

EDUCATION FOR SUSTAINABILITY (EFS) AS A LIVED EXPERIENCE AT A LAND GRANT
UNIVERSITY (MSU) – A CASE STUDY OF MSU TEACHING FACULTY

by

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ABSTRACT

Sustainability is a contentious and awkward topic to teach. Increasing concern and awareness of sustainability issues drives a need to study sustainability through an education lens. Education, specifically Higher Education (HE), is a vital source in understanding and ultimately addressing sustainability issues. However, HE institutions continue to promote unsustainable patterns on a local, regional, and global scale. There is an alignment between MSU's mission as a land grant institution and that of Educations for Sustainability (EfS). The shared mission is to serve local regions and citizens by addressing local, regional, and global issues through education, research, and service. This exploratory qualitative study aims to examine and describe the lived experiences of educators at MSU who teach 'fundamental' EfS courses. Data collected is from Interviews, course artifacts, a survey, and observations from the sample of four (n=4) MSU faculty and their courses. The research used a collective case study methodology. A central finding of this study is the faculty's dedication to accurately representing the complexities of sustainability to their students. The faculty's beliefs and experiences manifest in their courses by promoting inclusive scholarship and adaptable course design. This study offers a reflection of a small sample of MSU faculty teaching EfS to promote further research into EfS at MSU.

INTRODUCTION

This research project explores the intersection of sustainability and education through an education for sustainability (EfS) lens at Montana State University (MSU), Bozeman, Montana, United States of America. This exploratory research project utilizes qualitative data research methods to investigate the experience of faculty instructing courses focused on sustainability. This study examines how four university professors approach and teach sustainability courses at a land grant university. A deeper understanding of the faculty's experiences in the education for sustainability (EfS) space will inform teaching, learning, and curriculum for sustainability.

The literature is extensive in identifying that sustainability is a contentious and awkward concept to define (Christie et al., 2015; Cotton et al., 2007; Dunkley, 2013); Huckle and Sterling (1996); (Littledyke & Manolas, 2010; Ryan & Tilbury, 2013; Stevenson et al., 2012; Vaughter et al., 2013; Wood et al., 2016; Wright & Horst, 2013). Since the late 1960's and early 1970's scholars have been evolving the meaning of sustainability (Huckle & Sterling, 1996; Stevenson et al., 2012).

In parallel to the efforts to describe sustainability was a developing awareness of "wicked" problems which are "inherently different" in that "the information needed to *understand* the problem depends upon one's idea of *solving* it" (Rittel & Webber, 1973, pp. 160,161). Rittel and Webber (1973, p. 161) state further that "the formulation of a wicked problem *is* the problem!" Levin et al. (2012) went further by connecting sustainability with 'wicked' problems to describe the complexities of addressing climate change. Levin et al. (2012) acknowledge and elevate the complexities of climate change by coining the term "super wicked problems" (Levin et al., 2012, p. 124). "Super wicked problems comprise four key features: time

is running out; those who cause the problem also seek to provide a solution; the central authority needed to address them is weak or non-existent; and irrational discounting occurs that pushes responses into the future” (Levin et al., 2012, p. 124). This research will use the second trait as a guiding lens to explore this ‘dynamic tension’ that exists in Higher Education as being part of the solution while also being a contributor to the problem of climate change. Scholars go as far as to say, “education is proclaimed at a high level as the key to a more sustainable society, and yet it daily plays a part in reproducing an unsustainable society”(Sterling, 1996, p. 18).

An illustration of how this ‘dynamic tension’ manifests at MSU is through the ongoing debate regarding the sustainability practices MSU should adopt. On the one hand, MSU has taken steps toward addressing sustainability issues in universities practices and programs. These examples include Platinum LEED Building Certifications (MSU, 2018), an undergraduate Sustainability and Environmental Stewardship minor, Sustainable Food and Bioenergy Systems program, innovative campus energy efficiency through geothermal wells (Swearingen, 2020), and a Silver STARS rating from the Association for the Advancement of Sustainability (AASHE, 2019). On the other hand, there is an ongoing and contentious debate about what is next for the university’s policies and agendas to address sustainability-related issues. The debates are widespread across the MSU community. Both faculty and students at MSU are actively engaged in the discussions (*Associated Students of MSU Senate Minutes September 9, 2021*, 2021; *MSU Faculty Senate Meeting Minutes (SUB Ballroom D) 12/01/21* 2021).

As the oldest Land grant institution in Montana, a US state with a mainly urban population and an economy driven by a modern service sector (Department of Commerce, 2021), MSU’s mission is to serve its local region and citizens by addressing local, regional, and global

issues through education, research, and service. In addition to the land grant mission, MSU embodies the values and beliefs of the faculty towards sustainability in their teaching, research, and service (Orr, 1992). The goals of sustainability education, the strategies to achieve those goals, and the social, political, cultural, and economic norms of its constituencies fuel this ‘dynamic tension’ at MSU. A gap is present in understanding how MSU EfS faculty think about, feel, and practice EfS.

Through the research question: “What are the experiences, beliefs, and practices of MSU teaching faculty involved in teaching EfS courses?” this study will shine a light on the knowledge, attitudes, and pedagogies of university faculty who have decided to engage with sustainability as a fundamental guiding principle in their university responsibilities especially as they relate to teaching. Finally, the alignment between course content, the instructors’ methodologies, and students’ interest in EfS classes will be studied.

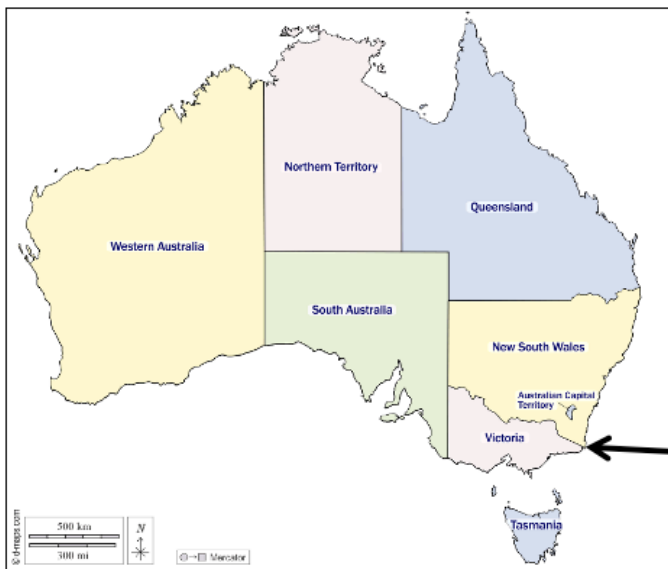
Reflexivity – A Personal Reflection

I taught at and led what can be considered an EfS campus in a remote setting in Australia for ten years between 2008 and 2018. The name of the campus is MLC Marshmead and is in the southeast corner of Australia near the town of Mallacoota, in eastern Victoria, close to the New South Wales border (Figure 1 & 2). The property is a satellite campus of MLC Melbourne, located in Melbourne, Australia. The Marshmead campus is both an education campus and a small-scale working farm that sits on over 500 acres surrounded by the Croajingolong National Park, a UNESCO Biosphere Reserve (*Croajingolong*, 1977). Students aged 14-15 years old attend Marshmead for a two-month term and live-in nine purpose-built houses that accommodate eight. The total population with staff and their families during a school term is approximately

one hundred. Due to the remote setting of the campus, a remote area power system (RAPS) is used to power the campus. The campus uses sustainable design principles throughout the RAPS; passive solar building design, water efficiency design, energy efficiency design, 300+ photovoltaic cells, 180 deep cycle batteries for energy storage, approximately 70 solar thermal hot water panels, a 2.5-kilowatt wind turbine, and over 1.5 million liters of rainwater storage. The expressed purpose of the MLC Marshmead program is to have students explore their role in promoting a sustainable future. The purpose-built campus infrastructure was utilized throughout the integrated curriculum to assist the students in exploring sustainability.

Figure 1 –

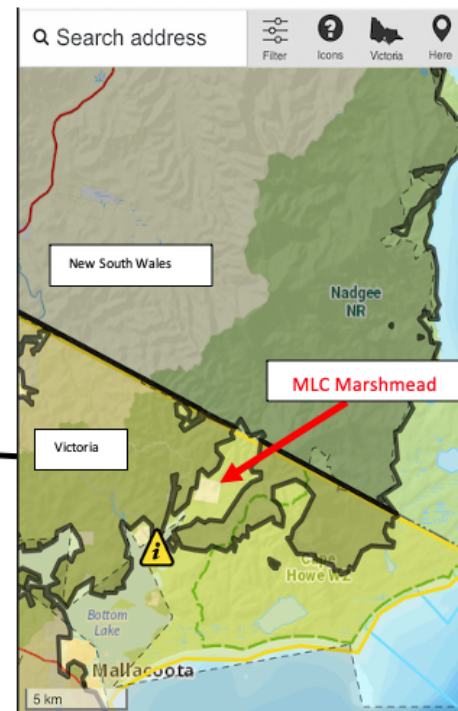
Map of Australia



Note: https://d-maps.com/carte.php?num_car=247254&lang=en

Figure 2 –

Southeast Corner of Australia



Note: Personal Screen Clip from VicEmergency App on February 8th, 2020

Figure 1 and 2 Map of Australia and Location of The MLC Marshmead Campus

The white section in Figure 2 that the red arrow is pointing at is the location of a remote residential education campus located in the southeast corner of Australia near the town of Mallacoota, in eastern Victoria, close to the New South Wales border. The gray shading with the black lines in Figure 2 that encircles MLC Marshmead represents the approximate location of the fire boundary that impacted the southeast corner of Australia from late December 2019 and into January 2020. MLC Marshmead incurred minimal damage in relation to the scale of destruction that occurred in the 2019-2020 Australian fire season. Reports following the 2019-2020 fire season connect the size and destruction at a level not seen before in Australia to climate change. An area similar in size to the country of England burned (*Australia's fires 'killed or harmed three billion animals'*, 2020), 434 million tons of CO₂ emitted, 33 human lives were lost (Werner & Lyons, 2020), and between 1 to 3 billion terrestrial animals died as a result of the fires (*Australia's fires 'killed or harmed three billion animals'*, 2020; Werner & Lyons, 2020). Adding invertebrates to the calculation increases the total number of terrestrial beings killed to 240 billion (Werner & Lyons, 2020).

Observing from my new home in Bozeman, Mt, I reflected on my personal experience working at MLC Marshmead and how that period shaped my understanding of sustainability. After the Mallacoota community, Marshmead campus, and people I know there were out of direct danger from the fires, my reflections shifted to a teacher's lens and how I developed my pedagogical approach to sustainability. In the various roles I held at MLC Marshmead; teacher, new teacher mentor, curriculum coordinator, deputy director, and director, I worked with both students and staff to help them develop their understanding of sustainability. The dedicated infrastructure, the curriculum's scope, and the campus's unique natural setting shaped how my

colleagues and I developed our understanding of sustainability education. However, the uniqueness of the setting and the privilege of the opportunity created tension as I contemplated my lived experience and the transferability of these experiences beyond Marshmead. My reflections also led me to wonder how other educators experience teaching about sustainability in more conventional education settings. "Colloquially termed Black Summer, the 2019-20 Australian bushfire season" (Burgess et al., 2020, p. 5) is an example of how climate change is having more significant impacts around the globe, the question of how education features in the sustainability discourse is an area that cannot be over-researched.

Context of Research

This study is in the context of a research thesis for a candidate in MSU's Curriculum & Instruction – Master of Education (M.Ed.) program. The study's time frame spans from the middle of 2021 to early 2022. As the research setting, MSU is a publicly funded education institution within the state of Montana, USA. Another important layer of contextualization is that MSU is one of Montana's eight Land grant institutions. It is the only university, the largest, and oldest land grant institution in the state (*Land-Grant University Website Directory - Montana*, n.d.). The mission of land-grant institutions has progressed beyond the initial focus on 'agriculture and mechanical arts' (*History of APLU - What is a Land Grant University*, n.d.para. 2). As the concept of land-grant institutions evolved, so did the “now famous academic trilogy: instruction, research, and service” (Johnson, 1981, p. 334). Today these institutions "deliver the innovative workforce of tomorrow; advance and promote research and discovery to improve society, foster economic growth, and address global challenges; and build healthy, prosperous, equitable, and vibrant communities locally and globally" (*About Us*, n.d., para. 2). How specific

land-grant institutions interpret and apply this evolved mission is connected to the communities they serve. MSU sits in the space of balancing the vision of land-grant universities with the reality of being a significant public institution in the state of Montana in 2022. A land-grant university is an important research setting in the context of education focused on sustainability as both align with promoting a better future for Montana citizens.

