Examining Mindfulness and Nature Connectedness on the Mental Health and Well-being of University Students

by

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ABSTRACT

The purpose of this study was to (a) embed nature and mindfulness into university course curriculum to determine the influence they have on students' health and well-being, (b) examine students' perspectives of mindfulness in the natural environment, and (c) to determine what students identify as the impacts of integrating nature and mindfulness into the university curriculum. This study was unique from previous studies. Several mindfulness practices were introduced so participants could explore and evaluate what worked for them and what did not. The research was conducted in two Environmental Education Certificate courses at Arizona State University: The Ecology and History of the Sonoran Desert (SCN 301) and Nature Journaling (SCN 309).

This action research (MMAR) study included a participant pool of thirty-two students: sixteen from the in-person SCN 301 courses and sixteen from the online SCN 309 courses. Students participated in four activities requiring them to sit in a location, engage in mindfulness, and observe nature. These activities are identified as "sit spots" in this study. The four sit spots included two indoor and two outdoor sit spots. Students participated in a one-minute breathing meditation, a 54321 mindfulness technique, and a self-administered, non-clinical Mindfulness-based Art Therapy (MBAT) component during these sit spots.

Qualitative and quantitative data was collected via the pre- and post-Nature Relatedness Scale (NR) and Perceived Stress Scale (PSS). Quantitative data was also collected during the Activity Survey (AS). Qualitative data consisted of open-ended questions in the AS, class discussion, researcher observations and notes, and students' reflections. All analyzed data was synthesized to produce the findings in this study.

The findings suggest that integrating mindfulness and nature into university positively influenced students' mental health and well-being. Students reported decreased stress and anxiety while increasing focus, attention, and academic performance. Mindfulness and nature cultivate a more mindful and meaningful way of connecting with oneself, individuals, and nature. Mindfulness and nature also were linked to learning by producing academic benefits. The results of this study inform my local practice and set the foundations to produce results in a larger educational context.

DEDICATION

This is dedicated to all the educators who work tirelessly to find creative solutions to support their students and to the educators in my life, past and present, who never gave up on me, supporting me with their time, energy, and countless conversations. This is for those who saw my potential and believed in me, even when I was challenged to see it myself.

To those of you who walked this journey with me, your support, patience, and unwavering encouragement to continue on this journey are genuinely appreciated. This is as much your accomplishment as it is mine. I am grateful to you, and your efforts will not be forgotten.

To all those formal and informal educators who challenge and support students so they are empowered to be more…Thank you.

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This study would not have been possible without the support of the Fall 2023 students enrolled in the courses chosen for this research: Ecology and History of the Sonoran Desert and Nature Journaling. By investing in this research, they invested in themselves, enhancing their mental health and well-being. Sharing their experience informed this research and will inform future efforts to incorporate nature and mindfulness into the course curriculum.

Thank you to my committee members who gave of their time freely. Thank you to my committee chair, Dr. Jill Koyama. Thank you for your feedback, suggestions, time, patience, and energy. Thank you to Dr. Mo, who participated in numerous conversations with me and shared her content knowledge on nature and the environment. Thank you to Dr. Danah Henriksen, who guided my efforts to understand various mindfulness techniques and their possible impacts on students. With the generous time and knowledge shared by this committee, this research is what it is today.

Submitting research on nature without acknowledging the land's ancestors would be remiss. As an Arizona State University student, the Tempe campus resides on the ancestral homelands of the Indian tribes, including the Akimel O'odham (Pima) and Pee Posh (Maricopa) peoples. These tribes have taken care of the land for centuries. I acknowledge and respect these tribes and this land.

