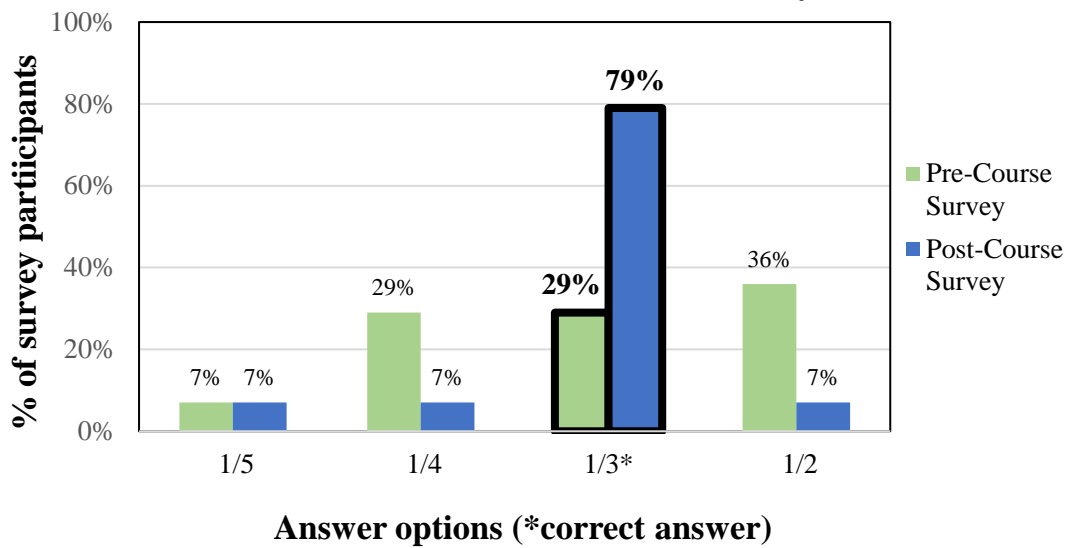
Question 8: How many pounds of trash does the average American produce daily?



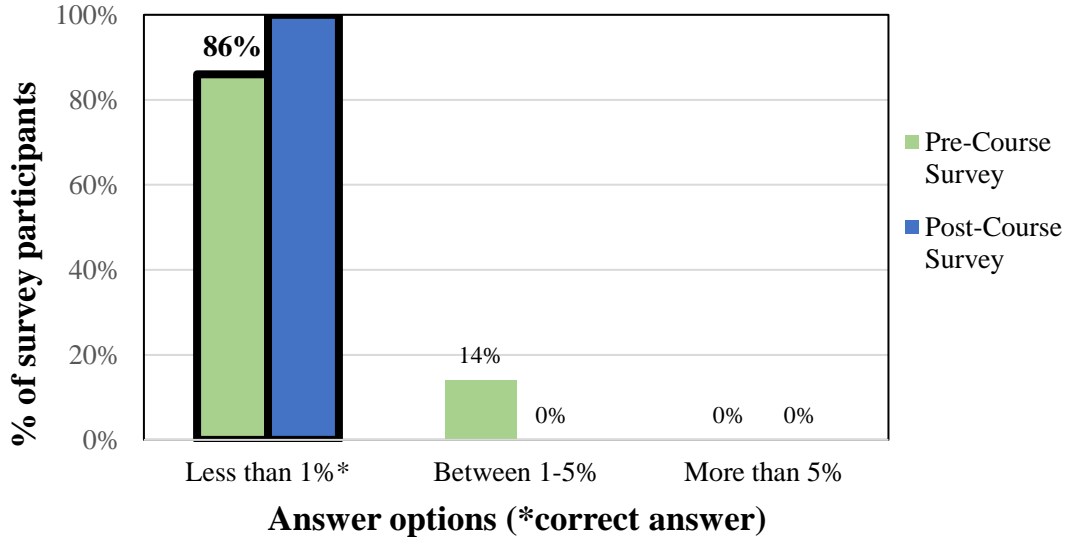
Question 9: What percentage of the trash that the average American produces is or once was edible?



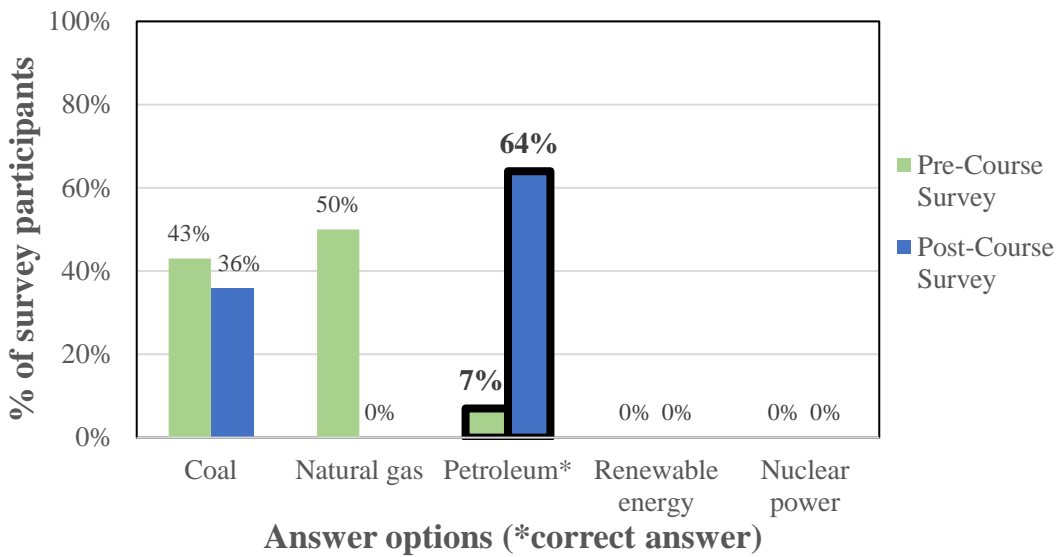
Question 10: Roughly how much of the food produced in the world is wasted or lost annually?



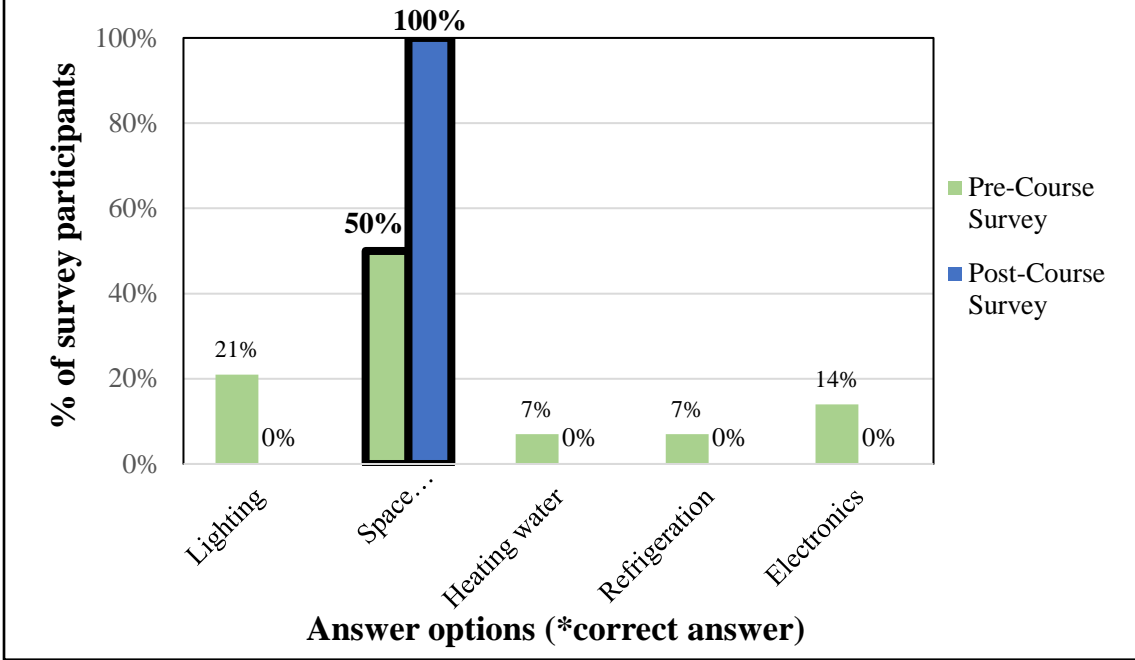
Question 11: Three-quarters of the Earth's surface is covered with water. How much of that water is drinkable?



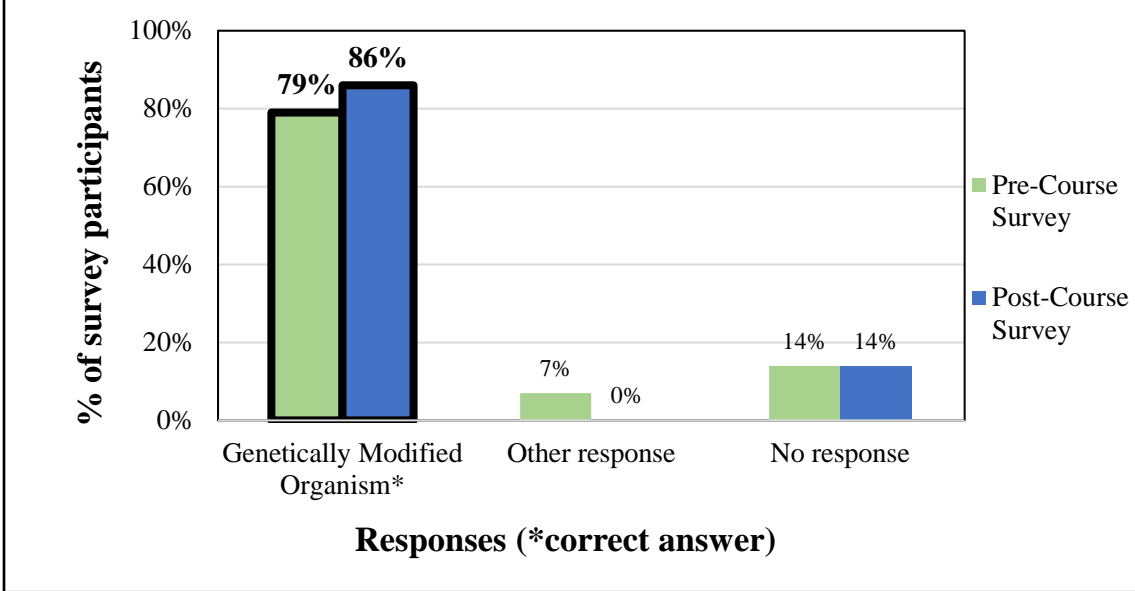
Question 12: Which primary energy source is consumed the most in the U.S.?