Statement of the Problem

Scholars acknowledge that defining sustainability is challenging and multifaceted (Christie et al., 2015; Cotton et al., 2007; Dunkley, 2013; Huckle & Sterling, 1996; Littledyke & Manolas, 2010; Ryan & Tilbury, 2013; Vaughter et al., 2013; Wood et al., 2016; Wright & Horst, 2013). The term sustainability exists in numerous contexts, this study is aligned not with a dictionary definition of sustainability, but instead, it is more aligned with the often-used Sustainable Development (S.D.) definition created by the United Nations (U.N.) in 1987. The U.N. connected its meaning to the anthropocentric concept of development. The definition links future generations' capacity to meet their needs to present societies' actions (*Our Common Future, World Commission on Environment and Development*, 1987). While the United Nation's S.D. definition implies a connection between the anthropological and ecological aspects of sustainability, it does not distinctly attach these two perspectives to the meaning of sustainability (Littledyke & Manolas, 2010).

An additional layer implied but not explicitly identified in the U.N. definition is the economic side of sustainability. In the business world, the inclusion of the economy into the characterization of sustainability is called the 'triple bottom line' (TBL). The TBL concept connects sustainability's societal, environmental, and economic aspects, bringing a more holistic

perspective (Littledyke & Manolas, 2010). A value is placed on all three bottom lines through the economic lens to determine how an organization measures success. This study will not engage in the value of TBL as a business practice. Instead, use the concept of TBL to help round out the definition of sustainability.

The complexity of defining sustainability transfers to pedagogical frameworks that focus on the intersection of education and sustainability. Environmental Education (EE) has been an instructional approach in the education industry since the 1970s when western societies gained a new awareness of the impacts of pollution (Gough, 2012; McKeown & Hopkins, 2010). An evolution beyond EE's eco-centric lens occurred through shifting worldviews that brought the anthropocentric lens into focus (*Our Common Future, World Commission on Environment and Development*, 1987). The Sustainable Development Goals (SDG) and the associated Education for Sustainable Development (ESD) pedagogy created a framework for this new anthropocentric lens. Acknowledging the lens that EE and ESD represent also illuminates the distinguishing criticisms of both frameworks. EfS attempts to find commonality between the eco-centric and anthropocentric lenses by being a "golden thread" within education that promotes sustainability through adaptation across perspectives, settings, and pedagogies (Lozano et al., 2013, p. 5). Accepting the EfS framework that promotes elasticity in its meaning encourages investigations into the application of EfS in various educational settings and contexts. In the context of MSU as a Land Grant University, a research gap is present in understanding the practices of faculty engaged in teaching sustainability courses.

Statement of Purpose

The purpose of this case study is to understand Education for Sustainability (EfS) as practiced by select faculty at Montana State University who teach sustainability courses. EfS is defined as a "critical and transformative" education model that allows for the inclusion of diverse "technologies, forms of social organization, and models of development and ideas, values" to encourage students to think critically about the implications of their actions on themselves, others, and the natural world. (Huckle & Sterling, 1996, p. xxiii).

Research Question

R.Q.: What are the experiences, beliefs, and practices of MSU teaching faculty involved in teaching EfS courses?

Sub questions:

- 1: What lived experiences have shaped the faculty's beliefs and practices of teaching EfS courses?
- 2: How do the beliefs of EfS teaching faculty manifest in the content and teaching strategies of their EfS courses?
- 3: How do the interests of students in EfS courses align with the instructional faculty and the course content?

Conceptual Framework

EfS is an existing concept with an existing library of literature. The concept map below organizes and displays the research's context and framework. The Four Commonplaces of

Education described by Schwab (1973); the teacher, the learner, the curriculum, and the milieu shape the education lens of the research. Gowin (1981) later used *governance* to "describe those factors that control the meaning of the educative experience" (Novak, 1984, p. 6). Each of the four commonplaces is distinct yet equal in the importance of the education process. The pedagogical approach of EfS is distinguished from Environmental Education (EE) and Education for Sustainable Development (ESD) by being less structured (Huckle & Sterling, 1996). Through the lens of the four commonplaces of education and EfS, the literature encourages further studies to understand better faculty's beliefs and attitudes in different settings and locations.

Figure 3

Conceptual Framework – EfS at MSU

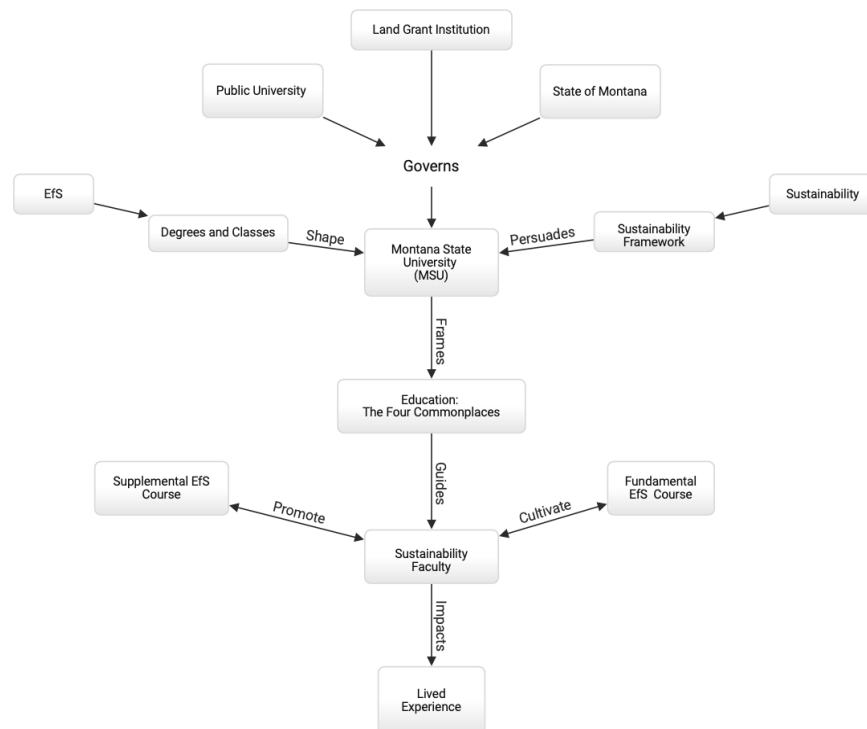


Figure 2 Conceptual Framework EfS at MSU

Philosophical and Interpretive Framework

A social constructivism interpretive framework was adopted for this investigation. As such, I recognize that the position and relationship between myself and the researcher participants contribute to the epistemological lens of the study. As the researcher, I bring my own experiences of EfS, and the MSU teaching faculty do as well. The combination of these experiences shape the process and outcomes of constructing a communal reality of EfS at MSU in 2022 (Creswell & Poth, 2018).

Delimitation

This study explores and describes an aspect of the intersection of sustainability and education that was undertaken based on the experiences of a small group of teaching faculty at MSU who instruct EfS aligned courses. The framework of EfS allows for a cross-discipline study of interpretations of EfS. Courses with sustainability at the center of the outcomes are known as “fundamental” EfS courses (Buckley, 2019, p. 980). Focusing on curricula such as those mentioned above was chosen to promote a study that engages with lived experiences of teaching staff who teach a course aligned with the ‘fundamental’ EfS course type at MSU. By bounding the study to ‘fundamental’ courses, it is not to say courses that cover sustainability principles in a “supplemental” way are not involved in navigating EfS at MSU (Buckley, 2019, p. 980). It instead increases the probability that instructors align their pedagogy with sustainability principles. For example, in a preliminary study for this project, a small survey (n=4) was conducted of instructors of courses listed in the MSU Sustainability Minor Program, and one of the respondents did not self-identify as teaching a sustainability course, "My courses

do not focus on sustainability" (Short, 2020, p. 15). The distinction between 'fundamental' and 'supplemental' courses creates a boundary that serves the study's research design.

Limitations

The research for this project sits with numerous limitations, and identifying them all has not been attempted. External and internal logistical constraints to the researcher impact the design and researcher. The chosen research design is also a point that creates limitations to the study. Through using a case study design, a valid question is, "how much of the case is being studied?". With confidence, it is clear to the researcher that there are staff not included in this study who teach 'fundamental' sustainability courses. Their non-participation came from their unwillingness to participate or the researcher not knowing their existence. Another important limitation to distinguish is that the focus of the research will only be on one of the *four commonplaces* of education, which is the teacher (Schwab, 1973). The other three commonplaces are acknowledged and viewed as contributors to the lived experience of MSU teaching faculty.

The researcher's ability and experience undertaking a project such as this is a part of the story of the study's limitations. The study's outcome is not intended to promote generalization. However, some level of information might transfer to other settings. The intent here is to offer a reflection of the research participants' lived experiences as they are within the constraints of the research boundaries.

Assumptions

The author has assumed that the 'fundamental' EfS courses and their instructors will align with and position themselves within the intersection of education and sustainability. A central assumption for this study is that MSU teaching faculty value teaching about sustainability. An additional assumption is that the staff members instructing their course are willing to reflect on and share their personal experiences. Based on the findings of a preliminary study, the researcher does not assume that the research participants will use terms such as EfS or 'fundamental' to describe their pedagogy and courses (Short, 2020).

Importance or significance of the study

This study may add value to how individuals who shape MSU policies and programs reflect on current EfS curricula and the experience of faculty who teach EfS courses. The author also acknowledges personal significance in completing this research as prior to this study, they had experienced EfS but did not understand what they were experiencing at the depth they do now.

REVIEW OF RELATED LITERATURE

Higher Education

Tierney (2006) highlights an ongoing examination of the question around the purpose of Higher Education(HE). It seems how one answers the question of "what is the purpose of HE?" is related to how one sees the role of HE in serving the public good. The debate and interpretation of the meaning of the public good are not new and have engaged ancient philosophers from Plato and Aristotle to Thomas Jefferson to modern-day HE administrators and scholars (Pusser, 2006). Another important distinction in the conversation focusing on the purpose of HE is related to the governance of public institutions (Tierney, 2006). Public institutes such as MSU have a responsibility to accommodate the "economic, social, and cultural forces that are impacting virtually all organizations and systems" in relation to the meaning of "public good" in the present-day USA (Tierney, 2006, p. 2). Thus, a discussion involving the meaning of public good in HE cannot occur without a "discussion about governance" (Tierney, 2006, p. 2).

Land Grant Institution

In 1862 the First Morrill Act, which created Land Grant Institutions, evolved the interpretation and application of the idea of public good in HE in the USA. The shift occurred through the focus on "agriculture and mechanical arts" to promote the success of American democracy through "an informed and educated electorate" at a scale and scope not previously seen (Cross Ii & Cross, 1999, p. ix). Pusser (2006, p. 14) highlights the literature examining this transition "prior to the founding of the land grant colleges, a primary public good produced by

the universities was the number of professionals produced therein" (Goldin & Katz, 1999; Rudolph & Thelin, 2011). Notable developments in the land grant model include the 1890 Second Morrill Act leading to the "creation of 17(19 currently) historically black land grant colleges," the 1966 National Sea Grant College Act promoting "research, teaching and education in marine and coastal sciences" (*About Us*, n.d.), and the Education Land-Grant Status Act of 1994 "providing land-grant status for certain Indian colleges and institutions" (H.R.4806 - 103rd Congress, 1993-1994, summary). The shift in the governance model in HE to include Land Grant institutions advanced the concept of service, addressing grand challenges, and equality in HE in the USA through a focus on "research for the common good and the training of agronomists, engineers, teachers, and public servants" (Pusser, 2006, p. 15).

Education: The Four Commonplaces

According to Schwab (1973), the interconnected "four commonplaces" of educating are the learner, teacher, subject matter(curriculum), and milieu (Schwab, 1973, p. 508). The first three commonplaces listed are more visible in the day-to-day practice of education. The fourth 'place' known as the *milieu* is still ever-present and evident in education. *Milieu* captures what is not present in the learner, teacher, and curriculum commonplace. Schwab (1973) describes *milieu* as "which the child's learning will take place and in which its fruits will be brought to bear. The relevant milieus are manifold, nesting one within another like Chinese boxes" (Schwab, 1973, p. 503). *Milieus* are context-specific and impacted by a wealth of diverse variables. Gowin (1981) began using the term *governance* in place of milieus as a way to acknowledge better the constructed systemic structures of education and "the factors that control the meaning of the educative experience" (Novak, 1984, p. 6).