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LIST OF ACRONYMS

Acronyms	Meaning
ART	Attention Restoration Theory
AS	Activity Survey
ASU	Arizona State University
DIFA	Desert Investigation Field Activity
EE	Environmental Education
HAP	Holistic Arts-Based Program
IAS	Intervention Activity Survey
MBAT	Mindfulness-based Art Therapy
MBSR	Mindfulness-Based Stress-Reduction
MLFTC	Mindfulness-Based Stress-Reduction
MMR	Mixed Method Research
NR	Nature Relatedness Scale
PS	Perceived Stress Scale
SCN 301	Ecology and Natural History of the Sonoran Desert
SCN 309	Nature Journaling
ZPD	Zone of Proximal Development

CHAPTER 1

INTRODUCTION AND PURPOSE OF STUDY

Historically, human cultures have been connected to nature and dependent on the natural resources the environment provides. The complexity of the interconnected systems of living and nonliving components in the environment contributes to establishing cultural norms and positive health and well-being of individuals. This, coupled with being present in the moment (mindful) with all that nature has to offer, is known to have beneficial impacts on humans.

Over the years, our civilization has grown and developed. Human engagement with nature has been replaced with busy lifestyles, technology, and additional priorities. Exploring nature has been replaced with screen time to allow students to navigate the demands of university course rigor. As lifestyles and priorities shift, our connection with nature depletes, along with taking advantage of the gifts nature delivers, such as stress relief and mental fatigue restoration. The following study examines how nature and mindfulness impact students' well-being and everyday life skills for coping with and managing stress.

Larger Context

University students often report experiencing stress, a "condition for which individuals label life situations as taxing or exceeding personal resources" (Roming & Howard, 2019, p. 832). As university students negotiate multiple domains—academic, health, social, cultural, work, and personal relationships—a singular domain or a combination of domains can cause or increase their stress levels. Like the rest of us, the

mindset students have during any situation when stress levels are associated with negotiating that situation (Crum et al., 2017) acknowledges the importance of cognitive assessment in determining the stress response of individuals, stating that individuals first determine the demand of the situation and then if they have the skills to cope with the situation. "Stress mindset is conceptualized as the extent to which an individual holds the mindset that stress has enhancing consequences for various stress-related outcomes (referred to as a 'stress-is-enhancing mindset') or holds the mindset that stress has debilitating consequences for outcomes such as performance and productivity, health and well-being, and learning and growth (referred to as a 'stress-is-debilitating mindset')" (Crum et al., 2017, p. 380). Student stress, which can be multifaceted, is evident at any university nationwide as students are challenged to find time for life, work, and school. The American College Health Association and American College Health Association (ACHA-NCHA) (2021) reported that 44.8% of college students categorize their stress as "more than average stress." Additionally, 34.4 % of students claimed they were under "average stress," while 12.8% reported being under "tremendous stress" (ACHA-NCHA, 2021). Only 8% of students reported "no stress" or "less than average stress." That 8% represents a combined total of both categories. These statistics indicate a need for student support in the area of stress management, which can include coping strategies such as mindfulness and nature connectedness.

Understanding students' stress requires that the sources or causes of that stress be identified. Defined as "stressors," these causes of stress may be situational or caused by short-term or long-term factors. What are stressors? This study will use the definition of

Hamaideh (2011), which defines stressors as "demands made by the internal or external environment that upset the balance, thus influencing physical and psychological well-being and requiring actions to restore balance" (p. 70). Students react to stressors in varying ways depending on what kind of stressor it is, its severity, its importance, and their health and emotional state (Hamaideh, 2011). Research shows that university students encounter stressors that include academic demands, pressure from and conflicts with peers, being away from home, transition challenges, disappointment with accomplishments, social challenges, expectations, and financial difficulties (Hamaideh, 2011). Additionally, Saleh, Camart, and Romo (2017) acknowledge that university students often encounter stressful situations such as first experiences with college, anxiety, depression, financial distress, and the freedom of scheduling and organizing their own time. Students' perceptions of these stressors influence their reactions and stress levels. If students have a positive mindset, a stressor is considered a positive challenge rather than a negative stressor, causing a physical and mental response.

