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Cultivating Spiritual Well-Being for Sustainability: A Pilot Study

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Abstract: Sustainability science has focused predominantly on external/technological solutions to environmental degradation while giving insufficient attention to the role of spiritual well-being for holistic sustainability. While it is important for students to learn about solutions in a time where environmental problems have been identified as prevalent, that alone is not enough. We propose that sustainability may start as a deep individual internal process manifested as a change of values stemming from enhanced spiritual well-being. The current study examined whether a novel sustainability classroom curriculum, including contemplative practices (CPs), increased traits indicative of spiritual development and well-being and happiness, which are theorized to increase sustainable behavior (SB). Students attended a 15-week university course promoting SB through CPs in a space intended to be safe and supportive. Participants were compared to unenrolled peers and completed pre- and post-intervention quantitative measures of (1) happiness, (2) self-compassion, and (3) SB, and qualitative questions investigating spiritual development and well-being. Multivariate and univariate follow-up analyses indicated that course participation increased student self-compassion and happiness, while SB was unaffected. Qualitative reports indicated that CPs led students to develop spiritual traits, a systems' thinking mentality and an awareness of their interconnectedness. Students, also, assigned greater importance to spiritual well-being as a prerequisite for SB.

Keywords: spiritual well-being; happiness; sustainable behavior; contemplative practice; inner sustainability

1. Introduction

Sustainability science has focused, predominantly, on technological solutions (e.g., carbon sequestration, renewable energy, etc.) to environmental challenges while giving insufficient attention to the role of spiritual well-being for sustainability. While important, external interventions may not ensure lasting sustainability since they do little to curb environmentally compromising behavior [1–4]. We propose that environmentally compromising behavior stems from a disconnection from our spiritual dimension. As a result, sustainability science may benefit from integrating spiritual well-being, which refers to the sense of fulfillment one experiences when their spiritual needs are met, into intellectual frameworks.

Scholars have recently suggested that a fuller array of individual and group behaviors, in addition to technological advances, are needed to stem long-term environmental degradation and ensure societal longevity. For instance, one framing for approaching sustainability challenges are the sustainability competencies, which consist of "a cluster of related knowledge, skills, attitudes and values that enable a person to act effectively in a job or situation" [5] (p. 1632). The sustainability

competencies include ways of thinking—considering complex systems, anticipating future scenarios, and strategic design of concrete solutions—ways of valuing—reflection and articulation of guiding principles and goals—and ways of acting—including skillful collaboration with and motivation of diverse individuals toward a common cause [6] (Figure 1).

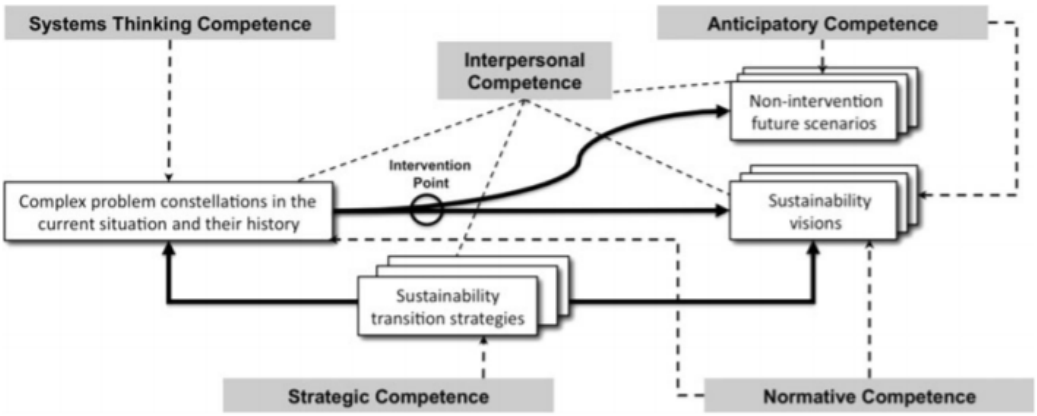

Figure 1. The five key sustainability competencies [6].

These competencies serve as an excellent framework to describe how people can engage in meaningful and effective sustainable behavior (SB). Even so, the competencies do not explicitly address why individuals adopt, or in many cases fail to adopt, motivation to engage in SB. We suggest that spiritual well-being, and one's resulting care for others and the environment, is a critical prerequisite for achieving motivation to engage in SB and that spiritual growth, combined with traditional academic learning, results in inconsistent and resilient SB. This study investigates whether spiritual growth—a process—and well-being—a state, cultivated through contemplative practices (CPs)—increase motivation to engage in SB and increase happiness even in the presence of perceived sustainability problems.