Schwab (1973) identifies balancing focus and action between the four commonplaces as crucial when educating. If the commonplaces do not receive equal attention, there is the risk of creating "bandwagon curriculums" with "short merry" lives that have "arisen from just such over emphases: the child-centered curriculums of Progressivism; the social-change-centered curriculums of the 1930s; the subject-matter-centered curriculums of recent reforms; the teacher-centered curriculums which may arise from unionism" (Schwab, 1973, p. 509). To avoid the pitfalls of 'bandwagon' movements within education a balanced coordination based on a shared value of the four commonplaces must occur (Schwab, 1973). Although the 'teacher' is the focus of this study, the question of "how the teacher exists with the other three commonplaces?" is necessary to explore.

Education for Sustainability (EfS) – A Background

Sustainability sits alongside justice, liberty, and democracy as an issue that lacks a singular definition (Huckle, 1996). The literature identifies that the "term sustainability is vague and overused" (Wright & Horst, 2013, p. 214). The ambiguity of sustainability and thus EfS is a hurdle that is prevalent in the literature. Indistinctness as an EfS trait is also rooted in the qualities it shares with Environmental Education (EE). EE is a foundational precursor to EfS, and the question has been asked about EE, "could there ever have been two more nebulous concepts combined to produce one, synthetic, professional discipline?" (Short, 2009, p. 8). Researching the concept of sustainability for this project through the lens of EE is critical in understanding the background of EfS, as EE provides a central perspective on the development and evolution of EfS.

The *Conference for the Establishment of the International Union for the Protection of Nature (IUCN)* convened at the Fontainebleau, Paris, France, in October of 1948, is credited with being one of the first steps towards establishing what is known as EE (Carter & Simmons, 2010; Disinger, 1985). The IUCN conference marks a shift beyond conservation and preservation of Emerson's *Nature* (1836), Thoreau's *Walden* (1854), George Perkins Marsh's *Man and Nature* (1864), and the works of John Muir (1838–1914), Enos Mills (1870–1922), Robert Marshall (1901–1939), and Aldo Leopold (1887–1948) towards "environmental awareness and environmental literacy" (Carter & Simmons, 2010, p. 4).

Another transformative event in EE was the first Earth Day on April 22, 1970. The first iteration was not known as Earth Day; instead, it was a "national teach-in" day that would focus on "the threat to the ecology of the world" (Christofferson, 2009, p. 4). The United States Senator Gaylord Nelson from Wisconsin developed the idea for a day dedicated to bringing awareness to "The Crisis of the Environment" (Christofferson, 2009, p. 518). Nelson initially framed *Earth Day* as a national *teach-in* event based on *sit-in* protests that were a common tool civil rights and anti-Vietnam war activists used to disrupt the protest's location passively. Nelson capitalized on this established and familiar protest methodology to align Earth Day with "the same concern the youth of the nation" had towards "changing this nation's priorities on the war in Vietnam and on civil rights" (Christofferson, 2009, p. 518). By associating the thinking about the two issues, Earth Day and the Vietnam war, Nelson highlights the connection between societal and environmental themes that will influence the evolution towards EfS. Through Earth Day and other events of the 1960's "awareness of the threat to environmental degradation" solidified the foundations of EE (Gough, 2012, p. 14).

The decade of the 1970s was transformative in EE, not only in the USA but also on an international level. At the United Nations Conference on the Human Environment, Stockholm, June 1972, "the first international political consensus on ways of preserving and improving man's habitat" (Thacher, 1972, p. 1) was created, and "education in environmental matters, for the younger generation as well as adults" is one of the twenty-six principles outlined in the declaration (Thacher, 1972, p. 3). There is a direct link between the Stockholm Declaration and the International Environmental Education Workshop in Belgrade, Yugoslavia 1975. The Belgrade Charter produced *A Global Framework for Environmental Education*, providing a more detailed framework of EE (*International Workshop on Environmental Education, Belgrade, 1975*, 1975). Within the Belgrade Charter, the framers of the charter described the need to encourage new "possibilities to develop new knowledge and skills, values and attitudes, in a drive towards a better quality of the environment and, indeed, towards a higher quality of life for present and future generations of living with that environment" (UNESCO et al., 1976, p. 2). The Belgrade Charter included six objectives; 1. Awareness, 2. Knowledge, 3. Attitude, 4. Skills, 5. Evaluation ability, 6. Participation (UNESCO et al., 1976, p. 2). Using these six areas, the authors of the framework wanted educators and students to be able to "consider the environment in its totality – natural and man-made, ecological, political, economic, technological, social, legislative, cultural and esthetic" (UNESCO et al., 1976, p. 2).

Building off the work of the Belgrade Charter, the subsequent development and evolution of EE was the 1977 Tbilisi Declaration ("Intergovernmental Conference on Environmental Education, Tbilisi, USSR, 14-26 October 1977: final report," 1977). The Tbilisi Declaration

combined the broad international reach of the Stockholm Declaration and the education focus of the Belgrade Charter to produce the transformative EE framework.

EE to Education for Sustainable Development (ESD) – A Shift

A shift occurred by some scholars in the late 1970s to early 1980s in the lens through which they viewed the issues of the environment. The variation is related to the philosophical perspective of the value placed on the "environment in its totality" (UNESCO et al., 1976, p. 2). On one side of the continuum, ecology receives greater value or the eco-centric lens, and at the opposite end, the importance of humanity receives more value and thus an anthropocentric lens. Although the Belgrade Charter includes anthropocentric language and attaches value to non-ecological factors, for some, the EE framework did not go far enough to accommodate anthropological factors. As a way to accommodate this perspective and bring humankind more into focus, the term "sustainable development" (SD) began to be used to capture the reorientated lens toward the totality of the environment. SD terminology marks the increased use of the term 'sustainability.'

The transformational event in the SD space was the 1987 Book by the Brundtland Commission: *Our Common Future – The World Commission On Environment And Development* (*Our Common Future, World Commission on Environment and Development*, 1987). The book is also known as the Brundtland Report, named after the former Norwegian Prime Minister, Gro Harlem Brundtland, the World Commission on Environment and Development chair. The oftensighted definition of sustainability is the definition the Brundtland commission provided for SD: "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (*Our*

Common Future, World Commission on Environment and Development, 1987). With this definition of SD and thus Education for Sustainable Development (ESD), the central focus is shifted more towards an anthropocentric core and away from the eco-centric core of EE.

Throughout the Brundtland report, an essential tool in achieving SD is education. It was not until 1992, at the United Nations Conference on Environment & Development Rio de Janeiro, Brazil, known as Agenda 21, that a framework of ESD was outlined. In chapter 36, PROMOTING EDUCATION, PUBLIC AWARENESS AND TRAINING, the report authors identify that "Education, raising of public awareness and training are linked to virtually all areas in Agenda 21" (*Agenda 21 United Nations Conference on Environment & Development*, 1992, p. 320). In the last sentence of the first paragraph of chapter 36, the authors expressly acknowledge and connect ESD to EE: "The Declaration and Recommendations of the Tbilisi Intergovernmental Conference on Environmental Education organized by UNESCO and UNEP and held in 1977" (*Agenda 21 United Nations Conference on Environment & Development*, 1992, p. 320). Using the Tbilisi Declaration, and thus EE, as the foundation for ESD, the two pedagogical frameworks, EE and ESD, are forever linked. The establishment of this link also embeds the well-documented tension between EE and ESD (Huckle & Sterling, 1996; Kopnina, 2012; Orr, 1992; Tilbury, 1995).

Criticisms of EE

The Belgrade Charter explicitly places value on the anthropocentric qualities of EE, yet a common critique of EE is that it does not provide enough accommodation for humankind's place in the environment. In the foreword of the Brundtland Report, this tension is addressed: "The environment does not exist as a sphere separate from human actions, ambitions, and needs, and

attempts to defend it in isolation from human concerns have given the very word 'environment' a connotation of naivety in some political circles" (*Our Common Future, World Commission on Environment and Development*, 1987, p. 7). In the same passage, Prime Minister Brundtland frames development as necessary due to human existence in the environment and striving to "improve our lot within that abode" (*Our Common Future, World Commission on Environment and Development*, 1987, p. 7). The inclusion of 'political circles' by Prime Minister Brundtland highlights the idea of 'power' and the location of 'power' in the anthropocentric vs. eco-centric debate that the literature underlines (Kopnina, 2012). It seems this fundamental criticism of EE led to the creation of ESD. What is not clear to this author is if a deficiency in the EE framework or the anthropocentric lens exerting power over the eco-centric lens created the ESD framework.

Criticisms of ESD

Where EE is disparaged for its eco-centric lens, ESD is, in turn, criticized for its emphasis on the anthropological lens as ESD is designed to accommodate and acknowledge a more human-centered core. Through this lens, the balance between the natural world and humanity is open to interpretation by humanity and the structures of society. Environmental sociologists such as Dunlap and Catton (1994) use the paradigm of 'human exceptionalism' to capture the subjectivity of how the dominant western worldview allocates value. Early examples of human exceptionalism exist in the Bible when the idea that humans "have dominion over" earth for their own needs (*King James Bible*, 1990 Genesis 1,26). Thus, allowing humans to place ourselves as a 'part of' or 'above' nature as we see fit (Kopnina, 2012, p. 703). Another characteristic of human exceptionalism is the belief that climate change will be solved through human creativity and skill (Kopnina, 2012). Thus, using an SD framework rooted in the human

exceptionalism paradigm will not create an equally balanced perspective or value system (Kopnina, 2012).

The literature identifies the creation of the SD, and thus ESD, a framework by the United Nations (UN), a large and far-reaching international organization, as an example of the power and influence sitting in the upper echelons of society (Kopnina, 2012). The ability of influential and wealthy organizations controlled by political and corporate leaders to affect the interpretation of SD and ESD creates a concern. There are questions about how a different outcome around environmental issues can be achieved if the people promoting the solutions are the same key people driving the issues. A concern is that all the good intentions and work put into ESD have created a 'business as usual' approach that will not achieve the desired outcomes (Huckle & Sterling, 1996; Kopnina, 2012). One reason suggested for this 'business as usual' outcome perspective of SD is that acknowledging climate change and the associated impacts makes an uncomfortable challenge to the human exceptionalism paradigm (Dunlap & Catton, 1994).

EfS – Between EE and ESD

On the continuum that the eco-centric lens of EE and the anthropocentric lens of ESD sit, there is a gap that allows for a similar yet alternative educational framework to EE and ESD. EfS sits in the space between these two recognized and established frameworks in a way that strives to address the 'naivety' of EE and 'business as usual' of ESD. EfS's creation is a reaction to ESD being interpreted as "too strongly associated with reformist and often idealist discourse that seeks a greener and fairer version of 'business of usual'" (Huckle & Sterling, 1996, p. xxii). The

creation of EfS seems to be an attempt to balance the eco-centric and anthropocentric lens. Much like ESD can be seen as a response to EE, EfS can be considered a response to both EE and ESD.

A tension that EfS inherits from EE and ESD is the pluralistic nature of the framework (Kopnina, 2013; Laessoe & Ohman, 2010; Reid & Scott, 2006; Stevenson, 2006). From an education perspective, a noted concern of an attempt to imbed multiple lenses within a framework will lead to confusion for both teachers and students (Kopnina, 2012). EfS seems to acknowledge this friction by stepping away from the pattern of creating broad general frameworks defining the lens. Instead, EfS is aligned more with what Orr (1992, p. 137) describes as the need for "grass-roots participation" in building knowledge and understanding of sustainability on a global level. Authors Huckle & Sterling (1996, pp. xxiii) also acknowledge a similar perspective as they "would rather not make pronouncements about what 'fits into' what." What hope do educators in the western reductionist-dominated paradigm have?

Scholars see the dilemma of navigating and defining EfS as both a positive and negative trait. On one side, the traditional western reductionist may see the blurriness of not knowing what it is as a deficit, while others see the opportunity to create the meaning of EfS as enabling and liberating (Huckle & Sterling, 1996). Others identify the empowering trait of those participating in EfS as a way for the principles of sustainability to be bent to fit any interpretation business, universities, communities, or individuals may wish (Christen & Schmidt, 2012; Robinson, 2004; Wright & Horst, 2013). "EFS is not an agreed set of ideas educators can tack onto existing thinking and practice to allow them to say 'we are doing sustainability,'" (Huckle & Sterling, 1996, p. 19).