As documented above, there are multiple sources of stress for university students. An individual has the potential to worry about anything and sometimes everything. The stressors that contributed to the percentages mentioned in the opening paragraph include academic performance and pressure, adjustment to new lifestyles (living away from home), social circumstances, budgeting, loans, and finding or maintaining employment. ACHA-NCHA (2021) documents that the leading source of stress among college students was academic-related. Of the 51.9% of the students who reported academic challenges in the last twelve months, 88.2% commented that academics contributed to moderate or

high stress. Students' concerns for academics were followed by finances (77.7% of students reporting increased stress levels) and employment (73.4% of students documenting elevated stress levels). Additionally concerning, these stressors may result in negative consequences. Students dealing with stress may see their learning impacted, their academic performance decrease, and their overall health affected. Health consequences include anxiety, depression, smoking, substance abuse, and adverse health habits. As a matter of fact, anxiety is listed as a factor that negatively impacts academic performance. Statistics show that an additional 29.5% of students claimed that anxiety was the reason for their poor academic performance (Hamaideh, 2011). Furthermore, stress may lead to the individual dropping out of college. Hamaideh (2011) acknowledges that high stress levels contribute to additional health concerns such as adverse health habits, smoking, and substance abuse.

Negative or positive consequences of stress are related to the severity of exposure, length of exposure to stressors, and mindset and perception of each individual (Roming & Howard, 2019). Thus, two individuals may encounter the exact circumstances, cope with them, and react to them differently. The response to stress is associated with a stress mindset, "the extent to which one believes stress has enhancing or debilitating effects on stress-related outcomes such as performance and productivity, health and well-being, and learning and growth" (Huebschmann & Sheets, 2020, p. 248). Those individuals who believe stress can have positive consequences have a stress-is-enhancing mindset; those who see the negative effects have a stress-is-debilitating mindset.

Students need to develop coping strategies to manage academics and life stressors

and reduce the risk of negative repercussions (Roming & Howard, 2019). "Coping" is a "proactive attempt to deal with stress despite the outcome" (Roming & Howard, 2019). There are adaptive and maladaptive coping skills. Adaptive coping skills are traditionally positive and beneficial, while maladaptive coping skills typically produce negative impacts (Giancola et al., 2009).

Research shows that university students cope with stress in several ways, such as seeking social support (peers and family) or developing a mindset to view situations positively. Additional coping strategies include developing positive self-esteem and problem-solving skills that minimize the severity of stressful situations (Roming & Howard, 2019). While this study focuses on integrating mindfulness practices and nature, additional adaptive coping strategies are available. Adaptive coping strategies include spiritual/religious connection, physical activity, time management strategies, study techniques, mediation, non-academic activities, and music, while negative coping strategies include avoidance, venting, denial, disengagement, and substance use (Giancola, Grawitch, & Borchert, 2009; Hamaideh, 2011; Roming & Howard, 2019). The positive adaptive coping skills combat stress and its negative consequences, helping university students manage and reduce stress levels. Additionally, adaptive coping skills are correlated with lower instances of depression, anxiety, and stress while increasing the student's quality of life (Roming & Howard, 2019).

Mindfulness, an adaptive coping strategy, has proven beneficial to student success (Shearer, Hunt, Chowdhury, & Nicol, 2016). Mindfulness does not eliminate student stressors. Instead, mindfulness is a change in perception, a shift in mindset that changes

our relationship with stress and how we react to it. As a focus of this research and an integral component of the intervention, the working definition of mindfulness as it pertains to this study is “a state of awareness and attention to the present moment with a non-judgmental acceptance of experiences" (Ingram, Breen, & van Rhijn, 2019). One of the most influential people in the mindfulness practice is Jon Kabat-Zinn. Kabat-Zinn pioneered Mindfulness-Based Stress-Reduction (MBSR) therapy in the 1970s at the University of Massachusetts Hospital (McCaw, 2020). Due to Kabat-Zinn's advocacy of mindfulness, mindfulness has been highly researched and has become recognized as a therapeutic approach in medicine and psychology (McCaw, 2020). Western society has adopted many mindfulness-based practices, which include meditation, mindful eating, mindful walking, and perspective (looking at challenges with compassion and optimism) and Mindfulness-based Art Therapy (MBAT) (McCaw, 2020). Often performed in a clinical setting, MBAT combines mindfulness practices with therapeutic art sessions. While clinically administered, MBAT is also used in an informal setting. The perspective technique refers to our mindset associated with how we view various situations—mindful breathing and walking each focus on the body’s sensations while eating and walking. Mindful eating focuses on the awareness associated with eating every bite on a plate, bringing full awareness to the sensations present. Mindful walking concentrates on each step and the breath during the walking exercise. Meditation will be a technique included in this study. Meditation is a mind and body practice with the purpose of reaching a heightened awareness of one’s mind and body. Meditation usually consists of a quiet