We define sustainability as "the ability of any individual, community or country to meet their needs and live happily without compromising the ability of other individuals, communities, countries and future generations to meet their needs and live happily" [7] (p. 66), acknowledging both the temporal (past-present-future), spatial (global-wide), and personal (human well-being and happiness) dimensions of sustainability goals. Regarding the latter, our use of the word happiness in this paper refers to subjective well-being or eudaimonia [8,9].

Motivation to engage in SB is likely multi-factorial with interrelated and interacting causes. In the current study, we consider this problem from the standpoint of spiritual well-being and propose that lack of motivation to act stems from a sense of separateness from the self (body, mind, and spirit), others, and the natural environment. This sense of separateness leads people to prioritize their personal comfort, stability, and goals above those of others and the environment (for more information on how people develop a sense of separateness, see [10]). We propose the expansion from an egocentric value system to one that includes the well-being of all can be achieved most directly through spiritual development and well-being. As this development occurs throughout people's lives, and a sense of connection is realized, we suggest that happiness and SB occur naturally without the need for special coercion.

Spiritual development and well-being have been defined and pursued in varied ways, shaped by culture, epoch, and individual-level preferences. Still, most authors have highlighted the integral role that CPs play in their pursuit and attainment, across culture and time [11–15]. Such practices encourage introspection [16] and may support an individual in accessing the meaning behind a problem or situation [17].

A small but growing number of sustainability scholars have addressed spirituality for the goal of fostering sustainability. Chowdhury and Fernando [18] state that spiritual well-being (comprising communal, transcendental, personal, and environmental dimensions of well-being) can influence the

ethical perceptions of consumer actions. Burns [19] suggests that connection with, and integration of, all parts of oneself (physical, intellectual, emotional, and spiritual), using methods of mindfulness, promotes ecological awareness and care. Similarly, Goralnik and Marcus [20] suggest that specific personal processes, including collaboration, reflexivity, and empathy are needed to achieve spiritual growth, and that such growth manifests in character traits such as compassion, altruistic love, and respect for life. Finally, Horlings [21] suggests that the development of this "inner dimension of sustainability" must be accompanied by commensurate values-change for personal growth to translate into meaningful action. Inner change may be especially important for sustainability scholars and activists, who confront perceived external sustainability challenges daily [20].

These sentiments, and our own views, are summed up well by Ulluwishewa [22], who states:

> *"External changes are necessary but inadequate to achieving sustainability and delivering happiness to all. Therefore, our attention should be focused on inner changes, the changes which make our relationships with fellow human beings and with nature less self-centered and more loving"* (p. 167).

Ulluwishewa asserts that spiritual growth and well-being may not only benefit the environment, but individual happiness as well, thereby resolving the oft perceived, but potentially illusory, tension between achieving personal and collective well-being. The view is also supported by research demonstrating the positive effects of contemplative practice on happiness [23] and of SB on happiness [24–28], suggesting a common determinant, spiritual development and well-being, may lead to both.

In light of such research, calls for inclusion of contemplative practices in academia and, specifically, sustainability curricula have grown [16,29–35]. Students, these scholars argue, must be equipped not only with the intellectual frameworks (i.e., the sustainability competencies) but also with personal traits (e.g., mindfulness, altruism, etc.) to motivate their engagement with, and persistence in, the cause of sustainability. As Goralnik and Marcus [20] state, such qualities support "*the development of resilient sustainability learners who are capable of engaging challenging, often emotionally charged, content about socio-ecological resilience*" (p. 84). CPs seem to help students develop new ways of thinking and problem solving as well as enhance the sense of moral purpose needed for the climate crisis we are living in today [4]. Classroom contemplative practice has also shown additional benefits, for example, reducing anxiety and increasing positive coping [33], improving attention and test performance [36] and supporting general well-being and stress reduction [32].

One of the few published empirical studies that evaluated CPs use in a sustainability classroom was Goralnik and Marcus [20]. These authors employed a two-to-five-minute "contemplative pause" [37] at the beginning of two introductory sustainability courses required for departmental majors. Both qualitative and quantitative data suggested that the activity was well-received by, and contributed to, the focus and engagement of students. However, students did not report any impact on sustainability-specific skills or learning. This study did not include a comparison condition and its results therefore require controlled replication. Wamsler and colleagues [33] tested mindfulness practices in a sustainability classroom and, similarly, did not include a control condition.