The literature also outlines how the interpretation of EfS's core concept is not the only factor that creates tension for EfS. A central theme that EfS represents is an "alternative educational paradigm" that has emerged from a postmodern world and is in opposition to the "current dominance of neoliberalism" (Huckle & Sterling, 1996, p. xxiii). The development of the EfS paradigm within education is a logical evolution in response to what some describe as the perspective that modernism represents (Orr, 1992). The shift away from modernism is pivotal in understanding the social constructivism perspective that EfS accommodates. To navigate a transition toward postmodernism and a contested landscape of sustainability, an educational model such as EfS may help promote an alternative future based on reflection and action towards a more sustainable future (Huckle & Sterling, 1996). EfS represents an inclusive framework that does not limit its interpretation of the purpose of education but instead supports a more diverse range of perspectives to create a new and different education trajectory. The literature tells us that EfS combines values, pedagogy, curriculum, and structures united to promote sustainability. Sterling (2010) offers a description of EfS as an "education 'for being'" (Sterling, 2004, p. 52) which aligns with using values to steer the application of knowledge (Buckley, 2019).

EfS in Higher Education – Challenges

An educational agenda with sustainability at its core encounters controversy and dilemmas in the context of Higher Education (HE) (Shephard, 2015). A significant point of tension in HE for a values-laden topic such as EfS is academic freedom. As a cornerstone of higher education, academic freedom creates an awkward and confrontational position as some "EfS scholars might argue against certain manifestations of academic freedom that are themselves unsustainable" as "traditional scholarly values of neutrality and scientificity [sic] are

utterly untenable in this world” (Hegarty, 2008, pp. 684, 687). Additionally, individual teachers may "avoid value dilemmas in teaching" such that EfS creates (Villanen, 2014, p. 179). If EfS is seen as biased or prescribing a type of indoctrination, a transition to EfS in HE will "be resisted as a challenge to an assumed academic freedom" (Hegarty, 2008, p. 684). EfS scholars in HE exist in a paradox of navigating the complicated and contested topic of EfS while working and serving institutions of HE:

“On the one hand, there is a deep concern about the state of the planet and a sense of urgency that demands a break with existing un-sustainable systems, lifestyles and routines, while on the other, there is a conviction that it is wrong to persuade, influence or even educate people towards pre- and expert-determined ways of thinking and acting” (Wals, 2010, p. 150).

The literature also points out that “aspirations of academics and managers is not enough to drive a transition to sustainability” (Gale et al., 2015, p. 258).

Another tension documented in the literature is the structural obstacles EfS encounters within HE (Sharp, 2009). These structural obstacles create "arenas of responsibility and tiers of management" that impede a contextual understanding of how institutions operate (Sharp, 2009, p. 3). Gale et al. (2015) provide an overview list of four challenges for EfS in HE, not the only four, of course;

“(1) disciplinary contestation, which creates confusion over what 'sustainability means; (2) institutional fragmentation, which prevents the interdisciplinary dialogue that sustainability demands; (3) economic globalisation [sic], which transforms higher education into just another market opportunity; and (4) 'fast and frugal' habits of reasoning, which steer time-pressed academics towards poorly integrated decisions and unsustainable positions” (Gale et al., 2015, p. 248)

Some scholars (Blättel-Mink & Kastenholz, 2005; Hegarty, 2008) make a point to encourage others not to misjudge the magnitude of the challenge of embedding sustainability in HE.

EfS In HE – A Framework to Navigate Challenges

The literature outlines significant hurdles facing the implementation of an EfS framework within HE. At the same time, the literature also identifies the generative nature of EfS as a way to navigate a contested and tension-filled educational landscape. One lens to look through is that the solution is within the problem. Lozano et al. (2013, p. 5) use the term "Golden Thread" to describe the potential of sustainability-focused education to unite university systems to create a framework that balances ecology and anthropological needs. Many scholars see the potential and have developed proposals to plot a course through the HE EfS landscape to better align the systems that operate within HE institutions (Gale et al., 2015).

By viewing the issue of HE EfS through the lens of taking advantage of already valued and accepted educational norms, some scholars see a viable path forward for EfS in HE. Other scholars point out that key 'sustainability competencies' such as critical thinking are already deeply embedded in HE and through the alignment of critical thinking with sustainability topics, positive traction and momentum occur for 'sustainability competencies' (Shephard et al., 2021). Using the critical thinking avenue seems to offer a way to circumnavigate the pedagogical impediments EfS encounters. Thus, allowing for the grand issues of ecological and anthropological sustainability to be divided so that addressing the various issues can fit into conventional classrooms and curriculums (Buckley, 2019).

Another example the literature highlights of how scholars are approaching EfS is what Buckley (2019, p. 980) refers to as the "typology of EfS courses." The 'typology of EfS courses' is used to distinguish the role sustainability plays in the course. One end of the typology continuum is "supplemental," which captures courses that include sustainability in the

curriculum but are not the class's central outcome. These courses can exist with or without sustainability as part of the content. 'Supplemental' courses also present examples of instructors who are "teaching beyond content" by bringing sustainability concepts into other subjects, which is the cross-discipline nature of EfS (Buckley, 2019, p. 973). At the other end of the continuum of the typology are courses known as "fundamental courses" these courses have sustainability as the core outcome of the course (Buckley, 2019, p. 980). These courses hold sustainability at the core of the curriculum, and thus without it, the course will not exist.

EfS In HE – An Educator's Perspective

In the literature examining the perspective of teacher experience of EfS, the theme of identity is examined (Buckley, 2019; Lundegård & Wickman, 2009; Villanen, 2014). There seem to be two sub-themes within the lens of identity. One of the themes connects previous experiences of being exposed to or involved with sustainable activities to their current role of teaching EfS. From those formative experiences, individuals developed "a personal commitment" that is identified as a "key driver" in their involvement with EfS (Buckley, 2019, p. 979). The second theme is the impact on EfS scholars' identity by operating in a contested and nebulous area such as EfS. Traditionally in HE, entrenched systems and structures shape a scholar's identity and status based on the level of knowledge they demonstrate and achieve in a specific field of study. The model of identity formation based on these established traditions may impact the EfS scholar's identity if their knowledge does not translate or fit into established HE norms (Hegarty, 2008). A gap in the literature exist around the experiences of HE teachers instructing 'fundamental' EfS courses faculty at a land grant university.

METHODOLOGY

A social constructivism paradigm guided this qualitative case study exploring and describing the lived experiences of a sample (n=4) of current MSU teaching faculty who teach ‘fundamental’ EfS courses. The case study approach allows for the "exploring a real-life, contemporary bounded system (a case) or multiple bounded systems (cases)" of the intersection of education and sustainability at MSU in 2021/2022 (Creswell & Poth, 2018, p. 98). A *collective case study* approach was employed as the researcher selected "multiple cases to show different perspectives on the issue" (Creswell & Poth, 2018, p. 99). The specific ‘fundamental’ EfS course type creates the boundaries for the case study.

Research Methodology

There is a direct connection between the lived experience of MSU teaching faculty instructing ‘fundamental’ EfS courses and the contemporary context of MSU in 2021/2022, and thus a case study research model was chosen (Miles, 1994; Mills & Gay, 2019; Yin, 2014). As the case study design is "an all-encompassing research method," it can at the same time be "difficult to grasp" (Mills & Gay, 2019, p. 404). By acknowledging the challenge of grasping the fundamentals of case study design, the author takes responsibility for the 'choice' of the research area and any unintended departures from the tenets of case study research (Creswell & Poth, 2018; Mills & Gay, 2019; Stake, 2005). The "tangible and illuminative" qualities of a case study are aligned with the desire of the researcher to serve the profession and the professionals within

education in shining a light on the teacher experience of those who are navigating the intersection of education and sustainability at MSU (Mills & Gay, 2019, p. 404).

The identification of faculty began with not seeking an individual. Instead, the process began with finding courses aligned with the ‘fundamental’ EfS course description. A distinction here is that many MSU teaching faculty may have a high level of skills, experience, and knowledge of sustainability, but if they do not currently teach a ‘fundamental’ aligned EfS course, they do not fit within the boundaries of this research project. Thus, the ‘fundamental’ EfS course type is central in defining the cases for this case study. The course type established as the guiding research boundary led the researcher to a list of associated faculty to contact and extend an invitation to participate in the research.

Site selection (context for the study), Sample, and Sampling Procedures

As clearly stated in the title of this study, the site selected is Montana State University (MSU), a large public institution of higher education located in Bozeman, MT, in the western USA. The research is only descriptive of the MSU Bozeman campus due to its existing sustainability framework and extensive educational and research offerings. Nonprobability sampling was used in this case study of MSU as it promoted the opportunity to pursue a purposeful sample (Merriam, 2009). Also, as a graduate student during the Covid-19 pandemic, there were numerous limitations and practicalities that needed to be balanced to complete this thesis, and MSU as a setting provided various opportunities to navigate many of those issues.

Finding courses that fit into the ‘fundamental’ category of having "sustainability (as) the main topic of a course" began by searching the MSU website for courses that may fit into this

classification (Buckley, 2019, p. 980). Through an 'All' search of 'sustainability courses' on the MSU website, two links provided lists of courses to investigate:

- The "Sustainability Studies & Environmental Stewardship in Liberal Studies" page outlines a minor offering with the same name.
<https://www.montana.edu/liberalstudies/sustainabilitystudies.html>
- "Classes" page within the Office of Sustainability- Sustainability in Academics section.
<https://www.montana.edu/sustainability/teaching/classes.html>

Although there is a cross-over between the lists, the lists are not the same. The Liberal Studies *Sustainability Studies & Environmental Stewardship Minor* list has seventy-six courses listed. There is a list of thirty-five courses on the Office of Sustainability *Classes* page. There are ninety-nine unique courses between the two lists, with twelve courses shared across both lists. With these two established course lists, the investigation can focus on the research questions for this case study and not on the justification of why or why not a course is on a list.

Once the list of ninety-nine unique courses was established, evaluation of the courses based on their title and course description began to determine if they fit into the 'fundamental' EfS course type. Starting with an assessment of the course titles with the words 'sustainability,' 'sustainable,' or 'sustain.' From the lists of ninety-nine, there are thirteen unique course titles with either 'sustainability,' 'sustainable,' or 'sustain' as part of the title. The Liberal Studies and Office of Sustainability lists share eight of those thirteen unique course titles. The inclusion or variation of the word 'sustainability' in the course title guided the sampling process to clarify and maintain the sampling procedure. The researcher wishes to acknowledge that the more extensive list of ninety-nine and the smaller list of thirteen undergraduate courses with either

‘sustainability,’ ‘sustainable,’ or ‘sustain’ represents a snapshot in time of sustainability aligned courses at MSU to the best of their knowledge.

After establishing the list of thirteen unique sustainability courses, the next step was to review the course descriptions listed on the MSU catalog to assess what course fits into the ‘fundamental’ course type. Course descriptions were reviewed and assessed based on the inclusion of a variation of the word ‘sustainability’ and the examination of sustainability through a historical, introductory, ethical, exploratory, or interdisciplinary lens. Seven of the thirteen courses were good representations of ‘fundamental’ EfS courses. Of those seven courses, four (n=4) teaching faculty accepted my invitation to participate in my research. Three of the four courses are on both the Liberal Studies minor and Office of Sustainability course lists. One is listed only on the Liberal Studies Sustainability Studies & Environmental Stewardship Minor. In the research sample (n=4), there are two 100 level courses, one 200 level course, and one 400 level course. Sharing more details regarding the courses or research participants will not occur to promote anonymity for the research participants. It was acknowledged in the Informed Consent to the research participants that readers could infer information from the details contained in the study. Thus, the researcher wishes to respect this agreement by omitting other more specific details that may lead to identification.

Table 1

Sample Pseudonyms and Descriptors

Participant Pseudonyms	Tenured	Course Level	Course Identification Code for Research
Pat	No	100	P111
Chris	No	100	C122

Table 1 Continued

Jess	Yes	200	J211
Sam	No	400	S411

Data Collection

Data acquisition occurred through interviews, course syllabi, course observations, and a one-question open-ended survey of students. The interviews with the research participants are the primary data source as the teachers described their experiences in their own words. The syllabi were used to examine how the teachers' experiences and knowledge of sustainability manifest in the course materials. Focusing on how the faculty's experiences translate in a classroom setting is the reason for the class observations.