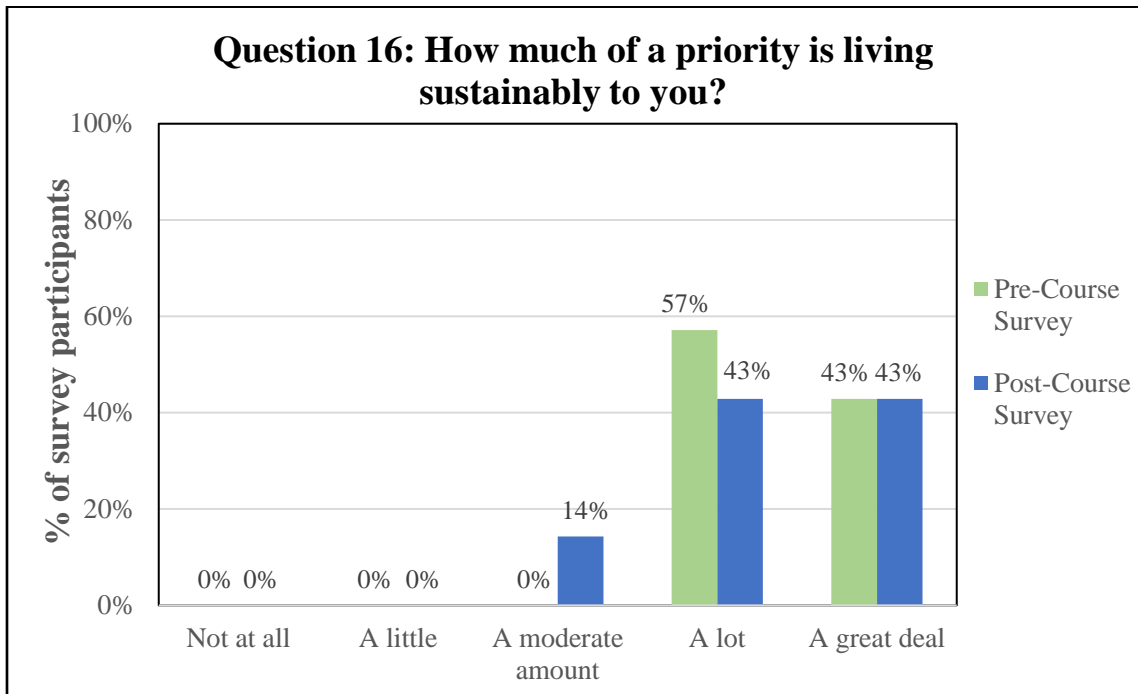
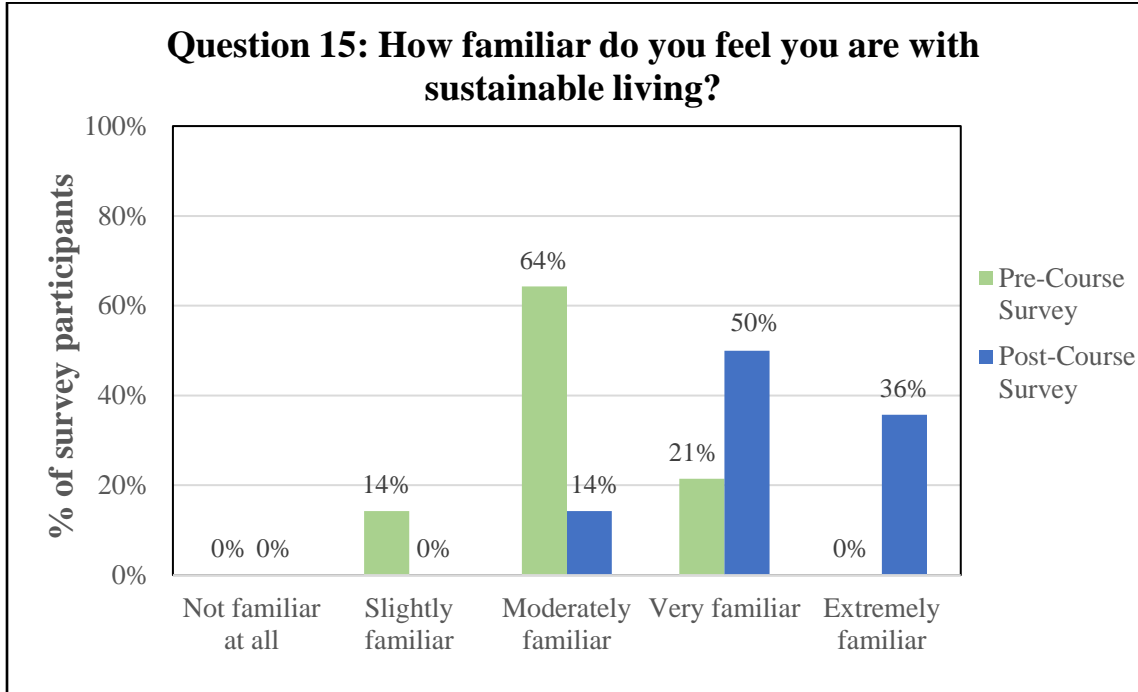
Question 13: What is the biggest energy user in the average home?

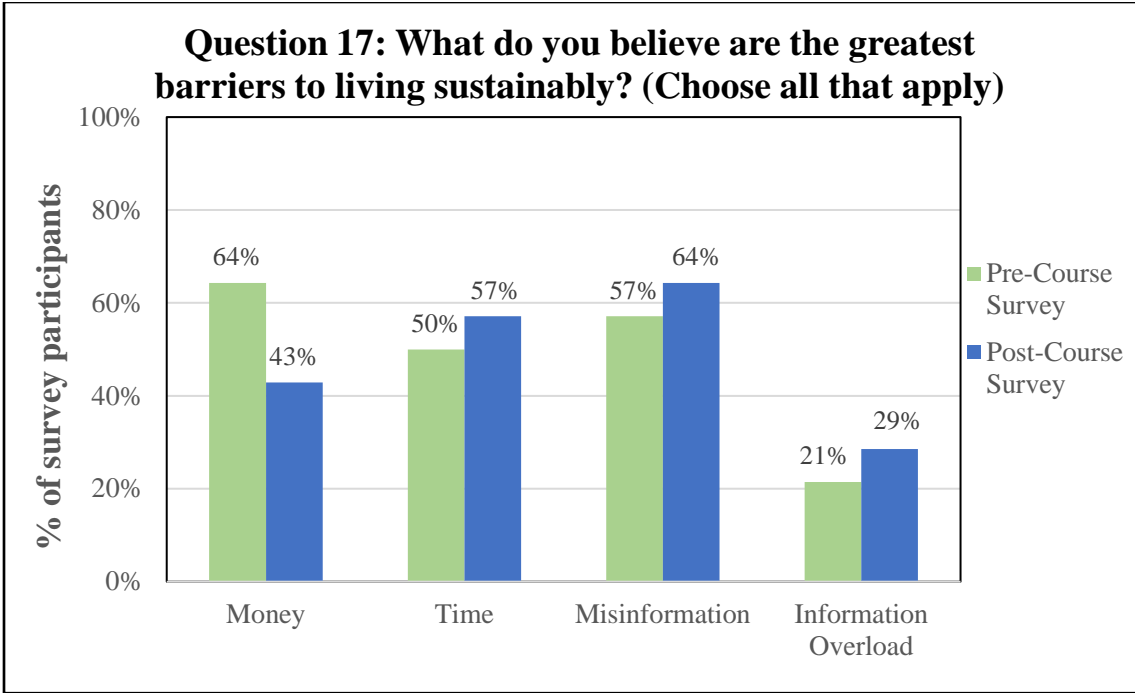


Question 14: What does GMO stand for?