The current study seeks to remedy these methodological concerns. It tests the hypothesis that including CPs in a sustainability classroom can increase happiness and traits indicative of spiritual development and well-being (e.g., mindfulness, compassion, love, etc.) which in turn are theorized to interact with traditional sustainability learning to increase SB. Further, we utilized qualitative data collection to investigate the reception of this curriculum, by students. Previous published studies have not specifically looked at spiritual well-being in the sustainability classroom. We included measures of SB in our assessment battery but did not expect to find significant changes here, given that behavior change is likely a result of multiple interacting factors—in particular, spiritual growth and academic learning—and we neither assessed nor provided instruction in the latter in our experiment. Specifically, we hypothesized that our classroom intervention would impact student spiritual development and well-being, reflected on quantitative measures as (1) increased happiness, (2) increased self-compassion, and in student qualitative reports of (3) the emergence of additional spiritual traits. Our research question was the following: what effects do CPs have on happiness and traits of spiritual well-being?

2. Materials and Methods

To test our research question, we conducted an online survey that included three assessment tools and an open-ended questionnaire. We describe these more in detail below.

2.1. Participants

Seven participants were recruited from a university class titled Cultivating Inner Sustainability and comprised the intervention arm of the study. Thirty additional students, recruited from a 100-level sustainability class and emails sent to graduate students in the same department, made up the control condition, yielding a total of $n = 37$ study participants. Sixty-eight percent of all participants identified as female, 29% as male, and 3% chose not to reveal their gender. Fifty-eight percent of participants identified as white, 16% as Hispanic/Latin, 13% from multiple races, 11% as Asian, and 3% as some other race. Sixty-one percent reported having earned some college credit, 16% reported an Associate's degree, 11% a Bachelor's, and 11% a graduate degree. Income levels for all members of participants' households for that year were reported as follow: 8.1% earned less than USD 10,000, 5.4% earned between USD 10,000 and USD 19,999, 13.5% earned between USD 30,000 and USD 39,000, 18.9% earned between USD 40,000 and USD 49,000, and 54.1% earned USD 50,000 and over.

2.2. Procedure

Intervention participants were drawn from the class Cultivating Inner Sustainability. On the first day of class during week one (T1), a volunteer explained the purpose of the study and consent forms to the participants. The study was optional and did not count toward the grade of students enrolled in the class. Students received no incentive to participate. The volunteer collected consent forms and kept them in a secure university locker for the duration of the class. Students who chose to participate in the study filled out the online assessment with an estimated time of 30–40 min to complete. The same online assessment was administered on week 15 (T2) and week 25 (T3).

Recruitment for control participants was obtained by teaching assistants from a 100-level course required for all sustainability students and an email sent to sustainability graduate students. Students from the 100-level class were given extra credit for completing assessments at T1 and T2. Informed consent was explained in the online assessment and collected online prior to students completing the assessment.

All participants completed pre- and post-testing, and only intervention participants completed class activities that were part of the experimental intervention.

2.3. Experimental Intervention

The class Cultivating Inner Sustainability was designed to create a collaborative effort among students and instructor to explore, practice, and develop skills that promote a process of personal growth through the use of CPs. The class was guided by two main objectives: (1) to engage in activities and practice that promote personal growth and (2) to allow themes, conversations, and practices to emerge in the moment. Each class session was composed of three parts: (1) class discussion, (2) contemplative practice (e.g., meditation, yoga), and (3) sharing personal intention for the upcoming week. Student homework, each week, included answering reflection questions in writing and completing a log stating what type of CPs they completed on each day, and journaling about their experiences with CPs. Class activities, including the CPs practiced each week, can be found in Appendix A.

2.4. Assessment Tools

Happiness Scale (H) [8]. We used the shorter version modified by Tapia-Fonllem and colleagues [38], which includes three questions rather than the original four. An example of a statement is "Compared to most of my peers, I consider myself:" The first two questions ranged from 1 (not a very happy person) to 7 (a very happy person), while the final question went from 1 (not at all) to 7 (a great deal).

Self-Compassion (SC) Scale—Short_Form [39]. This scale, an adaptation of the 26-item Self-Compassion Scale by Neff [40], contains 12 items and has a near perfect correlation with the original. Two examples of statements are, "When I fail at something important to me I become consumed by feelings of inadequacy" and "When I'm going through a very hard time, I give myself the caring and tenderness I need." Participants rate how often they behave in the stated manner using a scale of 1 (Almost Never) to 5 (Almost Always). The Self-Compassion Scale—Short Form measures six dimensions: self-kindness, self-judgement, isolation, common humanity, mindfulness, and over-identification. In our study, we used the total score.