The interview format was in person, except for one, and each participant was interviewed twice. Semi-structured open-ended questions explicitly developed for this study were used. Unscripted questions were also used to promote a deeper exploration of the subject's responses. For the first interview, a protocol was used (Appendix B). Participants were asked to sign an informed consent prior to the first interview. The interviews were recorded and retained for transcription and data analysis.

Following the conclusion of the first interviews, the course syllabi for the 'fundamental' EfS courses were collected. The course syllabi were retained to promote a deeper understanding as "one source of data is typically not enough to develop this in-depth understanding" (Creswell & Poth, 2018, p. 98). Reviewing each syllabus prior to the second interview allowed the researcher to ask specific questions about the content of their specific syllabi to further the

descriptions of the participants' lived experiences. The second interview did not use a protocol as questions varied based on the syllabuses and the first interview. Following the second interview, planning was put in place for the researcher to join a class and observe the course in person. Three out of the four courses occur in person, and observations occurred in the courses classrooms. The fourth course is an asynchronous online course, and an observation or student survey did not occur for this course. A conversation around the logistics and practicalities of surveying students using one open-ended question about their motivation for taking the course occurred during and after the second interview. The class observations, student surveys, course artifacts, and interviews improved data triangulation to create a deeper and richer description of the faculties' lived experiences and their courses.

Data Analysis

The transcripts of the interviews, course syllabi, class observation notes, and student survey results were first organized into files to promote sound data management strategies that will not hinder the data analysis. Following the data organization step, the reading and memoing process began to develop "a sense of the data as a whole without getting caught up in the details of coding" (Creswell & Poth, 2018, p. 188). Following the reading and memoing steps of the 'data analysis spiral,' the process of coding using emergent themes began. Memoing and ongoing updates to the coding took place throughout the reading and analysis of the data. As the research design incorporates multiple cases, the researcher first completed a "within-case analysis" to create a "detailed description of each case and themes within the case" (Creswell & Poth, 2018, p. 100). Following the *within-case analysis* step, a "thematic analysis across the cases" or "cross-case analysis" was completed (Creswell & Poth, 2018, p. 100). "In a multiple

case study, a within-case analysis is followed by a cross-case analysis" (Merriam, 2009, p. 205). During the *cross-case analysis* step of the research, shared and divergent themes were looked for in the coding process (Maxwell, 2012).

Methods of Achieving Trustworthiness, Credibility, and Transferability:

Several techniques were used to establish trustworthiness and ‘increase’ the credibility and consistency of the study findings (Merriam, 2009, p. 215). The researcher used data triangulation (interviews, course syllabi, observations, and survey results), member checking, thick descriptions of cases, and positionality statements to establish a scholarly approach to the data analysis process to create transparency of the chosen methodology. Promoting repeatability beyond the study's research methodology is not the intent of this qualitative study. Rather, the focus is on "whether the results are consistent with the data collected" (Merriam, 2009, p. 221).

Role of Researcher (positionality/reflexivity):

I am a former K – 12 classroom teacher who spent most of my career teaching in Australia at a private school in a department that aimed to promote a sustainable future. Thus, I have experienced the phenomena of teaching classes aligned with ‘fundamental’ EfS course types. My experience with EfS courses is within the K-12 levels at this point in my career. A reason for pursuing research in EfS comes from my personal experience of developing pedagogical approaches to EfS within the context of MLC Marshmead. Since the start of my time working at MLC Marshmead, I was aware of both the exclusivity and uniqueness of the campus and have desired to explore sustainability education in a more conventional setting. A driver of this desire comes from my aspiration to help embed EfS pedagogy across education at all levels.

Through all aspects of the research process, I have to be conscious of how my own bias show up throughout the research process and manage them in a scholarly manner in how I interact with my research participants and analyze the data I collect.

Research Questions Restated

R.Q.: What are the experiences, beliefs, and practices of MSU teaching faculty involved in teaching EfS courses?

Sub questions:

- 1: What lived experiences have shaped the faculty's beliefs and practices of teaching EfS courses?
- 2: How do the beliefs of EfS teaching faculty manifest in the content and teaching strategies of their EfS courses?
- 3: How do the interests of students in EfS courses align with the instructional faculty and the course content?

RESULTS

Individual Subjects Vignettes

Prior to addressing the formal findings of this research, the chapter will begin with short vignettes about each research participant. The vignettes allow these accomplished educators to introduce themselves to the reader as a way to illuminate the idiosyncrasies of their lived EfS experiences. Starting chapter four with these short stories endeavors to promote the reader's relationship with their beliefs, experiences, and actions to begin. Thus, when the research questions are addressed later in the chapter, the reader's prior knowledge of the individuals will encourage a sharper illumination of the findings.

Pat

Pat has lived with the ‘super wicked’ nature of studying sustainability for decades. Their excitement for how to solve the contested nature of sustainability began with youthful energy and diligent dedication. Their perspective has shifted through purposeful education, professional work outside of academia, and other personal experiences. Gone is the naiveté of their youth. However, their dedication is still strong, although with a different lens. The maturity of their point of view now features an intrapersonal lens they see as essential to staying engaged in the work required to make a meaningful and lasting impact. The struggle for Pat to keep exploring and working to improve is evident, and they passionately strive to transfer their understandings to their students.

Chris

Chris discovered the rewarding nature of working at the intersection of their two areas of study at university. Through combining their expressed values and multi-disciplinary background, they developed a worldview that has shaped their understanding and approach to EfS. Actively engaging in the interdisciplinary nature of studying sustainability is a central characteristic of their lived experience. They bring their interdisciplinary lens in how they approach EfS, endeavoring not to exclude perspectives as they work to create a comprehensive picture of the realities of sustainability for their students. Utilizing their experiences in and out of academia, they work to be a connector of ideas and people to advance sustainability.

Jess

Jess's curiosity about sustainability has been a driving force that has shaped their professional life. The alignment of their sustainability interest and their terminal degree was not in sync at a satisfying level for them. This orientation issue has been an ongoing source of both opportunity and tension for Jess. They have had pockets of support that have granted them both direction and grace in their pursuit of sharing what they know to be true about sustainability issues. Despite the latitude to build EfS courses, they have had to demonstrate and maintain a high degree of dedication to illuminating the value of a sustainability lens in a STEM field of study. A product of their lived experiences is clarity and resolve to continue to explore EfS for themselves, their area of expertise, and their students.

Sam

Sam's perspective toward sustainability does not come from a linear approach. Instead, it has formed through adventures in the practice of sustainability. Their lived experiences are from

their long history of sustainability work at the intersection of theory and the practicalities of the world. Through hands-on industry experience, Sam has learned that having a clear connection to the ‘why’ of sustainability is the best compass in navigating the ambiguous nature of sustainability work. In Sam’s EfS course, they endeavor to accurately represent the nuances of practically applying sustainability thinking in the world outside their classroom.

Findings

This study aims to shine a light on the thoughts, beliefs, and practices of faculty teaching ‘fundamental’ EfS courses at MSU. Through data triangulation (interviews, course material, observations, and student surveys), deductive analysis drove the coding and emergent theme identification process. A "first cycle coding" approach was adopted while reviewing each case’s data for the first time (Saldaña, 2013, p. 58). Using a descriptive lens to complete the ‘first cycle’ encouraged the “types of answers” needed to address the epistemological framing of the research (Saldaña, 2013, p. 61). Throughout the ‘first cycle’ and into the “second cycle coding,” categories of themes were recoded to distill the codes into four themes (Saldaña, 2013, p. 207).

The four emergent themes shared across the cases of study are *latent complexity of EfS*, *personal commitment to EfS content*, *inclusive scholarship*, and *adaptability of EfS courses*.

There are distinguishing qualities about each of these themes. However, the themes are also not independent from each other.

RQ #1 - What lived experiences have shaped the faculty's beliefs and practices of teaching EfS courses?

Latent Complexity of EfS

Pat- “A gateway to the study of sustainability with all its complexities and all its controversies.”

The above excerpt from Pat’s P111 syllabus creates a visual geared towards stepping into the multifaceted thinking that is their understanding of sustainability. As a part-time non-tenured tracked instructor, they bring a perspective within and external to academia. Their experience in the study of sustainability is grounded in their two graduate degrees that both have a sustainability focus. Despite the depth of their training, they shared that “[They] feel like an environmental hypocrite because I do this for a living, and I still can't get it right.” The tension that shapes their thinking is also evident in quote number one in Table 2, where they share that despite being “militant,” the impact of their behaviors is negligible. Pat also introduces the idea of EfS as an “ongoing process” in their second quote in Table 2.

“I feel really mean because I break the news that whether or not they [students] are vegan and whether or not they use single-use coffee cups doesn't really matter in the big scheme of things.” This quote illuminates how they do not want their students to miss a central understanding of sustainability they have experienced. The third quote in Table 2 describes a strategy they use to introduce sustainability's complicated and ambiguous nature.

Chris - “I feel like this is perpetually changing. It's so abstract that it's difficult to convey.”

Chris prioritizes studying sustainability as an interconnected and dense concept on day one of their C122 course. By exploring ‘systems thinking’ in the first class of the semester, they

set the lens through which the course will examine sustainability in the context of the subject area. As a full-time non-tenured staff member, they have an extended history of teaching their course. A significant source of their knowledge and training derives from a biology degree and a nutrition science degree. Combining those two areas of study and personal interest led them to the program they work in today. Their time at MSU also includes a five-year hiatus from teaching and academia to work as a deputy director of a national non-profit in their area of study. Today they are a “hub” for the interdisciplinary sustainability program in which they work. They point to this time away from MSU as generating a new capacity to “navigate across” “siloes departments” that exist at MSU as a HE institution.

To address the interconnected nature of sustainability as they know it to be, they share, “I start with the big picture and just frame out that this is why we even are talking about food systems. And honestly, now it really is a major issue of how do we feed a growing population without killing the planet.”

Jess - In a class observation, Jess was discussing data on an infographic about the carbon cycle, and they discussed the “hidden nature” of sustainability issues with their students.

Jess’s syllabus outlines that their course J211 will focus on “contemporary and often contentious issues” relating to technologies, policies, regulations, and economic forces driving the human behaviors that are creating planetary “challenges for human society.” As a tenured faculty member, they openly share how their “position of power” (Table 2) at MSU has granted them opportunities to explore EfS in a STEM program in a manner other faculty may not be able to. Although they have had a lengthy interest in sustainability topics, their degrees and training

did not have an associated sustainability lens directly connected to the programs of study. They identify that a transformative period in their understanding of EfS has been over the past decade through professional development and “teaching scholarship around these endeavors.” Their EfS knowledge and experiences are rooted in their teaching experience and advocating for the inclusion of EfS at MSU. The following quote highlights their beliefs about instructing an EfS course. “We are going to cover the broad range of sustainability, which is not just energy issues, it's social issues and interpersonal violence.”

Sam - “We are not dealing with issues that have clear-cut answers, nor are we dealing with a static, easily defined topic.”

The complexity of Sam’s sustainability understanding is communicated to students as part of their earliest interactions together in a welcome letter to S411. Sam is a part-time non-tenured instructor who holds a full-time non-teaching position at MSU. Their sustainability experience is grounded in the practical application of sustainability principles in industry settings for over thirty years. Three decades ago, the program that greatly influenced their sustainability path was a nine-month technical solar training program. Their degree is not directly associated with the department in which they teach. Sam brings their “hands-on field experience” to a formal academic setting in a way that highlights the journey of their lived experience. Sam highlights that their course is about “working together” as a class and that “the shared journey is harder.”

Another aspect of the complexity they know to be true is the error of seeking “perfection” by students in academics, see Table 2. To expose the students to this type of thinking, they share

in the course welcome letter that “there are no mistakes in this class and no penalty for thinking in ways that miss the mark. In fact, you are encouraged to ‘make mistakes’ on your way to clear outcomes.”

Table 2

Quotes - Latent Complexity of EfS

Participant	Quote
Pat	#1 “I would never use a plastic straw, and I am militant about everything. Now I know that doesn't really matter. What matters is understanding the bigger systems and where there is leverage to make change. I'm trying not to completely disempower them but also help them realize that it is so much more beyond our individual actions.” #2 “Incorporating sustainability into the world is an ongoing process, something that we always have to continue to pay attention to and continually iterate because we have got all these unintended consequences that we might not think about.” #3 “I find the most complicated systems map I can come up with, and it has maybe 10,000 inputs on it. I do this to illustrate to the students how you can keep going out and out and out and making it more complicated and figuring out more things that are impacting the system, just to understand that there are no black and white answers, aside from the fact that greenhouse gases are causing climate change.”
Jess	“I'm a white, heterosexual, cisgender male. I realized the position of power that I have in that regard. The capacity, therefore, to do these types of things, I'm privileged to be able to do so. And what I have learned recently is, say, for example, female faculty colleagues or other colleagues of minority status would feel less empowered to integrate some of these things into their courses. So, I'm in a position to take more risks than other people.”