location, comfortable body position, focused attention, and an open attitude. Meditation can be guided or just a concentration on breathing.

Research has shown that mindfulness has been associated with decreasing hostility, alleviating depression and anxiety, improving quality of life, increasing coping, improving executive function, and increasing regulation of emotions and self-awareness (McCaw, 2020). Messer, Horan, Turner, and Weber (2016) note the benefits of mindfulness practices for undergraduate university students at a Southwest university. The study examined 114 internet-delivered mindfulness and relaxation training participants and compared the results with a non-treatment group. Messer et al. show that mindfulness effectively reduces stress and increases coping for university students. Additionally, the study provides evidence that mindfulness improves attention, test performance, material retention, and decisions under stress (Messer et al., 2016).

Exposure to nature is another adaptive coping strategy. As Kaplan and Kaplan (1995) noted, nature has a broad definition, denoting multiple settings, including parks, open spaces, meadows, gardens, trees lining a street, and numerous other locations. Nature includes plants, landscapes, and visual demonstrations of nature, such as video streams or pictures of nature. There is no single definition of nature; it can be experienced indoors or outdoors. Thus, for this study, nature will be defined in the broad sense provided by Kaplan and Kaplan (1995): nature includes natural things and places one has experienced. The definition of nature will become important as research identifies “the environment” as a coping strategy for stress. Berto (2014) states that physical settings can play a role in coping with stress. There is evidence that natural settings are more

restorative than urban settings. Green spaces and exposure to natural environments can reduce psychological stress as well as mental fatigue (Berto, 2014; Ewert & Chang, 2018). Natural environments elicit a sense of calm and decrease negative moods and negative thoughts associated with stress. Along with reducing stress, exposure to nature has been associated with one's personal well-being. Exposure to nature has produced positive emotions such as enjoyment and wonder and increased intrinsic goals and cognitive performance. The positive impacts of nature and mindfulness become the foundations of the interventions as the local context is considered.

Local Context

Arizona State University's (ASU) largest campus is located in Tempe. ASU enrolled 103,609 undergraduate students in the Fall of 2020 (ASU, n.d.). Having campuses scattered across the state, ASU's Mary Lou Fulton Teachers College (MLFTC) has a presence on multiple university campuses. The university underwent an academic reorganization that consolidated all teacher preparation and undergraduate programs university-wide to increase opportunities for students on all campuses. In 2002, Michael Crow reconstructed ASU to the "one university, many locations" format. One of those "locations" is the Polytechnic campus, where research started for this study. This 600-acre campus in the East Valley houses approximately fifty-six buildings for academic and student service purposes (ASU, n.d.). In the Fall of 2020, the Polytechnic campus had an enrollment of 5,545 students, of which 155 students were enrolled in MLFTC programs (ASU, n.d.). MLFTC faculty, staff, and students on the Polytechnic campus have described the atmosphere as community-oriented.