Sustainable Behavior (SB) Scale [38]. This scale assesses frugal and pro-ecological actions, in addition to altruistic and equitable behavior. It consists of eight subscales:

(1) Indignation due to Environmental Damage (IED) [41]. This scale has 7 items, such as "When someone cuts down a tree (in the city or in the town)." Responses are anchored by 0 (it does not matter to me) to 5 (I feel so bad that I would try to prevent it by all means).
(2) Intention to Act Scale (IA) [41]. This scale has 11 items. An example of a statement is "Collaborate in environmental protection projects." Responses are anchored by 0 (I would never do it) to 3 (I would be willing to always do it).
(3) Affinity Towards Diversity Scale (ATD) [42]. This scale has 14 items, such as "I prefer to live around people of my age or generation and not people of other ages." Responses are anchored by 0 (do not agree) to 3 (totally agree).
(4) Frugality Scale (F) [41]. This scale has 10 items. An example of a statement is "If my car works well, I do not buy a new one, even if I have the money." Responses are anchored by 0 (strongly disagree) to 4 (strongly agree).
(5) Altruistic Actions Scale (AA) [41]. This scale has 10 items, such as "Give clothes to the poor." Responses are anchored by 0 (never) to 3 (always).
(6) Equity Scale (E) [41]. This scale has 7 items. An example of a statement is "My partner has the same right as me to decide on the expenses in the family." Responses are anchored by 0 (strongly disagree) to 4 (strongly agree).
(7) Pro-Ecological Behavior Scale (PEB) [43]. This scale has 16 items such as "Wait until having a full load for laundry." Responses are anchored by 0 (never) to 3 (always).

Open-ended questionnaire. Questions asked participants about their understanding of spirituality, SB, and happiness; their experience with CPs in class; and their personal intention for the class. A complete list of questions can be found in Table 1.

In addition, the class instructor (and first author of this paper) kept a journal of her observations after each class session. This journal was also coded and analyzed to inform the results of the study.

Table 1. Open-ended questionnaire.

Experimental Group
Time 1 (First week of class)
What is spirituality to you? Happiness? Sustainable behavior?
How do you define contemplative practices? Do you see a connection between them and spirituality, sustainability, and happiness?
Do you have any contemplative practice in place? Describe.
Do you practice and/or promote sustainability in your everyday life? Describe.
What is your intention for this class? (e.g., what area in your life you want to work on).
Time 2 (Last week of class) and Time 3 (Two months after semester ended)
What is spirituality to you? Happiness? Sustainable behavior?
How do you define contemplative practices? Do you see a connection between them and spirituality, sustainability, and happiness?
Do you practice and/or promote sustainability in your everyday life? Describe.
Have the contemplative practices in the class been beneficial? Give examples.
Have you used contemplative practices in other situations (class/home/work)? Give examples.
Do you plan to keep any of the contemplative practices learned in class? Describe.
Was your intention for the class met? Describe.
Is there anything else that you would like to add to this class and its impact on your learning?
Control Group
Times 1, 2, and 3
What is spirituality to you? Happiness? Sustainable behavior?
How do you define contemplative practices? Do you see a connection between them and spirituality, sustainability, and happiness?
Do you have any contemplative practice in place? Describe.
Do you practice and/or promote sustainability in your everyday life? Describe.

2.5. Data Analysis

2.5.1. Quantitative Component

Effects of the classroom intervention were investigated using repeated measures multivariate analysis of variance (RM MANOVA) on all quantitative pre and post assessments, in which an interaction between experimental condition and time would demonstrate differential improvement due to the class involvement. Assumptions of normality were checked using the Shapiro–Wilk test and visual inspection of Q-Q plots. Univariate ANOVAs were then utilized to ascertain how conditions differed from each other for each variable studied, with p values of 0.05 indicating significance for all multivariate and univariate analyses. In the case of non-parametric data, bootstrapping with replacement, utilizing 1000 samples, was conducted with p values of 0.05 again indicating significance. Effect sizes for correlated designs were computed and are included as g_{av} [44].

2.5.2. Qualitative Component

Answers to the open-ended questionnaire were coded using Holistic coding [45], which captures the overall theme of a section. After that, we used Axial coding [45–47] to reassemble data that were broken apart during Holistic coding. The aim was to connect different categories and determine which codes better represented the emerging themes. Finally, we conducted a qualitative content analysis, which is used to analyze humanmade artifacts [48,49]. This method was chosen because CPs were created by humans, so it seemed appropriate to analyze the open-ended questionnaires using this approach. During the process of coding the qualitative data from interviews and class observations, relevant themes emerged. These themes pinpoint how CPs influenced happiness and spiritual traits of SB in students in the experimental intervention.