Table 2 Continued

Sam	“I presented about mistakes, and I presented about how in our culture we are so driven by what some call perfection. Particularly in an academic setting, our children and most of us are driven by some measure of success. And we seem to, maybe some of us, have a real issue with failure, and yet failure is how we often discover if we have the right attitude toward failure or what does not work. So, I have a sense around sustainability that maybe we stifle our creativity by trying to get it right.”
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These stories demonstrate the *latent complexity of EfS* as a broad theme. Examples from each participant reveal the faculty’s vision of how they accommodate the ambiguity and complexity they know to be true about sustainability in their EfS course. Each faculty member used an epistemological lens to interpret and understand sustainability. As teachers, they also demonstrated how they decoded their thinking into a pedagogical approach to their EfS course. The process of interpreting the intricacies of their lived experiences of sustainability and then translating that comprehension into a course occurred at the individual level, yet the data points to the individual instructor in the sample experienced a similar phenomenon.

RQ #2 - How do the beliefs of EfS teaching faculty manifest in the content and teaching strategies of their EfS courses?

Two themes address this research question: *personal commitment to EfS* content and *inclusive scholarship*.

Personal Commitment to EfS Content

Pat - “I went into it just so naive, like, oh, I am going to do everything that I can, and if enough of us do our part, it is going to be okay. Then I realized, wait a minute. So, you are telling me my impact is like 0.000001%. Why bother? I then got really disempowered and felt like, what's the

point? I do not want my students to get to that point because that is not going to be good for their mental health. It's also not going to help change anything in the world.”

The above quote from Pat expresses a sense of commitment towards accurately depicting the challenges of engaging in the complexity of sustainability work to their students. They also establish how repeated inaction in society towards sustainability shapes their sustainability lens. Pat actively filters the “pessimism” (Table 3) they feel about global and local sustainability action to serve the students to “empower them to be able to see where they can plug themselves in to have the most impact and not burn out.” Providing examples and promoting behaviors that encourage students to avoid ‘burnout’ in the course content is a manifestation of their lived experience studying and working in the sustainability field. In a different example where they demonstrate their duty to serve the greater good, they were asked to share a color that represents the essence of sustainability for them. They responded with, “orange is the color of no ego. I just think because there is no room for ego in this, my ego is completely irrelevant and detrimental to the conversation about whether the community can keep itself from going extinct.”

Chris - “Sustainability obviously pops as a value of mine in so much of what I do and how I look at the world.”

The quote above connects their commitment to sustainability and their engagement in their EfS course. Another example of how Chris’s dedication shows up is in the quote, “I would say it's not something I don't want to do, but it's a challenge that I face in that class. How to present, how to have hard conversations without losing anybody to sensitiveness or offending.” Combining what they value and know about sustainability guides them in having robust class discussions that include all their students’ perspectives. They acknowledge that content of the

course and the worldviews and lived experiences of her students are at times in conflict. Despite the tension that these ‘hard conversations’ can create, she also shared openly in the class observation that they “love having” all student perspectives shared as part of the class. Their promotion and engagement in discussions with others outside their worldview demonstrates the manifestation of their beliefs on how to address sustainability issues.

Jess – “I feel now not only more competent but also more obliged to do so after the scholarship that I've done.”

Jess’s sense of duty toward understanding and sharing their knowledge has been present for their entire adult life,

“Since I would say since high school, I have visualized this metaphorical train derailment with the human enterprise and have been wanting to shed light on it ever since, understand it myself, and then share how I know what I think I know about it.”

Their knowledge, experience, background, and position align in a way that grants them opportunities to act on the dedication they feel towards advocating for and teaching EfS. A story they shared that demonstrates their calling toward EfS is when the legitimacy of their course content was questioned by other faculty members (see Table 3). Jess chose to respond by actively engaging in discussions with these other faculty members to open a dialogue about their differences of opinion. The importance they place on sharing what they know to be true about sustainability also manifests in their class.

“They [students] thought that my choice of having the Voice Center [visit the class] was out of an obligation that I felt imposed upon me from the University. And the comment was something to the extent of ‘I understand that you need to do this and that it's a requirement, but it has nothing to do with sustainable energy.’ After reading that comment, I articulated in class my choice, not my obligation, to have the Voice Center present to the class. I helped them to understand the context of

why I chose to include interpersonal violence and how it is directly related to climate change and sexual reproductive rights. It also has a direct link to climate change, both in a leading and following relationship, and I also then trying to help them understand or the entire class understand that [area of study] is a professional practice governed by both legal practices as well as ethical value systems.”

Sam - “What that [teaching an EfS course] requires of me is to, this is kind of a vulnerable statement, but I'll make it. It requires me to get out of my own way.”

Sam’s commitment to EfS is a combination of the enthusiasm they feel and the practical knowledge they possess. The source of the duty Sam feels comes from their deep interest and dedication to EfS. The quote “I was excited about teaching the class, and I wanted to convey that to the students” shows their interest. Their devotion to including relevant content that accurately represents their authentic experience working in the sustainability field occurred during a class observation. Sam openly shared with the class about errors made in previous field-based sustainability work to model learning from mistakes. They demonstrate their commitment level through their willingness to enter a state of being ‘vulnerable’ to serve their EfS course.

Table 3

Quotes - Personal Commitment to EfS Content

Participant	Quote
Pat	“I'm watching everything going on at Cop 26 (The 2021 United Nations Climate Change Conference), and I've seen this movie before. We know how it ends. So, I'm trying to keep my pessimism out of the classroom and just share factual information and empower them to be able to see where they can plug themselves in to have the most impact and not burn out.”

Table 3 Continued

Jess	“Other faculty members emailing me [Jess] and copying supervisors on the illegitimacy of the course content or of other things. And again, because of my position of power, I felt empowered to invite these individuals out to lunch and chat through these differences and opinions that we had.”
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The theme of *personal commitment to EfS content* emphasizes the manifestation of faculty's beliefs regarding the curriculum of their EfS course. Research participants demonstrated a sense of duty to represent sustainability in a way that is aligned with what they know to be true. The choice to accept this calling occurred irrespective of the idiosyncratic tension they associate with teaching an EfS course.

Inclusive Scholarship

Pat – “I essentially redo the course every year based on what I've learned over the last year where we are in climate action, technology, etc.”

The above quote displays their approach to advancing their understanding of sustainability. Pat models this continuing attitude towards learning to the students in the course syllabus by sharing

“In this course, we will co-create knowledge and learning. As your instructor, I will strive to provide opportunities for you to explore questions about sustainability in concept and application, in broad and specific contexts, and to formulate your own questions and explore their possible answers with myself and your fellow classmates to further your learning and spur purposeful action.”

Another way they showed this emphasis on collaboration as a pedagogical practice is when they discussed “meeting them [students] where they are” to differentiate the content and strategies for both the individual and cohort. A specific example Pat shared that was well received by the

students is the course content and assignments on “how to take care of their nervous systems and how to take care of their mental health.” Pat believes that

“The mental health piece gets really brushed under the rug in all aspects of life, but especially in sustainability, because when we are working on these bigger systemic issues, the people that end up working in these fields tend to be people that gravitate towards looking at the greater good.”

Chris – “I update my class every year. I know instructors in other content areas that do not update their courses nearly as frequently as I do. I have to update everything regularly because the [content area] is so dynamic and changing rapidly.”

Chris demonstrates their ever-expanding understanding of sustainability in the above quote. This example displays the continuing evolution of their understanding over their professional experience. They also prioritize collaborating with students to further the development of a thick and rich collective exploration of EfS. An example that highlights this is during a class observation, she used strategies that promoted the student voice to engage in complex discussions examining the content area. On three occasions in that class observation, they created space for multiple student voices to add depth to the conversation, which is only possible when multiple worldviews are incorporated. Another way Chris promotes the integration of diverse subjects is through welcoming and inviting guest speakers into the class. The syllabus shows that they have five guest speakers invited over the semester as a strategy to expand the content shared in the course. Chris also shared that they

“have had the great fortune of having some amazing Native voices [students and staff] come into my class to talk specifically about the history of colonization and its impact on Native food systems and particularly impact on public health challenges and lack of autonomy in terms of food decision making in tribal communities.”

Jess – “I have got a long way to go to feel fully comfortable with it [Indian Education For All]. And I’m constantly challenged by colleagues both within [STEM] and in the humanities, whom I’m working with to be cautious about my approaches to avoid, say, problematic inclusion or other historicization or erasure pedagogies that might lead to those outcomes.”

Jess’s quote displays their ongoing study of sustainability issues through their active and engaged scholarship. They also acknowledge the importance of collaborating with the students and understanding their worldviews. Jess demonstrated this in a class observation where they introduced the final project for the course. They framed the project by asking the students to share “what do you see?” when examining their topic area. Jess also told the class that they “do not want to be prescriptive” to promote a sense of comfort and safety in their students exploring their thinking.

Jess’s course also includes strategies to expand the content beyond their area of expertise and the student's perspective. They do this through the inclusion of ten guest presenters. Jess explains

“We do cover a lot of [STEM] content, but we contextualize the content with the Voice Center, with social justice issues, and IEFA [Indian Education For ALL], for example. We have sustainable business professionals come into class as the environmental context of [course content area] is not always apparent in [a STEM] courses.”

Sam - “Interdisciplinary cross-pollination, I think, is so healthy because that is the way the world works.”

The above quote highlights Sam’s openness to exploring novel scholarship about sustainability. In the following example, they demonstrate their perspective through seeking new knowledge,

“I’m just learning about equity and design. It is a brand-new topic for me as of a couple of days ago. A friend of mine clued me into this idea. In my limited understanding, it is bringing everybody to the table, and wow!”

They also modeled their learning behaviors in the class observation when they shared that they were constantly “studying myself.” The emphasis on collaboration between Sam and the students is evident in the course welcome letter and in the interviews. Thus, highlighting that they “both go down that road together” in the course.

Sam demonstrates their beliefs about what to include in their course with the presence of an assignment worth five percent of their final grade exploring “integrity in practice.” Sam uses a leadership lens to “explore a new model of integrity early in the course. This [integrity] might be a key to your professional success and performance as an [professional in this area] and has many benefits in various aspects of your life.” Thus, demonstrating the diverse content, Sam believes, is a part of exploring sustainability.

Inclusive scholarship as a theme represents the research participant's beliefs about how to engage in EfS. The faculty's understanding of sustainability manifests through pedagogy and strategies that do not exclude world views, knowledge, beliefs, actions, or examples concerning sustainability.

RQ3 - How do the interests of students in EfS courses align with the instructional faculty and the course content?

Adaptability of EfS courses

Pat – “It arms students with the theoretical, methodological, and political tools to begin envisioning a sustainable future for Earth’s human and nonhuman inhabitants.”

Pat's course syllabus displays how they aim to provide the students with "tools" to serve them in their sustainability understanding. Critical thinking skills as a documented learning objective of their course is a 'tool' that they emphasize. Pat's prioritization of transferable skills outside of their EfS course represents their endeavor to align with student interests despite their worldviews. They demonstrate an understanding that the students are "searching for that path that makes sense for them and trying to find a way to essentially take these big existential crises and narrow them down enough to figure out how they can get engaged." Pat provides them an experience that will serve their engagement with sustainability on whichever level they decide.

A student survey did not occur in this course.

Chris – "The students that come into this course understand that there are really complex problems to solve and they want to learn more about it."

Chris's Student - "I hope to have a better understanding of how sustainable food can be more attainable for larger populations. I also would like to have a broader understanding of the effects of our food system in relation to climate change."

An alignment between Chris's and their students' interests is present. Chris demonstrates in the above quote their grasp that the student has an awareness of the complexity of sustainability issues. The student example from a pre-course survey represents the students' existing knowledge of how sustainability issues are interconnected and complex. Chris frames their course in the syllabus as being "interdisciplinary in nature," which represents an alignment with their students' wish for "a broader understanding" of sustainability issues.

Chris also identifies that the course serves as a practical requirement for many students. “What motivates them [students] to take the class? It is linked to the sustainability minor, and it is a requirement in [this major].” Chris shared that only about a fifth of the students must take that course as part of their program, demonstrating the varied motivations accommodated in the course's practices and content.