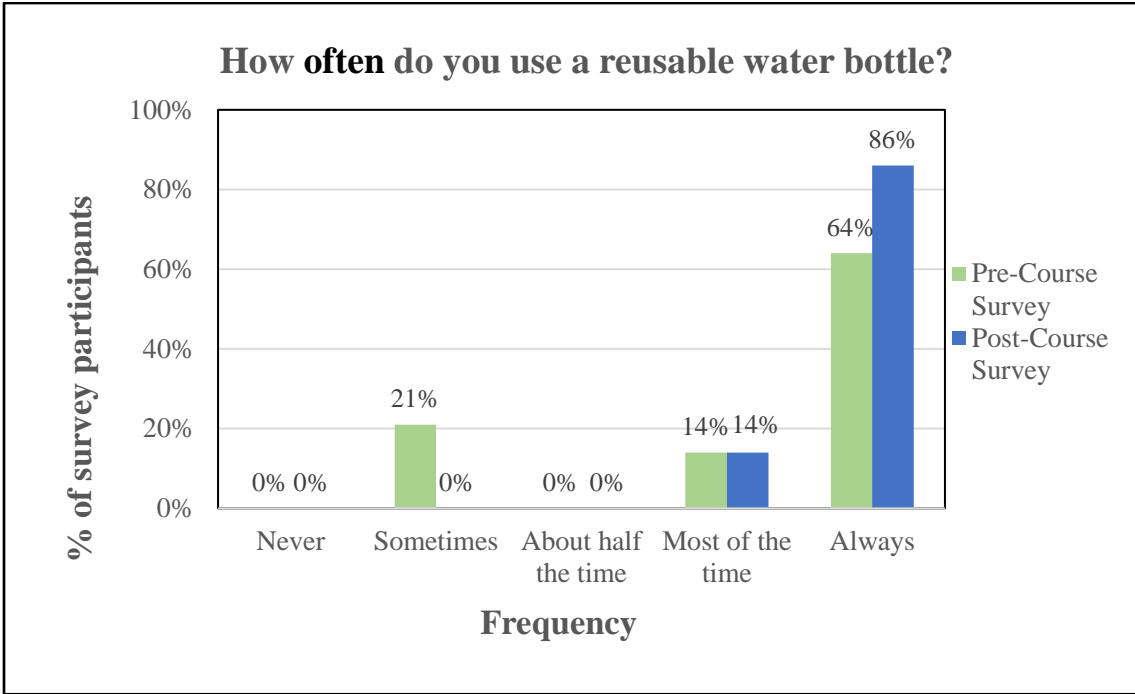


Sustainable Living Questions

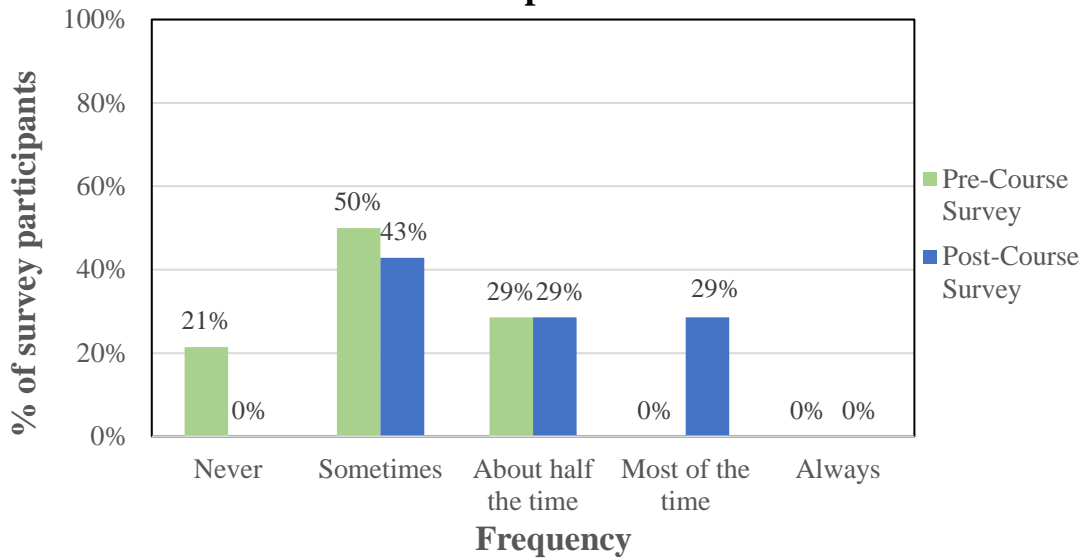




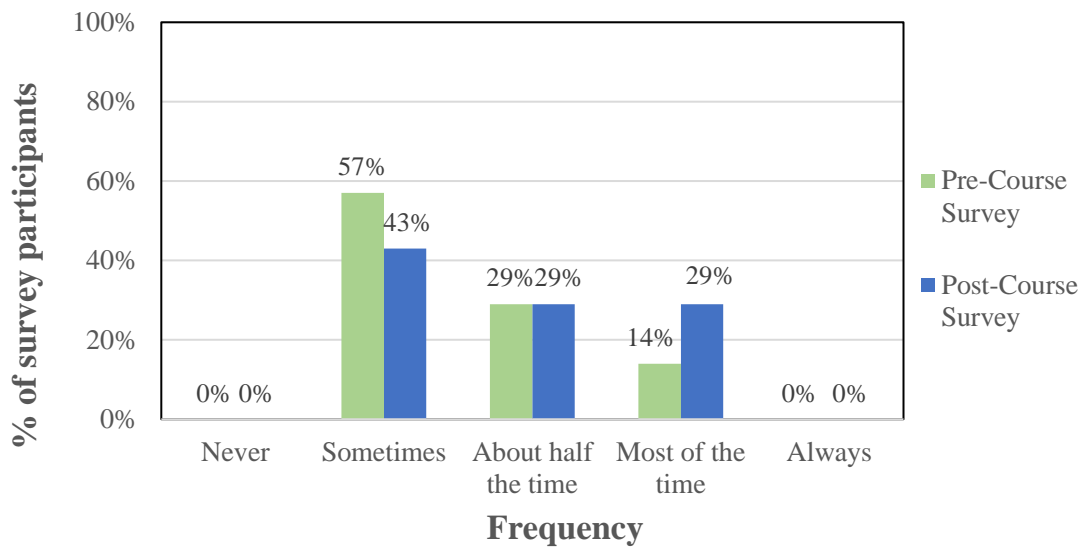
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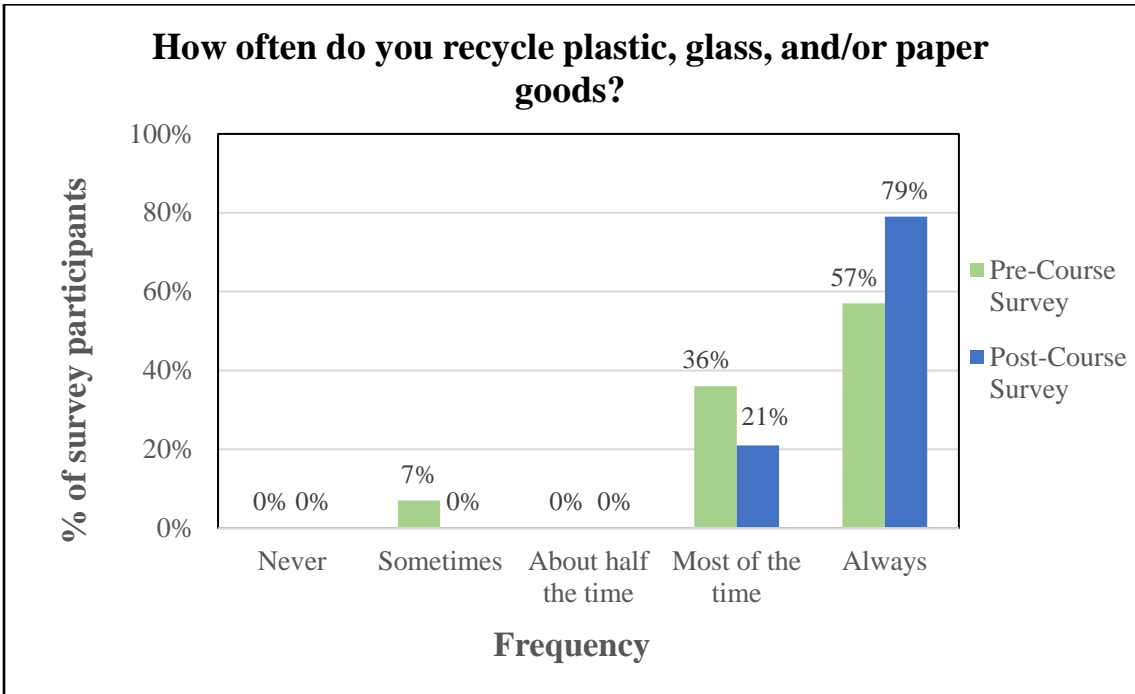
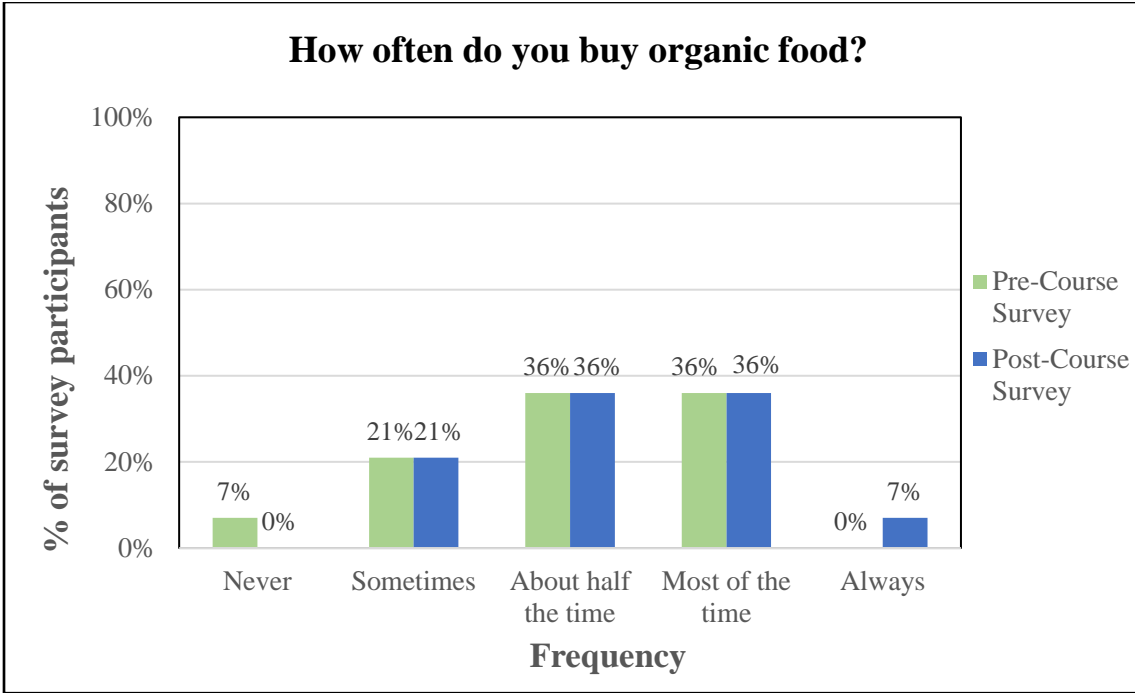