3. Results

3.1. Quantitative Component

3.1.1. Preliminary Analysis

Pretreatment Equivalence. Analyses of variance (ANOVAs) were run on the pretest scores of all participants who provided posttest data, and no differences were found on any assessment. Participants in each condition, then, appeared equivalent at the start of the study. Additionally, systematic differences between dropouts and completers were examined within the data set as a whole, as well as within each condition, and again, no differences were found.

Attrition. Of 74 pre-tested participants, 10 in the experimental intervention completed testing at T1, 6 at T2 and 7 at T3, while 64 students in the control group completed testing at T1, 35 at T2, and 11 at T3. Due to a communication error, insufficient incentives were offered for T3, leading to inordinate dropout for this time point. Since responses for T2 and T3 were collected in close proximity and did not vary significantly from one another, scores for T2 and T3 were averaged and the resulting scores are referred to as posttest data. In total, 37 students (50%) completed the intervention and post testing with dropout from the experimental condition slightly lower (30%) than from the control (53%).

Internal consistency. We found pre-intervention internal consistencies for all assessments, using all participants, to be good or excellent for all assessments. Cronbach's Alphas can be found in Table 2

Mean scores and standard deviations for assessments at pre and posttest can also be found in Table 2.

Normality of data. Data were normally distributed in all cases except for post-test scores on the variable happiness, which were mildly negatively skewed.

Table 2. Cronbach's Alpha, Mean Scores and Standard Deviations on Assessments Across Time.

Assessment	Cronbach's Alpha	Variable			
		Control *		Experiment *	
		M	SD	M	SD
H					
Pretest	0.853	5.10	1.27	4.77	1.14
Posttest		5.08	1.46	5.66	1.19
SC					
Pretest	0.842	3.13	0.74	2.88	0.65
Posttest		3.16	0.73	3.58	0.62
IED					
Pretest	0.848	3.90	0.98	3.59	0.77
Posttest		4.03	0.89	4.12	0.95
IA					
Pretest	0.837	3.18	0.48	3.04	0.48
Posttest		3.23	0.45	3.15	0.33
ATD					
Pretest	0.619	3.18	0.39	3.25	0.23
Posttest		3.10	0.37	3.23	0.27
F					
Pretest	0.79	3.79	0.76	4.09	0.75
Posttest		3.86	0.66	4.06	0.59
AA					
Pretest	0.838	3.31	0.62	2.94	0.6
Posttest		4.19	0.57	3.25	0.55
E					
Pretest	0.674	4.33	0.60	4.61	0.36
Posttest		4.37	0.53	4.54	0.52
PEB					
Pretest	0.735	3.58	0.46	3.61	0.48
Posttest		3.62	0.45	3.79	0.44

Notes: * Higher scores reflect improvement in participants.

3.1.2. Intervention Effects

Consistent with this study's hypothesis, we found a condition by time interaction showing differential improvement over time related to class involvement $F(9, 27) = 3.29$, $p = 0.0080$. Univariate ANOVAs indicated that the intervention improved happiness, $F(1, 35) = 4.98$, $p = 0.032$, $g_{av} = 0.72$ and self-compassion, $F(1, 35) = 5.26$, $p = 0.028$, $g_{av} = 0.91$, and did not affect SB. Subsequent bootstrapping analysis of the variable happiness, conducted due to its non-normal distribution, also yielded significance $F(1, 34) = 4.41$, $p = 0.043$, supporting the results of the initial analysis. See Table 3.

Table 3. Intervention effects on happiness, self-compassion, and sustainable behavior.

Assessment	Effect
H	$F(1, 35) = 4.98$, $p = 0.043$
SC	$F(1, 35) = 5.26$, $p = 0.028$
IED	$F(1, 35) = 2.77$, $p = 0.105$
IA	$F(1, 35) = 0.22$, $p = 0.639$
ATD	$F(1, 35) = 0.27$, $p = 0.605$
F	$F(1, 35) = 0.142$, $p = 0.708$
AA	$F(1, 35) = 3.17$, $p = 0.084$
E	$F(1, 35) = 0.29$, $p = 0.595$
PEB	$F(1, 35) = 1.77$, $p = 0.19$

3.2. Qualitative Component

3.2.1. Preliminary Analysis

Of seven students, six (86%) completed the questionnaires for the three time points, while one student completed only the questionnaire at T1. At T1, three students (43%) reported having a regular practice of contemplation (the student who did not complete T2 or T3 was one of these three). All students reported knowing what CPs were. We found differences in attitudes and behaviors at all the three time points and dropout was minimal in the intervention condition. Thus, we did not merge qualitative data for T2 and T3 as we did for the quantitative data.