Jess – “They [students] want to understand how fast we are going to transition to these electric cars and these solar panels and the wind turbines.”

Jess’s Student – “I can be part of the solution.”

Jess’s syllabus lists that part of the aim of the course is “to improve critical thinking skills and encourage informed and engaged citizenship.” The above student responses to the question ‘what are your motivations for taking the course?’ align with Jess’s interest in serving students as “informed and engaged citizens.” In the student survey responses, students shared that they were motivated to transfer the content of the course to six majors and two minors other than the course’s department. One student shared, “as a business student with aspirations to own my own business, sustainability is something I knew would be incredibly helpful in the long run as it becomes more and more popular and mandated.” Another response highlighted the transferability, “as an accounting major, I thought it important to diversify my knowledge and gain more information on energy and sustainability to better prepare me for the future.”

Jess also shares an awareness that student motivations are “to fulfill a science requirement.” Students commonly identified the ‘requirement’ aspect of their reasons for taking the course. Many students balanced the necessity of taking the course with statements such as “I

need the last of my core credits, and I'm always interested in learning more about sustainability since I'd like to grow old in the same world I grew up in.”

Sam – “They [students] are really not comfortable yet in pulling all of it together with a synergy.”

Sam’s Student – “I know the basics of building systems, but I would like to learn more about strategies to study and improve existing systems or develop future systems.”

There is an alignment between what Sam sees as a gap in the student experience and the student's motivation to fill that gap. A significant feature of Sam’s pedagogy is the inclusion of their field-based knowledge. The students are seeking first-hand knowledge of those types of experiences to provide them with learning that will prepare them for the context of the non-academic world. One student shared their motivation as “I hope to learn skills from this class that I may be able to apply to real applications.”

Sam also expressed on two separate occasions that they understand that their course is a requirement for graduation for the major. All the students who responded to the survey in Sam’s class acknowledged the necessary nature of the course.

The theme of *adaptability of EfS courses* represents how faculty construct their courses to make the learning transferable to the students’ lives beyond the course. The knowledge and lived experiences of the teaching faculty shape their understanding of how to connect EfS objectives with student motivations for taking the course. The faculty identified that students are interested in exploring sustainability more deeply to promote self-efficacy. Faculty also express an awareness of the practical nature the courses serve in meeting the requirements of programs of

study. Student responses to one open-ended survey question demonstrate an alignment between the research participants and their students' vision of the courses. Students want to both meet the requirements of their degree program and at the same study sustainability issues.

Summary of Results

Asking questions that examine the lived experiences of EfS faculty works to shed light on how their thinking, course design, and pedagogies manifest in the effort to coordinate their understanding of sustainability with the desires of their students. *Latent complexity of EfS* as a theme distinguishes the reflections of the research participants and how their lived experiences shape their EfS courses. *Personal commitment to EfS content* encapsulates the faculty's dedication to accurately representing sustainability in their teaching. *Inclusive scholarship* describes the social constructivism paradigm displayed in the studied 'fundamental' EfS courses. *The adaptability of EfS courses* illuminates a design characteristic used by faculty to accommodate diverse students' motivations for taking the 'fundamental' EfS class.

DISCUSSION

Vignette of Author

In many ways, I stumbled into discovering my commitment to EfS and desire to understand EfS. Having completed this study, I can connect episodes of my lived experience to the EfS phenomena. The eco-centric lens was nurtured through completing an Earth Science minor at MSU and working as an instructor for the National Outdoor Leadership School (NOLS). These examples are manifestations of the desire to appreciate and experience the grandeur of the natural environment. The anthropocentric lens matured through my major in Social Studies Broadfield, which prompted me to study and teach various social sciences. At the time, I did not realize, nor could I have articulated, that I was innately trying to connect and balance the eco-centric and anthropologic lens regarding sustainability. I now have new knowledge that shines a different light on my background, which helps me better understand the underlying tension and complexity that is a distinguishing characteristic of EfS. Although my major and minor at MSU represent the eco-centric and anthropologic lenses, the reality of teaching and living in three different countries led me to the defining EfS experience, teaching at MLC Marshmead in Australia, which in turn led me to this research topic for my master's thesis. My EfS story is not linear, nor are those of the research participants, nor is the story of EfS at MSU.

Discussion

Education focused on sustainability, whether it is Environmental Education (EE), Education for Sustainable Development (ESD), or EfS, is defined by contentious and awkward

interpretations of the meaning of sustainability (Christie et al., 2015; Cotton et al., 2007; Dunkley, 2013; Huckle & Sterling, 1996; Littledyke & Manolas, 2010; Ryan & Tilbury, 2013; Vaughter et al., 2013; Wood et al., 2016; Wright & Horst, 2013). The evolution of EE, ESD, and EfS over the previous decades has advanced the knowledge of sustainability, yet many difficulties continue to face the application of this understanding. A chapter of this story is understanding the lived experience of teachers engaged in teaching about sustainability. By asking the question, ‘what are the lived experiences of these instructors?’ a learning opportunity is created.

EfS is a "critical and transformative" education model that allows for the inclusion of diverse "technologies, forms of social organization, and models of development and ideas, values" to encourage students to think critically about the implications of their actions on themselves, others, and the natural world. (Huckle & Sterling, 1996, p. xxiii). This case study aims to understand EfS as experienced and practiced by four faculty members at Montana State University who teach EfS courses. There are, of course, limitations to the value of these results for MSU and the practice of EfS. The research design, methodology, skill of the researcher, actualities of implementing a plan, and the skewed balance of the four commonplaces of education stand out as acknowledged limitations.

RQ #1- What lived experiences have shaped the faculty's beliefs and practices of teaching EfS courses?

The findings point to the research participants having their own sophisticated stories surrounding their thinking and approach to EfS. Although their stories are idiosyncratic, the impact of personal and professional experiences of sustainability is evident in their courses. The faculty have a shared vision of building awareness in their students of the challenges of engaging

in sustainability work and thinking. *The latent complexity of EfS* as a finding is not surprising as the literature is extensive surrounding the struggle to define sustainability. Although not unexpected, this finding is important to acknowledge and validate the experiences faculty have in illuminating the diverse characteristics of EfS (Gale et al., 2015; Hegarty, 2008; Wals, 2010). Recognition of the *latent complexity of EfS* as a quality of instructing EfS courses by both teaching faculty and university administrators will be a productive step in continuing the evolution of EfS at MSU. An aspect of that evolution includes preparing instructors of EfS through professional development to better serve the advancement of EfS, MSU's Land Grant Mission, and the students who will apply their EfS learning in Montana and beyond (Gale et al., 2015).

RQ #2 - How do the beliefs of EfS teaching faculty manifest in the content and teaching strategies of their EfS courses?

Personal commitment to EfS content and *Inclusive scholarship* as themes in the data describe the social constructivism nature of the sample studied. The data offers an insight into the motivation faculty have in navigating the complexity of EfS. Adopting *inclusive scholarship* practices demonstrates the faculty's dedication to addressing the density of EfS. Their sophisticated understanding of what they know to be true about sustainability guides them in creating rich course content. A commitment to include diverse contexts, examples, and worldviews in their courses represents a primary belief the faculty have towards sustainability. It is apparent in the data that the research participants have clarity of the purpose and value those diverse additions in their courses. The clear intent and ability to justify the diverse content sets the scene for exploring the topics using a critical thinking lens. The literature points to critical thinking skills as a foundational and productive approach to EfS (Buckley, 2019; Gale et al.,

2015; Lozano et al., 2013; Shephard et al., 2021). The emphasis on critical thinking in EfS is a constructive way to approach sustainability issues and is less likely to create a sense of indoctrination that the literature highlights as a risk (Hegarty, 2008). The faculty work toward illuminating the generative nature of EfS to promote meaningful engagement in the students. Without a deep personal connection to the complexity of EfS, their attempts to use inclusive practices may not productively serve the desired intent of EfS.

The literature cautions that although there may be "aspirations of academics and managers," their commitment is "not enough to drive a transition to sustainability" (Gale et al., 2015, p. 258). Although the faculty's calling to serve their EfS courses might not be 'enough' on its own, in the context of their agency, they are serving EfS at MSU. The question of 'what is enough?' is beyond the scope of this research and alludes to the 'wicked' and 'super wicked' nature of sustainability. Instead of trying to define or label 'enough' in the context of EfS at MSU, a different type of thinking can be adopted to ask 'how can the knowledge, experiences, and commitment of current EfS faculty be capitalized on to inform what is next for EfS at MSU?.'

RQ # 3 - How do the interests of students in EfS courses align with the instructional faculty and the course content?

The data illuminates that the faculty understand that the students have two dominant reasons for taking their EfS course. One is personal motivation, and the other is the required nature of the course on some level. Faculty accommodate these distinct motivations by structuring their courses as an invitation to extend the students thinking regardless of where their interests originate. The research participants lived experiences have shaped their understanding that for the students to engage in the issue of sustainability deeply, they must do so in their own

way. To promote connections that serve students on an individual level, each faculty brought the idea of adaptation to their courses. This adaptation is in the form of welcoming and encouraging their students to elicit a personal understanding of sustainability based on the content of the course and in a way that fits their motivations for taking the course.

The theme of *adaptability of EfS courses* is a goal the faculty have for their EfS courses and how their courses accommodate the students' motivations. Despite what appears to be no significant coordination or collaboration between these instructors, they all have what seems to be a similar approach in how they address their students' desires. This approach appears to adjust to the students who are actively seeking and those who are passively seeking an EfS course.

Implications and the Future

Chris – “There's no silver bullet. You [students] need to think in terms of silver buckshot.”

Sustainability is known to be problematic to define, understand, and study. The awkwardness of EfS is amplified in HE due to the “disciplinary contestation,” “institutional fragmentation,” “economic globalisations[sic],” and “fast and frugal habits” of faculty are known to be a central challenge for EfS in HE (Gale et al., 2015, p. 248). Irrespective of the level of engagement individuals and institutions of higher education display, these known challenges will not disappear. Combining the inventory of ‘fundamental’ EfS courses currently at MSU with the description of the EfS faculty’s thoughts, beliefs, and actions offers a useful reflection for MSU. How or even if this reflection of EfS is used will be part of the EfS story at MSU.

As both the content and context of EfS at MSU are so complex, there are many questions on offer to explore further. Numerous questions also align with Schwab’s (1973) four

commonplaces of education. Through the governance lens, further explorations of the alignment of EfS and the land grant mission is a research area to continue to investigate. A parallel study examining the experiences, beliefs, and practices of ‘supplemental’ EfS course instructors is a logical progression from the teacher's lens. A student-centered lens can focus on exploring how students’ sustainability prior knowledge is evolving. A question through a curriculum lens can ask to what extent is EfS content reaching the broader MSU student population. Determining what is next for EfS at MSU is connected to the questions MSU is willing to ask.

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APPENDICES

APPENDIX A

INTERVIEW PROTOCOL (FIRST INTERVIEW)

Interview XXXX – Course XXXX

- I am most curious about your teaching experiences at MSU. Can you please share the story of how and why you came to teach XXXX?
- Can you please tell me about your course?
- In what ways does your personal experience in sustainability shape how you teach your course?
- What do you value the most about teaching this course?
- Based on the Thinking Routine developed by the Harvard Graduate School of Education: What color comes to mind when thinking of teaching your sustainability course? Why did you pick that color(Ritchhart, 2011)?
- The literature tells us that there are many inhibitors to sustainability education in Higher Education (HE). What one roadblock at MSU do you spend the most time navigating in relation to this course?
- In what ways does the mission of MSU as a Land Grant University show up in your course?
- In thinking about teaching your sustainability course, what is one thing you wish you would never have to do ever again?
- What is your one wish for the future of sustainability education at MSU?

A THINKING ROUTINE FROM PROJECT ZERO, HARVARD GRADUATE SCHOOL OF EDUCATION

Color, Symbol, Image

A routine for distilling the essence of ideas non-verbally.

As you are reading, listening, or watching, make note of things that you find interesting, important, or insightful. When you finish:

- Choose a **color** that you feel best represents or captures the essence of a key idea.
- Choose a **symbol** that you feel best represents or captures the essence of a key idea.
- Choose an **image** that you feel best represents or captures the essence of a key idea.

With a partner or group, first share your color and then share the item from your reading that it represents. Tell why you chose that colour as a representation of that idea. Repeat the sharing process until every member of the group has shared his or her Color, Symbol, and Image.

Purpose: What kind of thinking does this routine encourage?