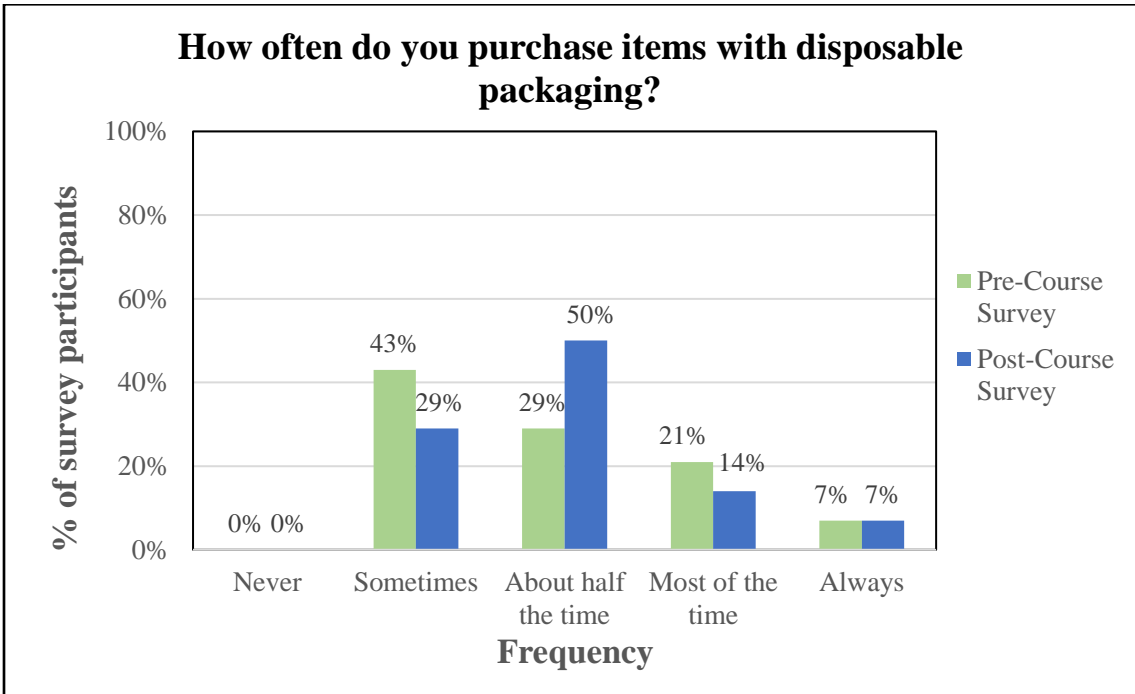
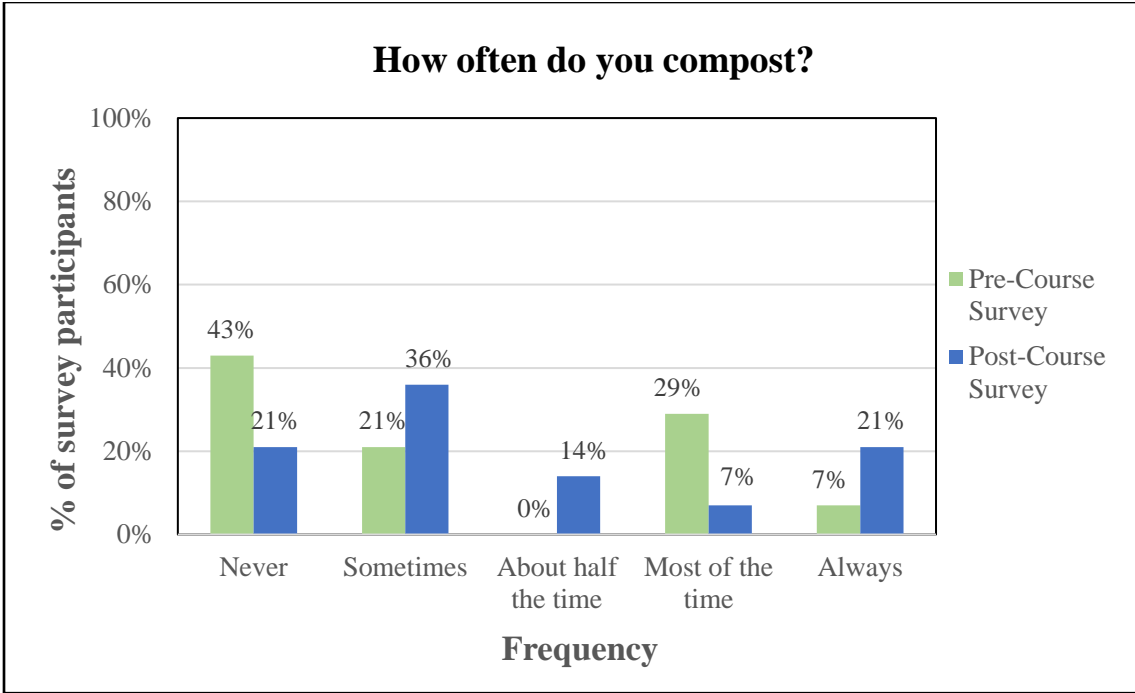
How often do you shop at the farmer's market or co-op?



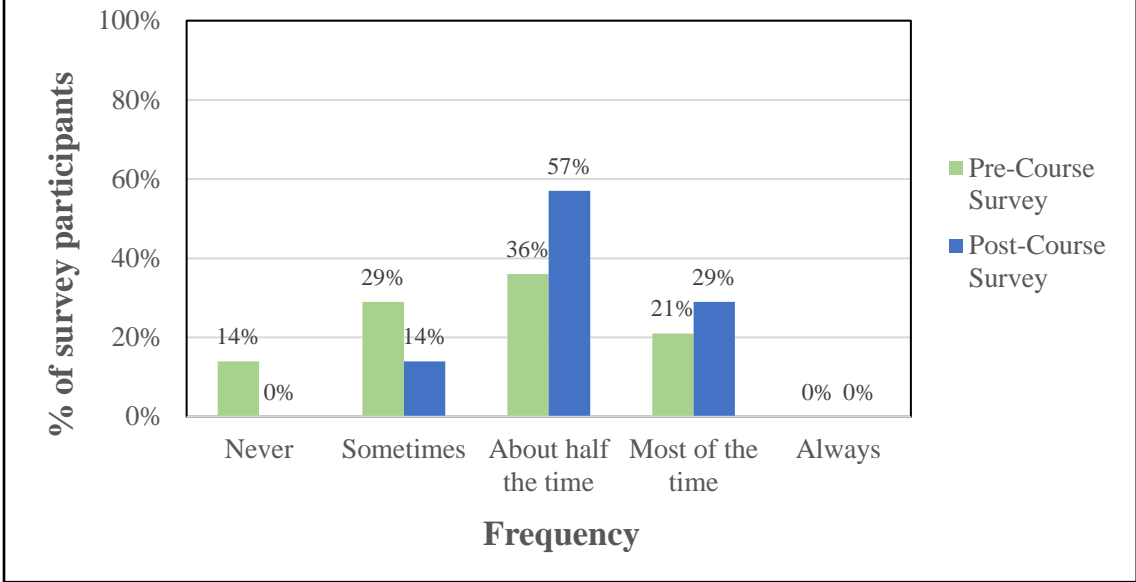
How often do you buy local food?



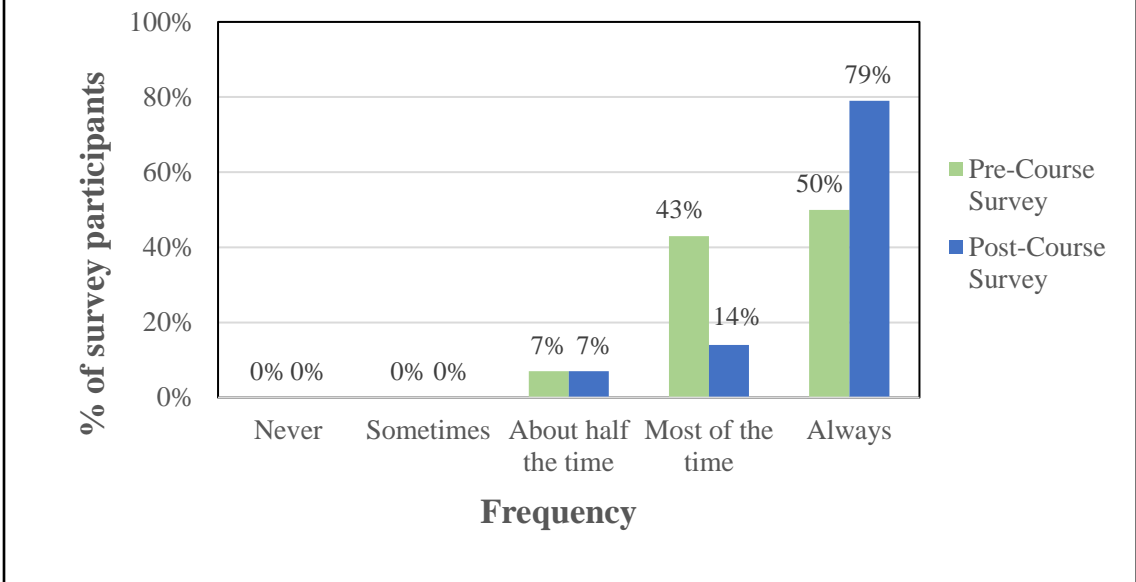




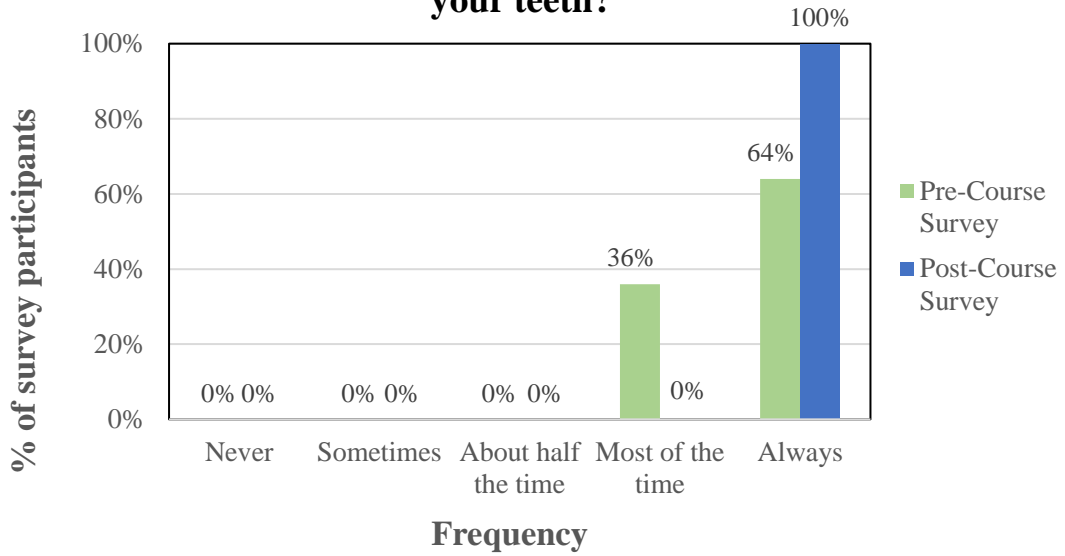
How often do you buy food in bulk?