3.2.2. Intervention Effects

- Effects of CPs on views of sustainability

At T1, students viewed SB primarily from an ethical viewpoint, focusing on their own and others' actions and the harm or benefit these have for the environment. For example, one participant stated:

> *"Sustainable behavior involves being conscious of the environment in your daily life and doing the best you can to not bring harm to the environment and other life forms"* (Participant MMJ016).

As the intervention progressed, participants expressed more holistic views about how their emotional states, and an awareness of these states, impacted their sustainability choices. For example, participant PSD282 stated at T2:

> *"Sustainable behavior to me is about caring—caring about the environment that surrounds me (be it plants, animals, people). Caring about the implications or consequences my actions have and then acting according to that."*

At T3, students continued to place emphasis on their internal states as determinants of behavior but expanded this perspective to consider how behaviors interact and compound on a global systems level. The following statement is an example:

> *"Sustainable behavior is letting this peace within yourself reflect in your actions. So for example, enough of society achieves this peace and decided to let their external circumstances reflect this. They realize they enjoy eating eggs but no longer feel good about how these eggs come to them. So they decide to transform the system so it is a peaceful process for chickens, workers, and consumers"* (Participant JBD352).

Further, students attributed this change in their thinking to CPs. For example, a student stated:

> *"Contemplative practice requires that one consider beyond one's self into the realm of spiritual relationships"* (Participant ESA283).

Another stated:

> *"I define contemplative practices as ways of centering myself, being in the moment, hyperaware. And I see a connection. I feel when I am in the moment, involved in life, knowing that everything is interconnected, I cannot behave in an unsustainable way and be happy at the same time"* (Participant PSD282).

- Effects of CPs on happiness

None of the students explicitly reported increased happiness as a result of CPs. However, one student mentioned that CPs lead them to a sense of peace and "setting a good tone" for their week (Participant JBD352) and four students (67%) talked about being able to connect within and relax with these practices. Of these four students, one stated at T2:

> *"it is interesting right now to use journaling as a crisis management method. I haven't applied journaling consistently but right now in a personal crisis, it helps me to navigate through my thoughts, emotions, and actions"* (Participant SSA282).

Thus, while happiness was not named in students' responses, CPs appear to have benefitted students' mood, in part by providing coping.

- Effects of CPs on traits of spirituality

Students generally reported finding the class CPs beneficial, with four students (66%) indicating they were very helpful and two students (33%) suggesting they were partly helpful. Students reported benefits stemming from CPs, at T2 as: becoming more patient toward themselves and their families and learning to see their own life through different lenses (17%), finding self-love and self-compassion (17%), alleviating stress (17%), and being able to focus, be in the present moment (known in the literature as present moment awareness), and calm down (50%). Practices that students reported to be most helpful included meditation, journaling, and breathing exercises. For example, a student said: "*anytime we meditated it set a great tone for my week, lightened my heart and allowed me love myself more deeply*" (Participant JBD352). Another student stated:

> *"Starting to journal has really enriched my life! It has become so natural, so habitual. I enjoy every word that I write. It helps me be with myself in that very moment. Write down everything that distracts me and eventually be centered in the present moment. It's such a gift:)"* (Participant PSD282).

At T3, three students (50%) reported continuing to use CPs and derive benefits from them, while three students (50%) discontinued use. Of the latter group, one student reported plans to reinitiate CPs at some point in the future, one student reported ceasing CPs due to an unsupportive home environment and the final student provided no additional information. The latter may have been the result of lack of motivation to engage in CPs. Those who continued engaging in CPs reported continued benefits including heightened awareness of self, relationships, and emotions, and an opportunity for catharsis. For example, one student from this group stated "[CPs] *have brought to the forefront of my mind areas of my life and in my relationships that need attention*" (Participant ESA283). Another reported that journaling allows them to "*get thoughts out that I don't want to keep in the system*" (Participant SSA282). In addition to meditation and journaling, one student reported finding Feldenkrais "*vital in setting a good tone for my week*" (Participant JBD352).

- ◎Effects of CPs on SB in daily life

When students were asked whether they practice SB in their lives at T1, all of them talked only about basic SB (e.g., recycling, eating vegetarian or vegan, reducing consumption and single-use plastics, and avoiding toxic materials). Five students (83%) expressed a more holistic view of sustainability in their behavior at T2 as they talked about being mindful, more loving and compassionate, and conscious of their inner sustainability. Yet, two students (33%) went back to basic SB at T3 when they were not in the class anymore.