The community atmosphere of the Polytechnic campus, amongst the MLFTC student population, is where my research originated. Mary Lou Fulton Teachers College had offices for faculty and staff on the third floor of Santa Catalina Hall. The Polytechnic campus was where I was previously employed as an administrative specialist. In the context where I situate this study, I now work as an MLFTC instructor. However, as an administrative specialist, I worked in that position for four years until January 2022. At the beginning of this study, also on the third floor, just past my desk, was the MLFTC student lounge. Centrally located, my desk had become a stopping and gathering place for students, faculty, and staff. My desk area was one place where students converged to have conversations and "hang out." My conversations with students revealed that the diverse population had multiple challenges; however, one commonality was their stressors related to integrating the demands of school, work, and life. MLFTC students indicated that they had an exceptional amount of coursework. Additionally, students expressed challenges with the expectations of university coursework, the academic expectations, and the rigor of the program, which were all demanding on MLFTC students. Time management was another challenge, as students struggled to integrate the time necessary to manage everyday life. Students commented that all of their daily tasks could be overwhelming.

As an administrative specialist, I connected with multiple facets of the MLFTC Polytechnic system in operation. I communicated and interacted with faculty, staff, and the student population. Conversations throughout the years allowed me to identify that the Polytechnic campus used to have a "community" feel that has been lost over the years

with the merging of multiple campuses under one large ASU systems umbrella. Up until Michael Crow reconstructed ASU to the "one university, many locations" format (more extensive system), MLFTC had education departments on each of ASU's campuses, operating under their own system with their own dean. While this larger system format allowed for some growth and opportunities, like the sharing of faculty and the expansion of course offerings across multiple campuses, the change also contributed to some challenges. The previous smaller system allowed MLFTC on the Polytechnic campus to establish a close-knit, community-based atmosphere where relationships were formed, support was established, and activities to bring everyone together were attended. With the change to the larger systems format, the smaller community environment dissipated, leaving many Polytechnic MLFTC faculty, staff, and students talking about it as a distant memory. Based on these interactions, I have organized events for faculty, staff, and students over the last several semesters to encourage building relationships and community. I have had activities such as painting, coloring, puzzles, gardening, crafts, and other stress-relieving activities at these events. While students, faculty, and staff engaged in stress-relieving activities, "stress away" or "peace and calming" essential oils were diffused in the air. Quiet, relaxing music played in the background. In addition to these indoor events, students, faculty, and staff were encouraged to participate in "Walk It Out Wednesdays." Every Wednesday, we gathered in the lobby and walked as a group outside. The opportunity to enjoy the surrounding natural environment of the Polytechnic campus was refreshing. On more than one occasion, a student who participated in these two events commented on how they "needed this" or commented, "This is so relaxing."

These comments and student responses to the events I have organized support a need for additional coping strategies for stress management for students at the university level.

While increased stress levels were initially discovered in conversations with MLFTC students, the challenge does not solely exist at Teachers College. As my research has evolved, it is notable that stress management and the need for coping strategies are university concerns. Students across the ASU campus identify with similar stressors as MLFTC students. On top of these common everyday stressors, the COVID-19 pandemic transformed and is still altering everyone's life, creating its own challenges. Operating amid a pandemic has been stressful not only for students but also for faculty and staff that serve the students. Research indicates that academic demands increase at the university level, and new social relations are established (Friedlander, Reid, Shupak, & Cribbie, 2007). Friedlander et al. note, "Students are often uncertain of their abilities to meet these demands (2007, p. 259). As students struggle to manage their academic and life stressors, they may fall behind in coursework, or the quality of their assignments is impacted. These factors add to the stress levels of students and impact their health. This vicious cycle causes several academic and personal challenges that have contributed to the student's unsuccessful completion of coursework or even withdrawal from courses. The student population at ASU reported that "the following had resulted in receiving a lower grade in a class, taking an incomplete or dropping a class, or disrupting their graduate studies over the past 12 months: Anxiety - 13.0%; Stress - 15.7%" (ASU, n.d.). The ASU Stress and Resilience website documents the following statistics: 1) in the last 12 months, 60.9% of ASU students experienced more than average stress; 2) 64.8% of ASU

students experienced enormous anxiety (ASU, n.d.). Therefore, there is evidence that students would benefit from learning coping strategies that would allow them to decrease their stress levels and increase their success rate. The challenge is implementing change in a large system. Therefore, small-scale change may be more impactful for student success.