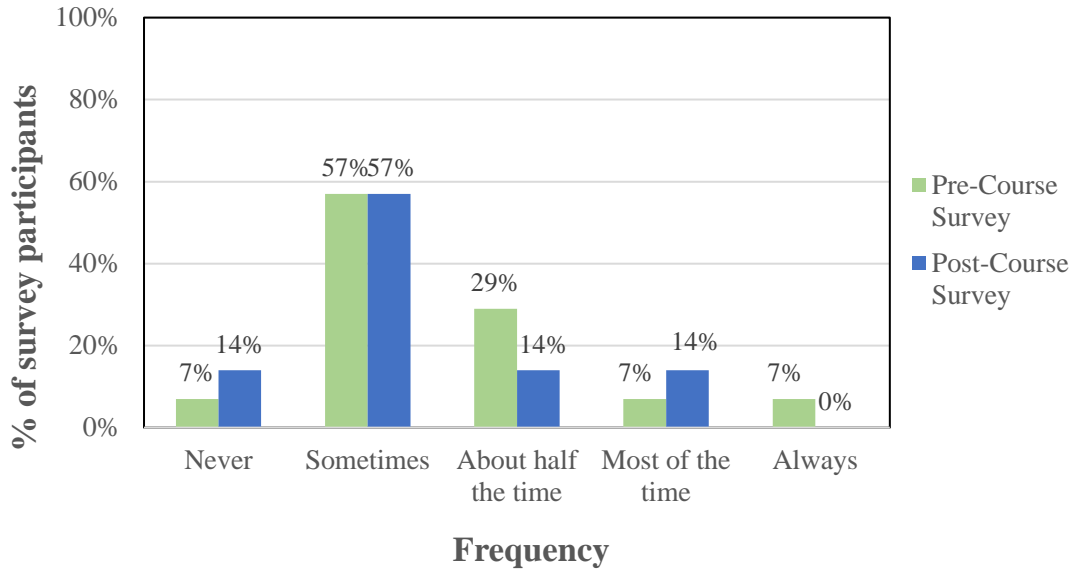
How often do you turn off lights not in use?

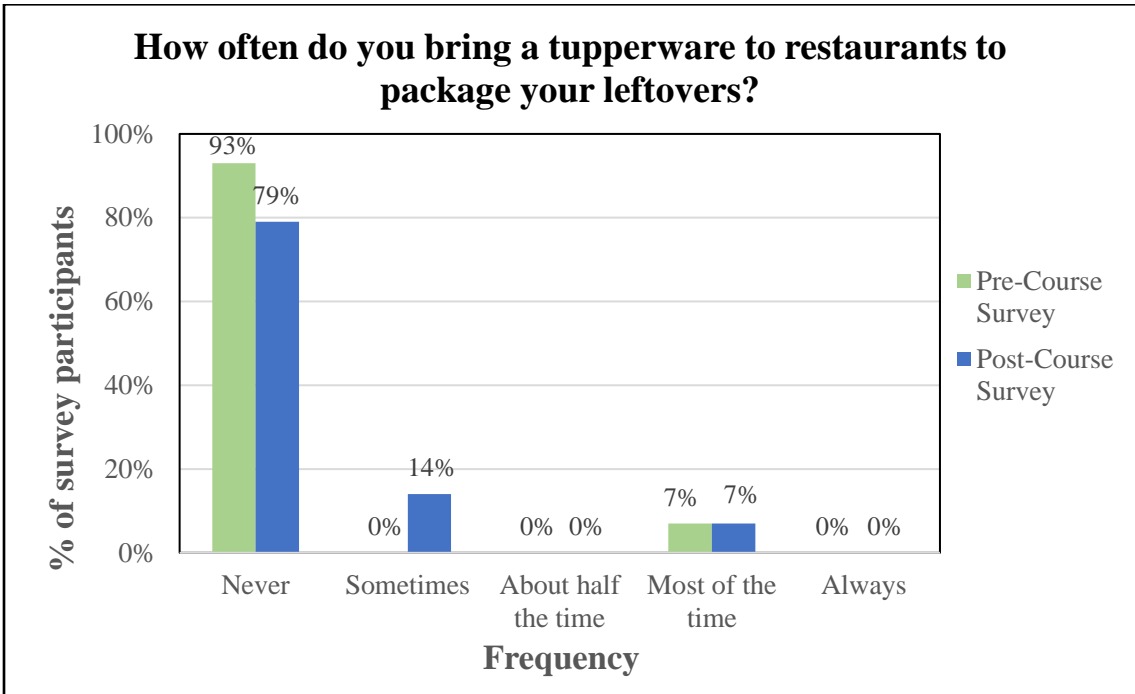
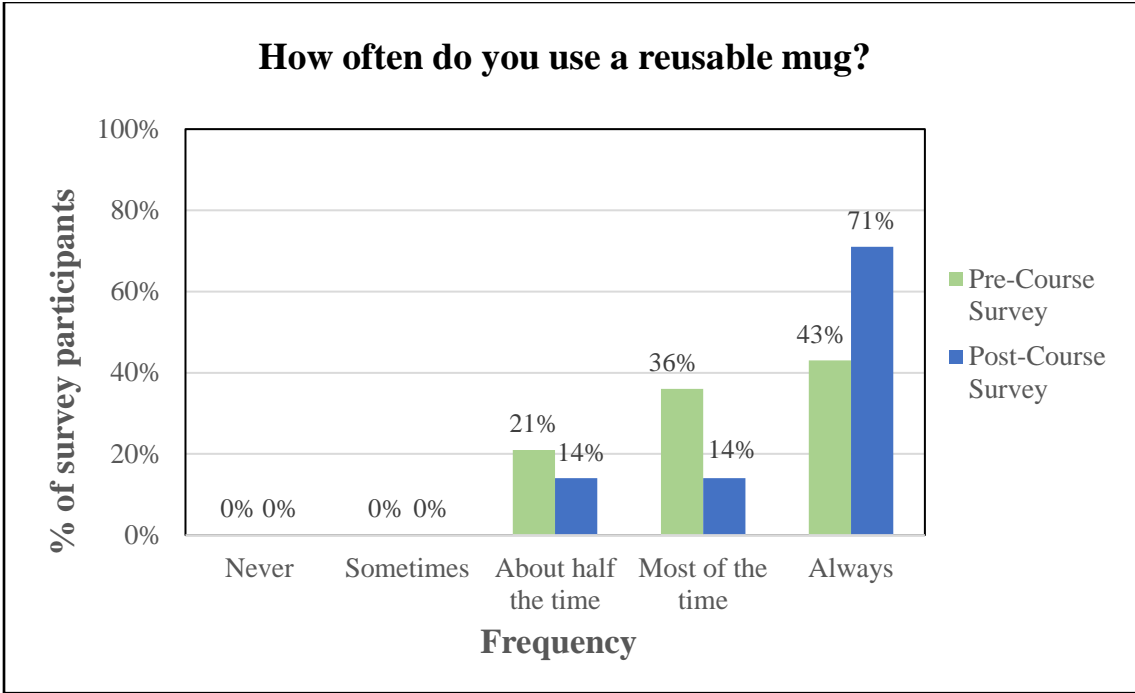


How often do you turn off the faucet while brushing your teeth?

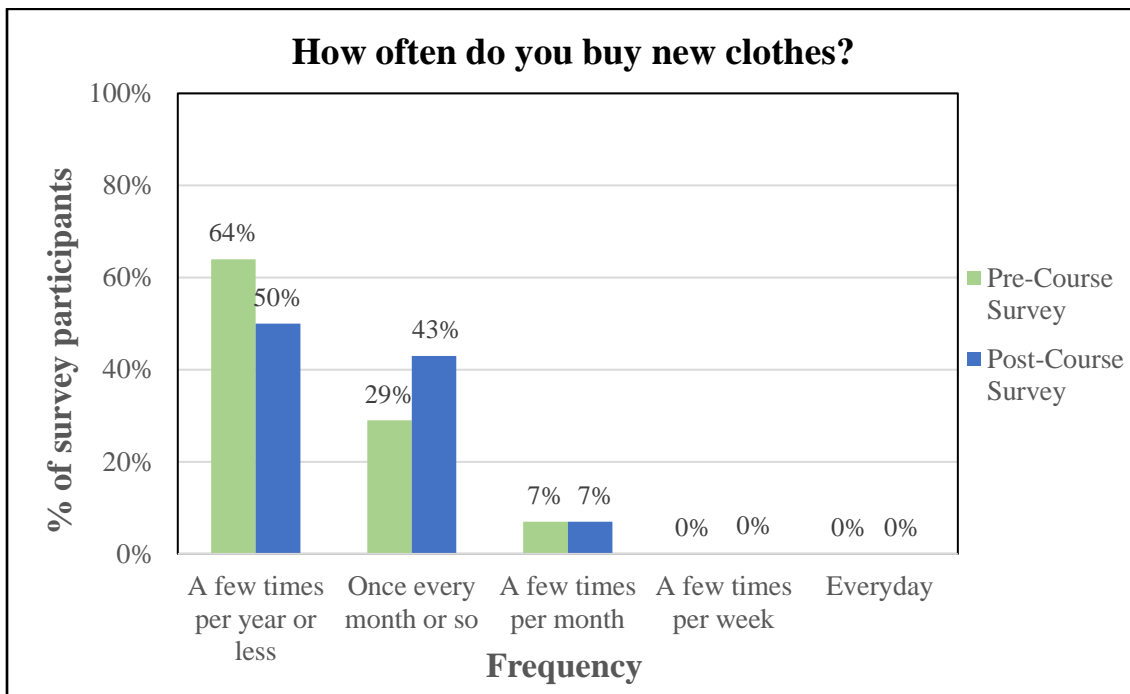
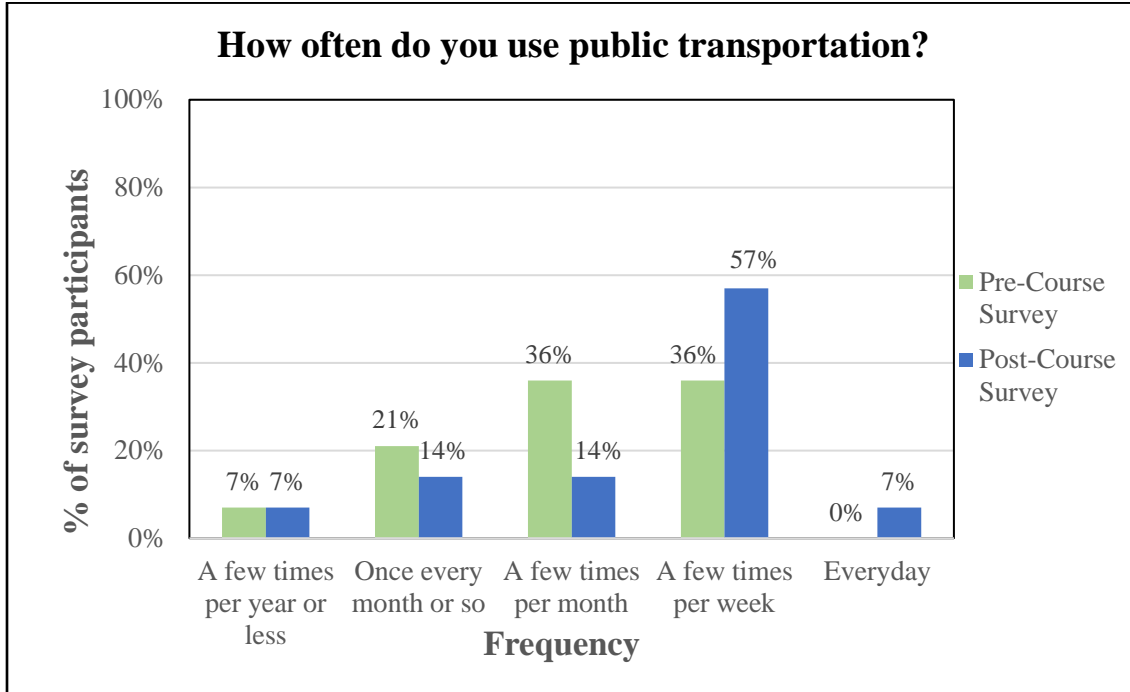