- ◎Student experience of the class

At T2—the final day of the class—five students (83%) reported finding the class useful while 1 left this question blank. One student mentioned that the class gave her ideas about how to do CPs. This is important for educators to know because not every student has heard of CPs and/or knows how to meditate or engage in related practices. Other benefits reported included: safe space and space for co-creation and reflection on people's humanity. A student stated:

> "*The class gave me a place/time to reflect and have a shared experience with other people, making me realize they are as human as I am*" (Participant VSJ700).

This suggests that having a formal class time where students can engage in CPs is beneficial to them. Finally, one student made a connection between this course and its importance for sustainability:

> *"I think it is such an important course for sustainability. Even if you do not know what is going on, being open to this class is incredibly beneficial and key to expanding your understanding of sustainability beyond ecology and project management and governance. It shows what sustainability looks like in the individual. I wish it was advertised more and more people took it. Incredibly powerful!!"* (Participant JBD352)

Students reported finding the same benefits to the class when they completed T3 but added a couple of recommendations to improve the class. One student reported feeling uncomfortable in the classroom and suggested a future class used a different setting. The classroom we used was a seminar room with a big table in the middle that prevented students from seeing one other when laying down on the floor for Feldenkrais or meditation. The space we use affects the outcomes of the class; thus, it is important to select a place that creates a welcoming space for CPs. Another student stated, "*I wish it would have been more research based meaning incorporating literature*" (Participant SSA282). The class did not use any academic literature for the experimental intervention.

4. Discussion

4.1. Summary of Findings

The primary aims of this study were to investigate whether the inclusion of CPs in a sustainability classroom would enhance student well-being and traits indicative of spiritual development and to assess how well such a curriculum would be received by students. We designed and facilitated a 15-week class utilizing contemplative and related practices (intention setting, a safe space for students to discuss life challenges, etc.) and compared student outcomes, pre to post, with those of unenrolled peers. Intervention participants showed gains on quantitative measures of happiness and self-compassion and qualitative analysis suggested a development of spiritual traits (i.e., present moment awareness, compassion, patience, and love) theorized to support SB. SB itself, likely a result of multiple interacting factors, remained unchanged, as we hypothesized, since our intervention targeted only the factor of spiritual development Students reported experiencing peace, connectedness within, relaxation, and a safe space in the class and identified these traits as valuable for ongoing SB. Moreover, the class and CPs led some students to develop a systems' thinking mentality and an awareness of their interconnectedness with other beings--two competencies for sustainability. Finally, students generally found the class accessible and useful and a number of students reported continued contemplative practice at two-month follow-up.

4.2. Implications of Findings

Our study adds to a growing literature that supports integrating contemplative practices into higher education. In particular, our study found that students engaging regularly in this practice were happier and more self-compassionate than peers, traits that have been found to aid in coping, stress management, and academic persistence [50–53]. Further, students in our class, reported appreciating the inclusion of contemplative practices and indicated that their understanding of academic material improved as a result.

In addition to their general salutary effects, contemplative practices may benefit sustainability students especially. While previous authors [20,33] have integrated contemplative practice into sustainability classroom curricula, ours is the first study to assess personal, academic, and behavioral outcomes in a controlled manner. As discussed in our findings, we found that CPs improved students' understanding of sustainability competencies, despite the class never discussing these competencies directly. It seems likely, instead, that greater understanding of oneself and others, via CPs, indirectly benefits the learning of sustainability content. Second, as noted in the literature [50,54], the scope of environmental challenges may cause students and those employed in the sustainability sector regular stress and require skilled management of unpleasant emotions, changes in motivation, grappling with larger ethical issues, etc. Just as doctors must learn not only appropriate medical techniques but also how best to manage personal and emotional aspects of patient illness, so too, sustainability students would likely benefit from guidance in managing the personal impacts of sustainability work. Personal development requires consistent effects; as such, we recommend integration of contemplative practices into traditional academic curricula, throughout one's course of study.

Qualitative data from this study suggest that contemplative practice engendered student spiritual growth. This is, admittedly, not a novel outcome, given that contemplative practices are designed toward this end and a broad literature supports this result. Still, it is notable that such growth can be achieved with limited practice in a classroom setting. Further, this result serves as an independent variable manipulation check, supporting our intervention's validity.