On a smaller scale, MLFTC supports its students at a college level by implementing a Success Team that currently offers wellness programs. MLFTC states, "Wellness for MLFTC students is twofold: When you learn to prioritize your well-being, you'll be prepared to model a healthy lifestyle to your future students. You are also able to plan and coordinate wellness activities in your classroom and other educational settings" (Wellness Coaching, 2020). Using mindfulness to support faculty, staff, and students, MLFTC positively supports its entire system. MLFTC offers education courses on three ASU campuses: West, Tempe, and Polytechnic. Multiple campus locations make it difficult to spread resources to all students. However, strategies are constantly being considered for implementing support. For example, amid the pandemic, the vast majority of support was dispersed via video conference (Zoom). Acknowledging that safety guidelines were necessary, Zoom was a resourceful and innovative way to distribute information and support faculty, staff, and students. However, Zoom lacked the personal connection our Polytechnic students needed to feel included in the community. These limited resources reinforced the need for mindfulness practices or other activities specific to our Polytechnic students. While these observations are specific to Polytechnic

students, analyzing the situation raises questions about the needs of university students overall.

As mentioned, since these original discoveries, my role with MLFTC has shifted. In January 2022, I became an instructor for the Environmental Education (EE) Certificate program, a certificate program in the Teachers College. With the understanding that sustainability and the health of our planet's environment are concerns in every economic sector and profession, the EE Certificate prepares our future leaders in environmental awareness and sustainable practices that may be incorporated into any workspace. This 15-credit certificate enhances future leaders' resumes and increases students' potential career options. The EE certificate program is designed for traditional and nontraditional educators and is available to any degree-seeking ASU student, not just MLFTC students.

My employment circumstances have allowed me to observe a larger student population. As an instructor in the EE certificate, I now teach on multiple campuses and in various formats, in-person and online, increasing my exposure and contact with ASU students. The EE certificate offers courses such as Introduction to Environmental Education, Ecology and Natural History of the Sonoran Desert, Nature Journaling, Biodiversity Conservation, and much more. In my first semester as an instructor, I incorporated a “sit spot” into Nature Journaling and two Ecology and Natural History of the Sonoran Desert sessions. A sit spot, put simply, is a location in nature that one visits with the intention of sitting still, being quiet, and getting to know the area (Young et al., 2010). When visited regularly, a sit spot can create awareness, increase observation skills, and heighten one’s senses. As part of the assignment, I asked students to find a place to

observe. Before starting initial observations, I asked students to sit quietly for a couple of minutes and connect with nature by focusing on their senses. What do you see? Hear? Smell? Feel? Frazer and Stathas (2015) state, “Becoming more aware of one’s thoughts, mental processes, emotions, and sensations, one’s physical and psychological well-being begins to improve in all areas of life” (p. 78). Then, I asked students to document their observations and draw what they see in nature. Similar to students attending mindfulness events on the Polytechnic campus, EE students commented, "This is relaxing," "We should do this more," and "I was so stressed. I really needed this," and in Ecology and Natural History of the Sonoran Desert, “Seeing it is so different from looking at photographs.” Based on these first semester’s observations, there is a need for student support in stress reduction across academic platforms (online and in-person). These initial observations during outdoor activities compel me to further research mindfulness practices, the impact of nature, and their place in a university setting.

As briefly introduced in the earlier section, mindfulness is one coping strategy that has the potential to assist students in alleviating stress. Although mindfulness is relatively new to the mental health arena, it has historically been present in Buddhist culture but only arrived in the United States in the 1970s. The use of this mindfulness practice is on the rise. Mahalingam and Rabelo define mindfulness as "the cultivation of attention to 'feelings (experiences, thoughts, beliefs, etc.) and the ability to experience them as they are (letting it be) without needing change'" (2019, p. 52). Mindfulness is living in the present moment, acknowledging and accepting your feelings, thoughts, and the way your body feels. Sparks (2018) believes that mindfulness positively affects

individuals by improving mood, reducing stress, anxiety, and depression, as well as embracing less negative thinking and distractions. Yamada and Victor (2012) document that mindfulness meditation incorporated into university classroom learning outcomes benefits students by reducing perceived stress levels, lessening rumination, increasing self-compassion, and decreasing anxiety. Research shows mindful university students have higher self-esteem, lower anxiety, self-regulation behavior, and a positive association with trust and social support during trauma exposure (Weaver & Swank, 2021).