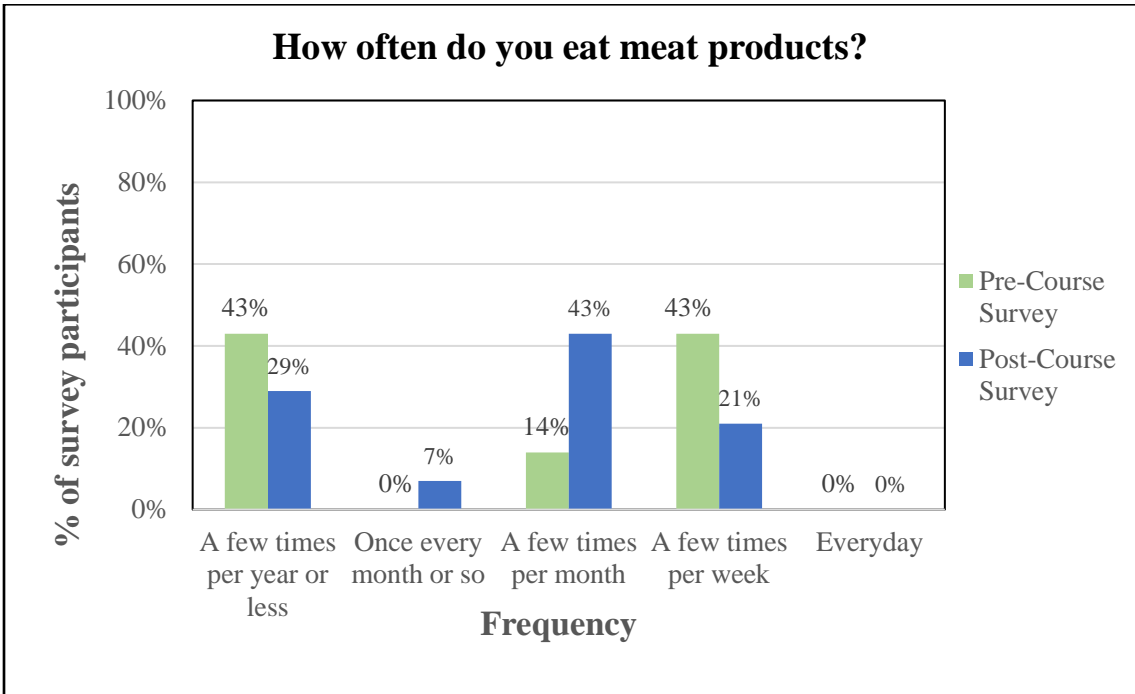
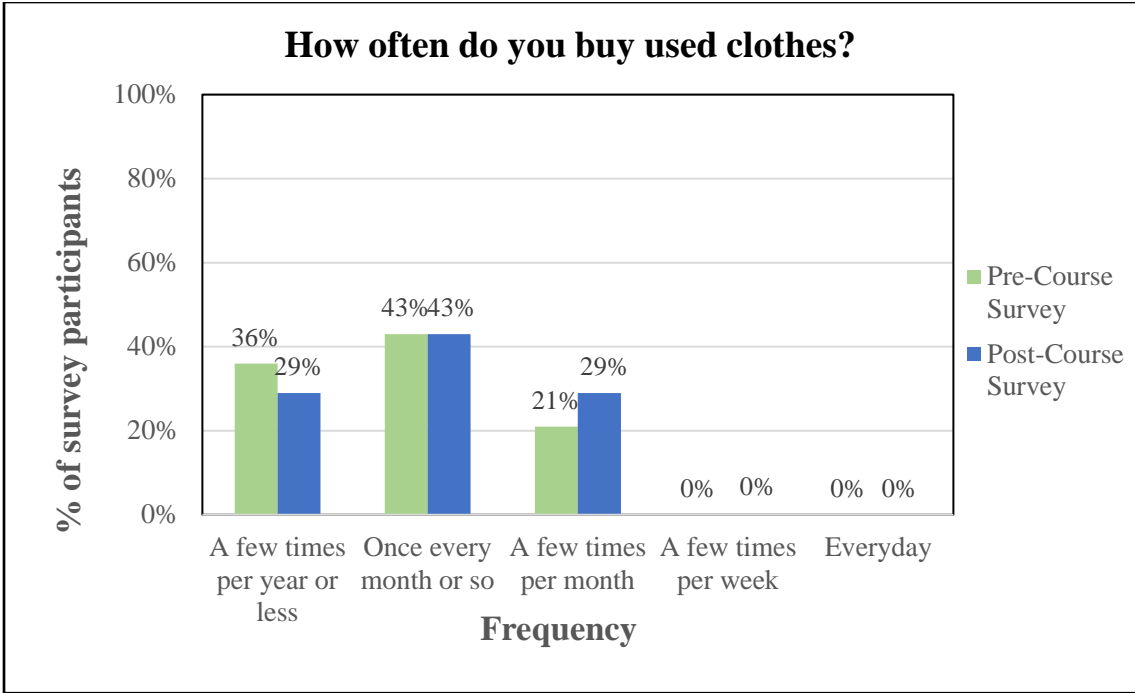
How often do you buy items you don't need?