Student spiritual growth, however, did not translate into increased SB, as measured by our assessments. This outcome was not altogether surprising given that behavior change is likely multi-factorial and a result not only of spiritual development (e.g., development of care for others and the environment) but also adequate knowledge (e.g., of where to recycle, how to reduce carbon emissions, etc.) and societal infrastructure (e.g., availability of electric vehicle charging stations, solar panel tax credits, etc.). While our pilot study tested the feasibility and personal/spiritual effects of a contemplative practice-based classroom curriculum, future research should examine in more detail the necessary and sufficient conditions to produce environmentally focused behavior change, since this change, and the remediation of global environmental degradation, is a critical outcome. We believe that spiritual development is integral to behavior change; however, this is an empirical question, and we look forward to further research.

4.3. Limitations

This study has several limitations. First, our classroom intervention sample size was low. While small samples are not uncommon in pilot studies, we recommend that future fully powered investigations replicate these findings. Second, participants were self-selected for the classroom intervention. As such, despite our promising results, it is unclear if a spirituality-focused curriculum would produce similar effects for students not previously interested in the topic, for general-population adults, etc. In addition, our sample contained more women than men. While this imbalance is common in sustainability classes, future research should make sure to examine male participants' perspectives on such curricula. To remedy these concerns, we recommend including contemplative practice curricula in some required sustainability classes and not others, utilizing a wait-list control design, though some questions related to generalizability will of course remain. Finally, students in the control condition had no responsibilities other than pre and post-testing. It is therefore possible that observed changes were due to non-specific group factors, such as social support, rather than to contemplative practice. Utilizing an active-comparison group, or dismantling-treatment strategy, could isolate which aspects of the intervention benefit participants most.

5. Conclusions

Despite the development of intellectual frameworks and technological solutions, sustainability challenges persist. Understanding the precursors of sustainable rather than environmentally damaging behavior and mapping a path to widespread adoption of the former, may serve as a potent

and long-lasting remedy. Spiritual growth, developed alongside traditional sustainability competencies in higher education, may be such a path and deserves continued study.

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Appendix A

Table A1. Summary of class sessions and contemplative practice each week.

#	In-Session Activities	Theme of Discussion	Stage of Group	Space	Reflection Questions for the Week
1	Completing survey (T1)				
2	No class—Labor Day				Where and when is it most difficult for you to focus your attention, to be present? And why do you think this is the case? How do you cope or handle stress in your life now?
3	Check in Class discussion Guided meditation	Personal intention	tentativeness from the group	classroom	What is happiness to you? Do you consider yourself happy? Please describe. Do you extend love to yourself? Think about happy, sad, stressful and difficult times in your life. Please describe.
4	Check in Class discussion Soul Gazing activity	Vulnerability	forming identities	classroom	Do you give yourself a mental break from stress and worries? Why or why not? How do you do it? Often, our bodies give us signals when we need to slow down in our busy lives. Do you listen to these signals? Do you give your body the break it needs?
5	Check in Psycho-synthesis activity	Emotions		classroom	What identity do you choose to show in this class? What about outside of class? Why do you hold these identities?
6	Meditation Check in Class discussion	Identities	comfort with each other	outdoors: green space	What is masculinity to you? Femininity? How does it affect you? (Feel your feelings and talk about them)
7	Check in Yoga Class discussion	Pain	vulnerability	outdoors: green space	What do you love about yourself? What makes you special? Do you choose to show this love for yourself around people? (e.g., classes, friends, work, family)
8			Fall Break		
9	Check in	Personal growth		classroom	On a scale from 0 (least) to 10 (most) rate how vulnerable/open you have been in the class and reflect on why.

	Semester review Guided imagery and Feldenkrais				What has helped you to open up so far? What would you need from people in the class to open up more? Is being vulnerable important to you?
10	Check in Movie: "The Way Out"		more vulnerability	classroom	Sit in with your emotional energy from this morning and reflect on how 'the way out' (referring to the message of the movie, not just the title) affects/influences you. What message did you get from the movie? How can it impact your overall life?
11	Check in Class discussion	Personal growth	connection	outdoors: green space	Thinking and feeling about your inner exploration in this class, what was your original intention at the beginning of the semester? How has it evolved? What is your intention now? What do you need from the class to fulfill that intention? (Think about activities, discussions, etc., you'd like to do in the last 2 remaining classes we have).
12	No class—Veterans Day				
13	Check in Loving Kindness meditation Class discussion	Feelings	connection	classroom	What's your love language? Do you give it to yourself? How do you extend love to people, animals, plants, etc. around you?
14	Check in Potluck—mindful eating & prayer	Class	connection	classroom	
15	Completing survey (T2)				

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