ASU has established a mindfulness center on the Tempe Campus to address this new awareness regarding the importance and impact of mindfulness. The mindfulness center is open to all ASU students who choose to visit it on the Tempe Campus. Understanding the positive effects of mindfulness, the center serves ASU students, faculty, and staff with the purpose of "deepening ASU's culture of healthfulness, personal balance, and resiliency among students and employees" (ASU, n.d.). It is essential to note the population that the mindfulness center services. It is not only our student population that is challenged by life stressors. Stress does not discriminate. The faculty and staff that support the university student population also are challenged by life stressors. Flook, Goldberg, Pinger, Bonus, and Davidson (2013) document the role of the educator in the classroom climate, student learning, and social-emotional support for students and acknowledge that the educator's stress levels may impact their ability to perform these tasks at their optimal capacity. Although the university supports its community's well-

being by providing mindfulness services, not all students take advantage of these services. Thus, additional support is needed.

Nature also contributes to a person's well-being. Howell, Dopko, Passmore, and Buro (2011) state, "Wilson's (1984) biophilia hypothesis predicts that people's psychological health is associated with their relationship to nature" (p. 166). Biophilia is a theory that suggests humans have an innate tendency to connect with nature or other living things. This connection is human nature. Scheibel, Gallinat, and Kühn (2022) suggest that the "biophilia theory has posited an automatic, potentially deep-rooted need for contact with nature. Acting against this proposed tendency to seek contact with natural environments may affect mental health" (p. 1). Some benefits of connecting with nature include stress reduction, improved attention, positive influence on mental restoration, and a coping strategy for attention deficit (Grinde & Patil, 2009). Grinde and Patil (2009) also suggest that connecting with the outdoors has physical health benefits and increased longevity. Nature connectedness comes from various experiences, such as being in the wilderness, at a park, in a garden, or bringing nature to one's residence.

Combined, nature and mindfulness may potentially be a natural remedy for students' mental health and well-being. The beneficial qualities mentioned in the preceding paragraphs speak to the advantages of mindfulness and nature connectedness. The two adaptive coping strategies cohesively intertwine, allowing individuals to benefit from each. Nature connectedness and mindfulness were explored by Schutte and Malouff (2018). The researchers analyzed data from 2,345 participants and noted that there was a significant association between greater mindfulness and more connectedness to nature.

The study identified that the non-judgmental perspective that mindfulness demonstrates encourages individuals to fully engage in the nature experience. This deeper level of experience develops a sense of connectedness to nature. The study also concludes that those participants who spent 30 minutes a day in nature for 30 days showed significant increases in mindfulness. Furthermore, those who engaged in mindful meditation reported a greater connection to nature compared to those in the control group.

Mindfulness practices and nature connectedness are critical components of this study. Based on the conversations with Polytechnic MLFTC students, observing students at stress-relieving activities, and monitoring students' reactions to outdoor assignments in the Environmental Education certificate program, the data collected indicates a need for student support. This study will examine if mindfulness practices support increased connection for students in the Environmental Education certificate program, allowing students to manage their stress levels better and increase student success. With the importance of mindfulness and nature connectedness as a coping strategy in mind, the following research questions were formulated: 1) What is the perception of mindfulness practices experienced in a natural environment by students enrolled in Environmental Education (EE) Certificate courses? 2) What do student participants identify as the effects of incorporating nature and mindfulness into their EE curriculum? (How do nature and mindfulness impact university students and the university curriculum/courses?)

Problem of Practice

My initial exposure to the problem of practice started on the Polytechnic campus. Through conversations with MLFTC students, multiple challenges were discovered.