This routine asks students to identify and distill the essence of ideas from reading, watching, or listening in non-verbal ways by using a color, symbol, or image to represent the ideas.

Application: When and where can I use it?

This routine can be used to enhance comprehension of reading, watching, or listening. It can also be used as a reflection on previous events or learnings. It is helpful if students have had some previous experience with highlighting texts for important ideas, connections, or events. The synthesis happens as students select a color, symbol, and image to represent three important ideas. This routine also facilitates the discussion of a text or event as students share their colors, symbols, and images.

Launch: What are some tips for starting and using this routine?

After the class has read a text, you might ask the class to identify some of the interesting, important, or insightful ideas from the text and list these on the board. Write CSI: Color, Symbol, Image on the board. Select one of the ideas the class has identified. Ask students, what color might they use to represent the essence of that idea. What color captures something about that idea, maybe it is the mood or tone. Select another idea and ask the class what symbol they could use to represent that idea. *You might define a symbol as a simple line representation or uncomplicated drawing, such as two crossed lines to denote an intersection of ideas, or a circle to represent wholeness or completeness.* Then pick another idea from the list and ask students what image they might use to represent that idea. *You might define an image as a visual image or metaphor that is more complex and fully developed than just a symbol.*

Share your experience with this thinking routine on social media using the hashtags #PZThinkingRoutines and #ColorSymbolImage.



This thinking routine was developed as part of the Cultures of Thinking project at Project Zero, Harvard Graduate School of Education.

Explore more Thinking Routines at pz.harvard.edu/thinking-routines

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APPENDIX B

MEMBER CHECKED DATA

The data is displayed by where it was collected from.

Syllabus for Course P111

- “A gateway to the study of sustainability with all its complexities and all its controversies.”
- “In this course, we will co-create knowledge and learning. As your instructor, I will strive to provide opportunities for you to explore questions about sustainability in concept and application, in broad and specific contexts, and to formulate your own questions and explore their possible answers with myself and your fellow classmates to further your learning and spur purposeful action.”
- “It arms students with the theoretical, methodological, and political tools to begin envisioning a sustainable future for Earth’s human and nonhuman inhabitants.”

Interviews

- “I feel like an environmental hypocrite because I do this for a living, and I still can't get it right.”
- “I would never use a plastic straw, and I am militant about everything. Now I know that doesn't really matter. What matters is understanding the bigger systems and where there is leverage to make change. I'm trying not to completely disempower them [students] but also help them realize that it is so much more beyond our individual actions.”

- “I feel really mean because I break the news that whether or not they [students] are vegan and whether or not they use single-use coffee cups doesn't really matter in the big scheme of things.”
- “Incorporating sustainability into the world is an ongoing process. We always have to continue to pay attention to and continually iterate because we have got all these unintended consequences that we might not think about.”
- “I find the most complicated systems map I can come up with, and it has maybe 10,000 inputs on it. I do this to illustrate to the students how you can keep going out and out and out and making it more complicated. This way, they can figure out on their own the connections and the things that are impacting the system. I do this just to help them understand that there are no black and white answers, aside from the fact that greenhouse gases are causing climate change.”
- “I went into it just so naive, I will do everything that I can, and if enough of us do our part, it will be okay. Then I realized, wait a minute. You are telling me my impact is like 0.000001%. Why bother? I then got really disempowered and felt like, what's the point? I do not want my students to get to that point because that is not going to be good for their mental health. It's also not going to help change anything in the world.”
- “I'm watching everything going on at COP 26, and I've seen this movie before. We know how it ends. So, I'm trying to keep my pessimism out of the classroom and just share factual information and empower them to see where they can plug themselves in to have the most impact and not burn out.”

- “I just think because there is no room for ego in this, my ego is completely irrelevant and detrimental to the conversation about whether the community can keep itself from going extinct.”
- “I essentially redo the course every year based on what I've learned over the last year regarding climate action, technology, etc.”
- “Meeting them [students] where they are.”
- “How to take care of their nervous systems and how to take care of their mental health.”
- “The mental health piece gets really brushed under the rug in all aspects of life, but especially in sustainability, because when we are working on these bigger systemic issues, the people that end up working in these fields tend to be people that gravitate towards looking at the greater good.”
- “Searching for that path that makes sense for them and trying to find a way to essentially take these big existential crises and narrow them down enough to figure out how they can get engaged.”

The data is displayed by where it was collected from.

Syllabus –

- Systems thinking is introduced on the first day of the semester.
- They frame their course in the syllabus as “interdisciplinary in nature.”

Class Observation –

- On three occasions in that class observation, they created space for multiple student voices to add depth to the conversation that is only possible when multiple world views are incorporated.
- They shared openly in the class observation that they “love having” all student perspectives shared as part of the class.

Interview –

- “I feel like this is perpetually changing. It's so abstract that it's difficult to convey.”
- Points to this time away from MSU as generating a new capacity to “navigate across” “siloes departments” that exist at MSU.
- “I start with the big picture and just frame out that this is why we even are talking about food systems. And honestly, now it really is a major issue of how do we feed a growing population without killing the planet.”
- “Sustainability obviously pops as a value of mine in so much of what I do and how I look at the world.”

- “I would say it's not something I don't want to do, but it's a challenge that I face in that class. How to present and how to have hard conversations without losing anybody to sensitiveness or offending.”
- “I update my class every year. I know instructors in other content areas that do not update their courses nearly as frequently as I do. I have to update everything regularly because the [content area] is so dynamic and changing rapidly.”
- “I have had the great fortune of having some amazing Native voices [students and staff] come into my class. They talk specifically about the history of colonization and its impact on Native food systems. Their focus is particularly on the impact on public health challenges and lack of autonomy regarding food decision-making in tribal communities.”
- “The students that come into this course understand that there are really complex problems to solve and they want to learn more about it.”
- “What motivates them [students] to take the class? It is linked to the sustainability minor, and it is a requirement in [this major].” They shared that only about a fifth of the students are required to take that course as part of their program.

The data is displayed by where it was collected from.

Syllabus-

- In the syllabus, they outline that their course will focus on “contemporary and often contentious issues” relating to technologies, policies, regulations, and economic forces driving the human behaviors that are creating planetary “challenges for human society.”
- The syllabus lists that part of the aim of the course is “to improve critical thinking skills and encourage informed and engaged citizenship.”

Observation-

- In a class observation while discussing data on an infographic about the carbon cycle, and they discussed the “hidden nature” of sustainability issues.
- They framed the final project by asking the students to share “what do you see?” when examining their topic area. They also told the class that they “do not want to be prescriptive.”

Interview-

- They identify that a transformative period in their understanding of sustainability has been over the past decade through professional development and “teaching scholarship around these endeavors.”
- We are going to cover the broad range of sustainability, which is not just energy issues, it's social issues, and interpersonal violence.”

- “I’m a white, heterosexual, cisgender male. I realized the position of power that I have in that regard. The capacity, therefore, to do these types of things, I’m privileged to be able to do so. And what I have learned recently is, say, for example, female faculty colleagues or other colleagues of minority status would feel less empowered to integrate some of these things into their courses. So, I’m in a position to take more risks than other people.”
- “I feel now not only more competent but also more obliged to do so after the scholarship that I’ve done.”
- “Since I would say I was in high school, I have visualized this metaphorical train derailment with the human enterprise and have been wanting to shed light on it ever since, understand it myself, and then share how I know what I think I know about it.”
- “Other faculty members emailing me and copying supervisors on the illegitimacy of the course content or of other things. And again, because of my position of power, I felt empowered to invite these individuals out to lunch and chat through these differences and opinions that we had.”
- “They [students] thought that my choice of having the Voice Center [visit the class] was out of an obligation that I felt imposed upon me from the University. The comment by the student was something to the extent of ‘I understand that you need to do this and that it’s a requirement, but it has nothing to do with sustainable energy.’ After reading that comment, I articulated in class my choice, not my obligation, to have the Voice Center present to the class. I helped them to understand the context of why I chose to

include interpersonal violence and how it is directly related to climate change and sexual reproductive rights. It also has a direct link to climate change, both in a leading and following relationship, and I also then trying to help them understand or the entire class understand that [area of study] is a professional practice governed by both legal practices as well as ethical value systems.”

- “I have got a long way to go to feel fully comfortable with it [Indian Education For All]. And I'm constantly challenged by colleagues both within [STEM] and in the humanities, whom I'm working with to be cautious about my approaches to avoid, say, problematic inclusion or other historicization or erasure pedagogies that might lead to those [harmful] outcomes.”
- “We do cover a lot of [STEM] content, but we contextualize the content with the Voice Center, with social justice issues, and IEFA [Indian Education For ALL] for example. We have sustainable business professionals come into class as the environmental context of [course content area] is not always apparent in [a STEM] courses.”
- “They [students] want to understand how fast we are going to transition to these electric cars and these solar panels and the wind turbines.”
- They also share an awareness that student motivations are “to fulfill a science requirement.”

The data is displayed by where it was collected from.

Syllabus or Welcome letter-

- “We are not dealing with issues that have clear-cut answers, nor are we dealing with a static, easily defined topic.”
- “Working together” is emphasized.
- “There are no mistakes in this class and no penalty for thinking in ways that miss the mark. In fact, you are encouraged to ‘make mistakes’ on your way to clear outcomes.”
- A leadership lens is used to “explore a new model of integrity early in the course. This [integrity] might be a key to your professional success and performance as an [professional in this area] and has many benefits in various aspects of your life.”

Observation-

- They openly shared during a class observation about errors made in previous field-based sustainability work to model learning from mistakes.
- In the class observation when they shared that they were constantly “studying myself.”

Interview-

- “Hands-on field experience” of sustainability work.
- “The shared journey is harder.”
- “I presented about mistakes and about how in our culture we are so driven by what some call perfection, particularly in an academic setting. Our children and most of us are driven by some measure of success. We seem to, maybe some of us, have a real issue

with failure, and yet failure is how we often discover if we have the right attitude toward failure or what does not work. So, I have a sense around sustainability that maybe we stifle our creativity by trying to get it right.”

- “What that [teaching an EfS course] requires of me is to, this is kind of a vulnerable statement, but I'll make it. It requires me to get out of my own way.”
- “I was excited about teaching the class, and I wanted to convey that to the students.”
- “Interdisciplinary cross-pollination, I think, is so healthy because that is the way the world works.”
- “I'm just learning about equity and design. It is a brand-new topic for me as of a couple of days ago. A friend of mine clued me into this idea. In my limited understanding, it is about bringing everybody to the table, and wow!”
- “Go down that road together” in the course.
- “They [students] are really not comfortable yet pulling all of it together with a synergy.”
- They expressed on two separate occasions that they understand that their course is a requirement for the students for graduation for the major.

APPENDIX C

STUDENT SURVEY DATA CITED IN RESEARCH

Course P11 – Pat

No student data was collected from this course.

Course C122 – Chris

- “I hope to have a better understanding of how sustainable food can be more attainable for larger populations. I also would like to have a broader understanding of the effects of our food system in relation to climate change.”

Course J211 – Jess

- Student # 1 “I have been a lifelong skier and seeing the planet warming and my ski seasons becoming shorter every year is very frightening. For example, today (2/28) it is currently almost fifty degrees outside, this is very unusual for Montana in February. I figured that by educating my self on the energy uses of my self and people around me as well as the sustainability of those energy uses and sources, I can be part of the solution.”
- Student # 2 “On top of filling core credit requirements, I was motivated to take this course over others as a grasp of how energy in present in the environment and how it is sustained to preserve our earth and make for a brighter more efficient future. As a business student with aspirations to own my own business sustainability is something I knew would be incredibly helpful in the long run as it becomes more and more popular and mandated.”
- Student # 3 “I believe in being honest, therefor the main reason for me taking this course is to gain elective credits. Though this is a cut and dry answer the question I want to answer is

why I chose this course and not the other elective options. The reason why I chose this course is because I believe that climate change is a big deal and could cause some serious problems for us and for future generations. I thought this course could enlighten me about the problem and inspire me to look for solutions. As an accounting major I thought it important to diversify my knowledge and gain more information on energy and sustainability to better prepare me for the future.”

- Student #4 “I need the last of my core credits and I'm always interested in learning more about sustainability since I'd like to grow old in the same world I grew up in.”

Course S411 – Sam

- “1. It is required for graduation in my chosen degree. 2. It is an interesting topic and it is becoming more relevant in my chosen profession. I hope to learn skills from this class that I may be able to apply to real applications. 3. I know the basics of building systems but I would like to learn more about strategies to study to improve existing systems or develop future systems.”