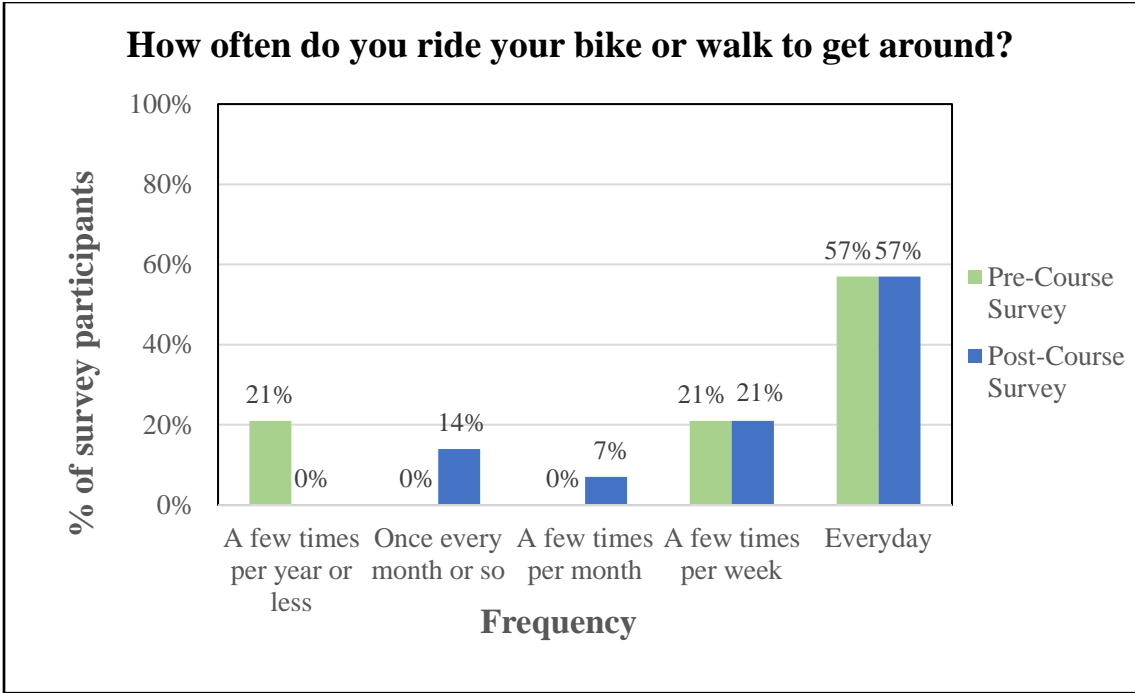




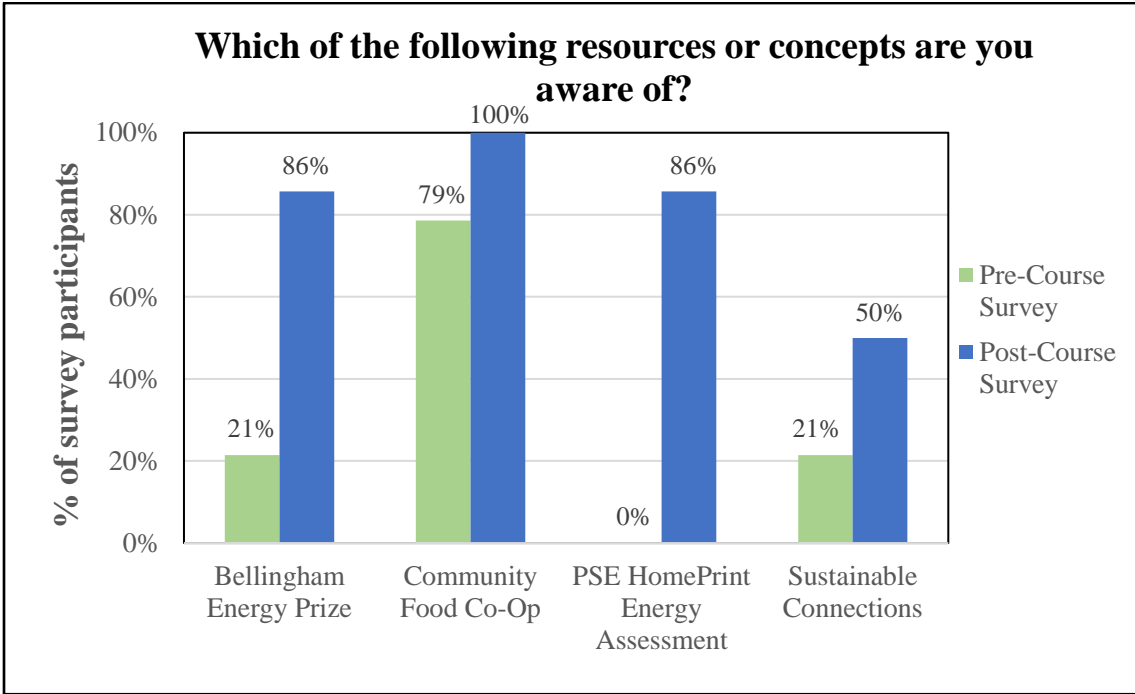
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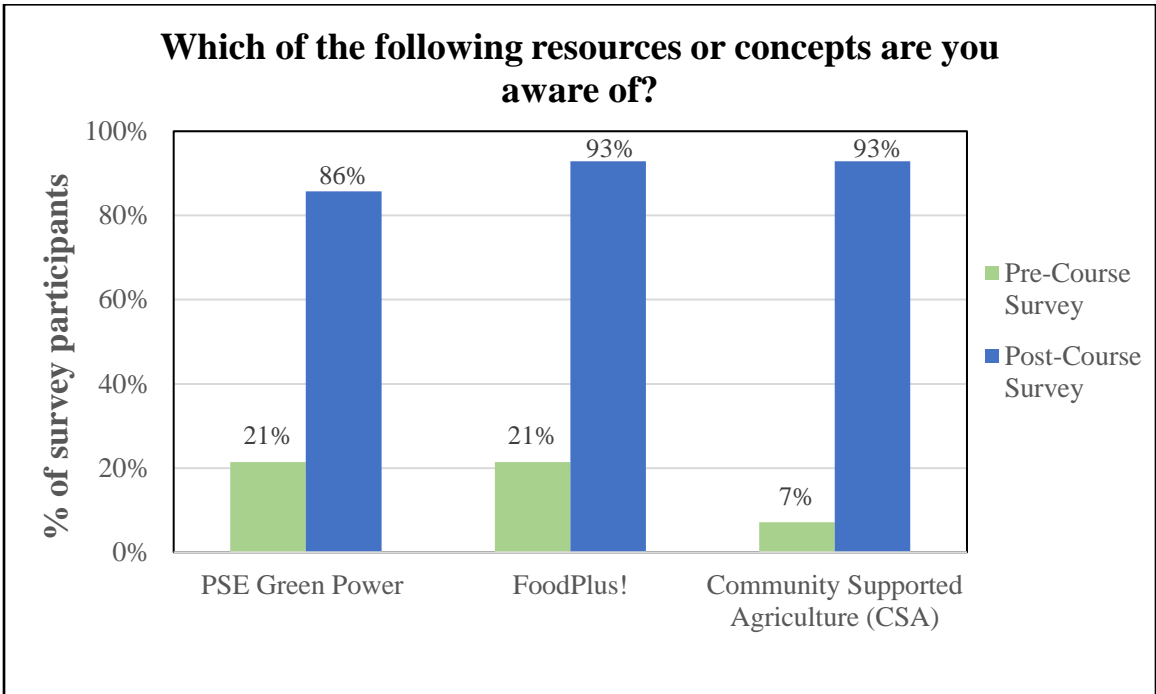
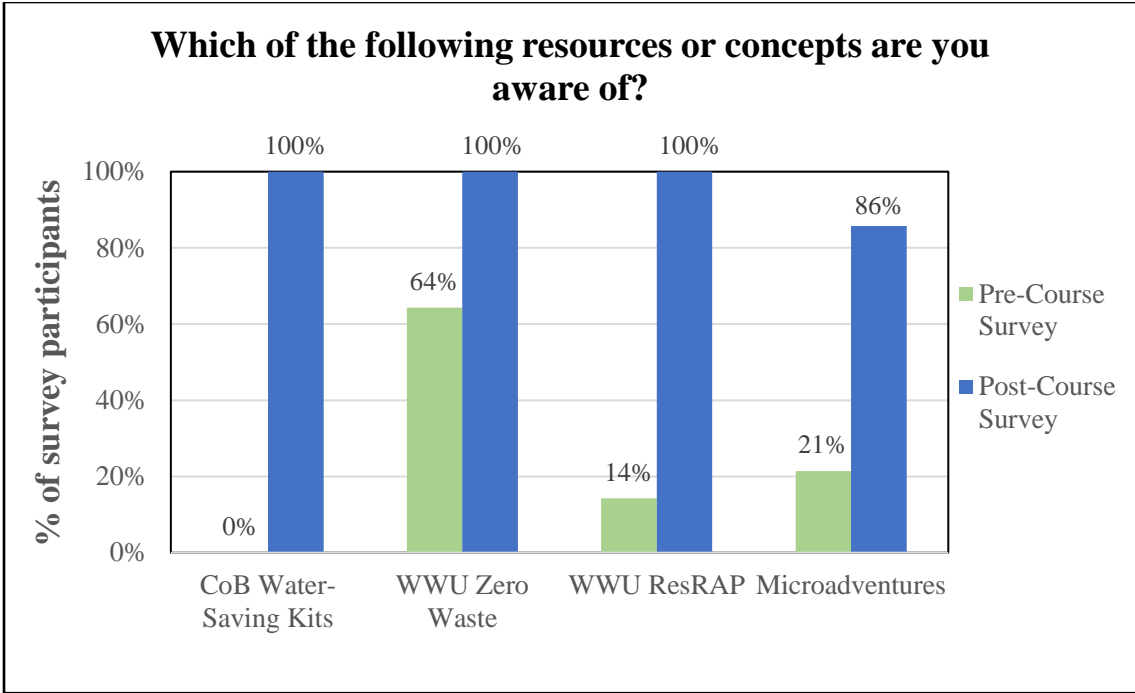




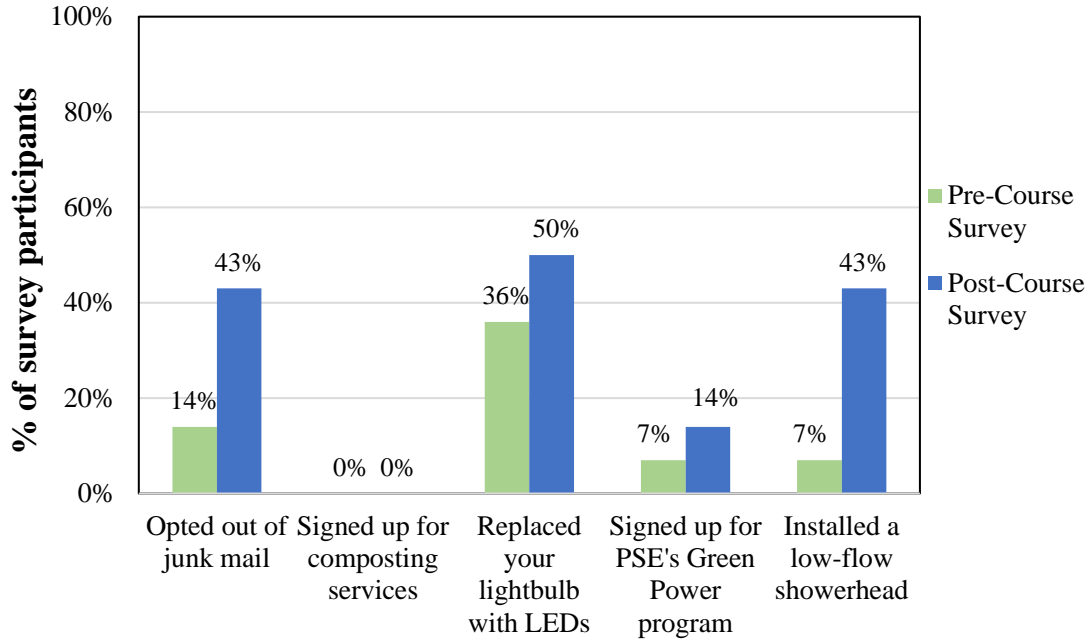


The following charts display data from Question 20:

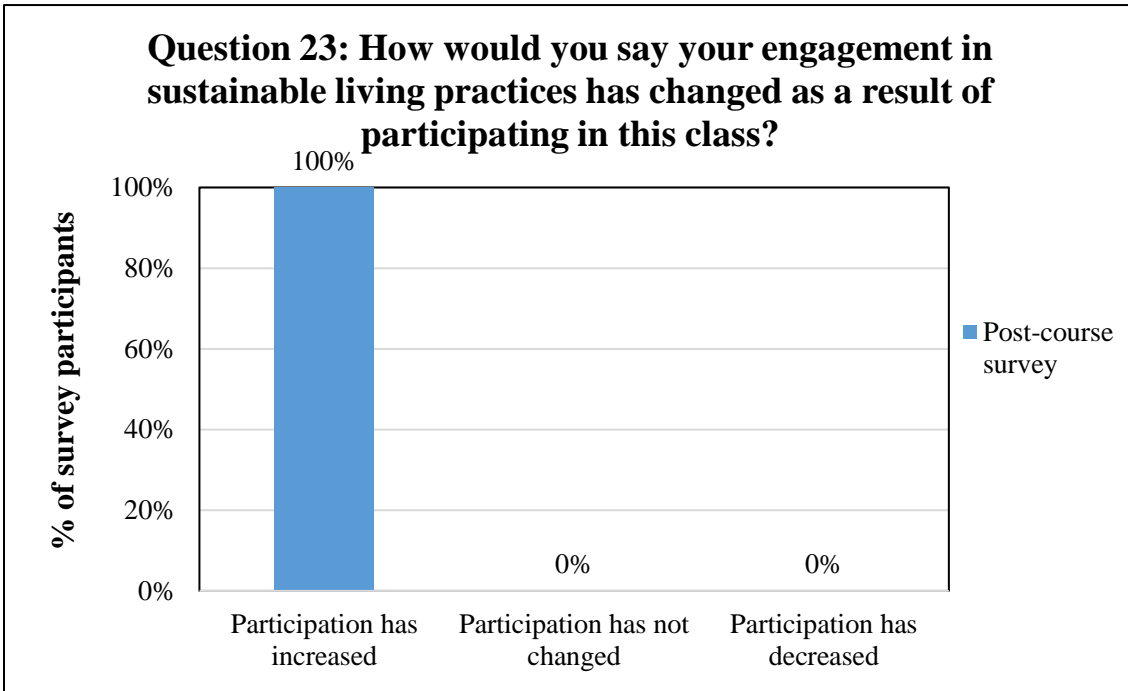
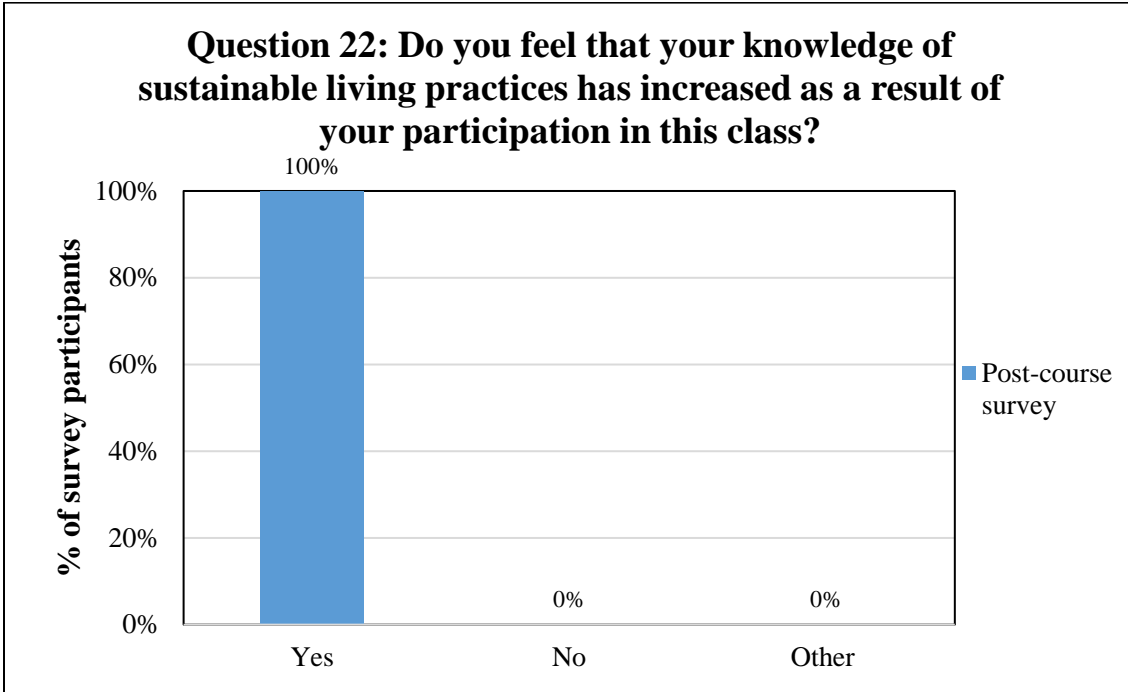




Question 21: Which of these actions have you completed? (Choose all that apply)

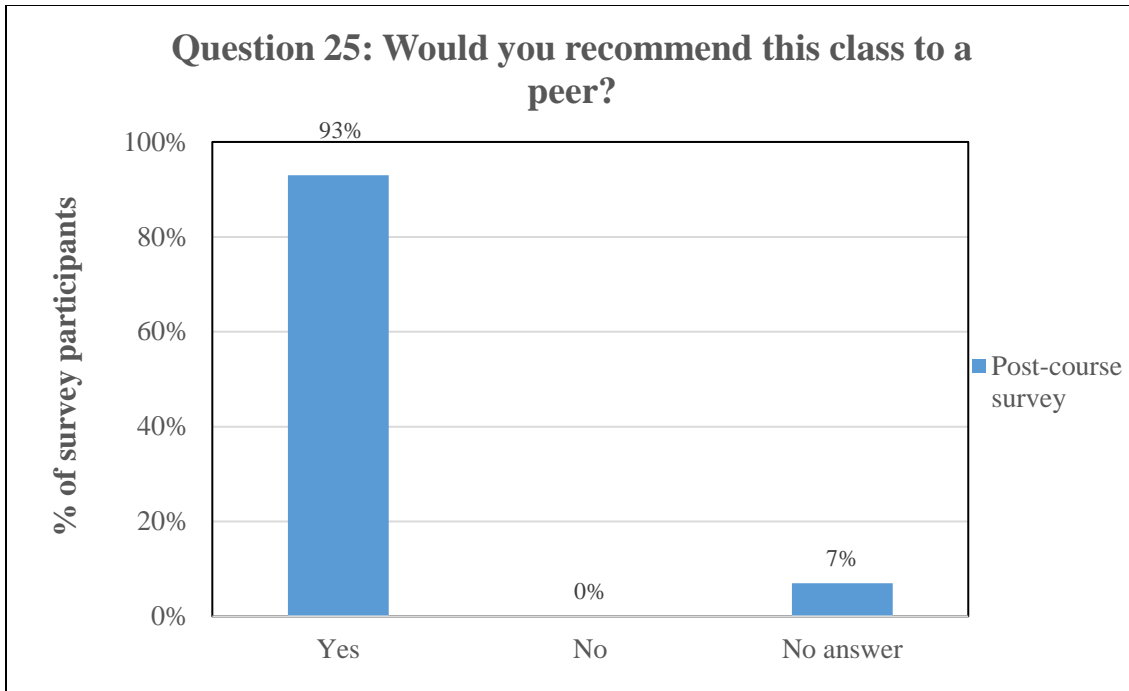


Course Reflection Questions (Post-Survey Only)



Question 24: Which practices do you engage in now that you did not engage in before taking this class?

Response #	Student Responses
1	Cutting down on meat, unplugging electronics, being conscious of shower length
2	Being mindful of packaging, choosing to walk or bike, unplugging things, buying locally
3	Reduced shower times, cold-water laundry, and sustainability awareness reminders
4	Line-drying clothes, biking/walking to work, purchasing LED lightbulbs, buying MORE locally grown foods, eating LESS meat
5	Reusable coffee mug, compost more often, more conscientious about water use, buy less things with disposable packaging
6	I am now more aware of the food I eat and what I buy as well as engaging in more energy sustainable activities
7	Bringing my own produce bags, taking other modes of transportation, thinking locally, spreading the word about the environment, etc.
8	Buying low waste products, buying local, saving water and energy, attempting zero waste
9	Taking the stairs instead of the elevator, shorter and cooler showers, buying less, not wasting food, drying and washing clothes as efficiently as possible
10	Using a reusable towel instead of paper towels, new grocery shopping mindset, laundry tactics, conscious of my water usage, replacing light bulbs, using all of my food, recycling more, etc.
11	I did not think to unplug appliances before this class, which is what I have been doing. Same with consistently turning off lights and buying used clothes.
12	Composting
13	I take shorter showers, buy more locally/organic food, eat less meat
14	I am more mindful and do a better job at my practices like composting, turning off the lights, and reducing water usage



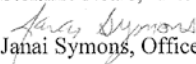
Question 26: Please write any suggestions you have for how this class could be improved (11 responses).

Response #	Student Responses
1	I LOVED IT
2	All my suggestions were written into my final paper.
3	Add in field trips! I would still love to visit the recycling and compost centers.
4	I think a field trip would be really cool and impactful.
5	It was a very interesting class and I learned a lot.
6	Honestly I have none I thought this class was perfect. I loved every bit of it! Keep up the great work!
7	Field trips
8	More serious course of study
9	I have no idea how this class could be improved, I already enjoyed every second of it.
10	Nothing I can think of.
11	This was an awesome class! I hope it stays available for multiple credits.

Institutional Review Board (IRB) Approval Form

WESTERN WASHINGTON UNIVERSITY Office of Research and Sponsored Programs

MEMORANDUM

TO: Stefanie Neale, Environmental Studies
FROM:  Janai Symons, Office of Research and Sponsored Programs
DATE: 9/20/2016
SUBJECT: Institutional Review Board– Exemption Research Approval

Thank you for submitting a research protocol regarding your human subject research EX17-018 “Sustainable Living Practices Class” for review by the Institutional Review Board (IRB).

Approval: The HSRC has reviewed the materials you submitted and found the project described falls into Category #2: research involving survey or interview procedures. Although the research qualifies for exempt status, the investigators still have a responsibility to protect the rights and welfare of their subjects, and are expected to conduct their research in accordance with the ethical principles of Justice, Beneficence, and Respect for Persons, as described in the Belmont Report, as well as with state and local institutional policy. All students and investigators collecting or analyzing data must be qualified and appropriately trained in research methods and responsible conduct of research.

Determination Period: An exempt determination is valid for five years from the date of the determination, as long as the nature of the research activity remains the same. If the involvement of human subjects changes over the course of the study in a way that would increase risks, please submit a revised protocol.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems that may increase the risk to the human subjects or change the category of review, notify the Research Compliance Officer promptly. Any complaints from subjects pertaining to the risk and benefits of the research must be reported to the Research Compliance Officer.

If you have any questions, feel free to email me at janai.symons@wwu.edu.