However, students identified one common problem: the stress of integrating work, life, and school. With a shift in employment from administrative specialist to instructor in January 2022, an opportunity to observe a larger student population emerged. I now have access to students in the Environmental Education certificate program, teaching courses in-person and online to students on multiple campuses. The EE certificate is offered to every college at ASU and has a growing enrollment. In Fall 2022, approximately 370 students enrolled in EE certificate courses. Initial observations in my new role are that there is still evidence that managing stress is challenging. Mindfulness practices combined with integrating nature into university courses would benefit university students. Incorporating mindfulness and nature into university courses would expose students to coping strategies that could combat the stress that affects assignment completion, quality of assignments, student mental health, as well as their physical health. Therefore, there is evidence that students would benefit from learning mindfulness practices and the benefits of nature connectedness that would allow them to decrease their stress levels and increase the students' success rates.

Research Questions

The following research questions were formulated: 1) What is the perception of mindfulness practices experienced in a natural environment by students enrolled in Environmental Education (EE) Certificate courses? 2) What do student participants identify as the effects of incorporating nature and mindfulness into their EE curriculum? (How do nature and mindfulness impact university students and the university curriculum/courses?)

CHAPTER 2

THEORETICAL PERSPECTIVES AND RESEARCH GUIDING THE PROJECT

Chapter 1 defined the purpose of this project. The chapter documented the local and larger context, provided statistics concerning the problem of practice, and introduced the concept of mindfulness and nature. Chapter 2 will examine two theoretical perspectives, Sociocultural Learning Theory and Attention Restoration Theory, their connection to the problem of practice and the possible implications of using these theories as a lens for this study. Prior to examining the two theories, I will begin the section discussing literature relevant to this study, the benefits (effects) of nature and mindfulness, and a general overview of the topics and their relevance.

Nature Connectedness: Nature and Mindfulness

Nature

Nature connectedness and mindfulness are not new practices. Throughout human existence, cultures have been connected to their environment and dependent on the natural resources provided by the earth's ecosystems, the interconnected systems of biological organisms, and the physical environment. This dependency and relationship with the Earth formed the foundation for the cultural norms and the development of a sense of place that taught these early societies to respect and be mindful of their surroundings, appreciating the land, water, air, flora, and fauna. This sense of place establishes a deep connection to the environment, bonding an individual to the natural surroundings. The feelings of comfort, safety, and well-being established by forming a

sense of place contribute to the development of stewardship, which is conserving, caring for, and being mindful of the natural environment and its resources.

Historically, the connection between humans and nature is recorded dating back to the beginning of time with the hunter and gathering societies. Early humans were dependent on nature and their environment for survival. Indigenous cultures have represented their connection to nature through artistic expressions, such as dances, songs, and storytelling. The Indigenous people view themselves as part of nature, an extension of an ecological family shared among ancestry and origin (Salmon, 2000). Their cultural views are that their relatives are a part of all-natural elements of the ecosystem. This perspective forms mindful interactions with nature and enhances the preservation of the ecosystem. The indigenous people's relationship - beliefs, attitudes, emotions, and behaviors - with nature is an example of nature connectedness, "a psychological construct that describes a realization of our shared place within nature" (Van Gordon et al., 2018, p. 1654). Nature connectedness is passed from generation to generation, shifting or remaining the same depending on life circumstances and the evolution of the culture.

This connection with nature has been challenged over time with the advancement of our innovations, and the need to assimilate (forced or chosen) into modernity has dramatically changed the ways in which people connect and engage with non-built environments. Population growth, advancements in industry, and urbanization have depleted our natural resources, reduced natural spaces, and created more economic demands. With industrial innovations, current social and cultural norms, the development of technology, and increasing priorities on an individual's time, people often spend more

time engaged in intellectually focused tasks indoors than leisurely exploring nature outdoors. The Yale School of the Environment confirmed this trend when they reported on a survey conducted with 12,000 adults and children across the United States. The survey concluded that many people had lost a close connection with nature due to the increasing use of computers, smartphones, televisions, and other technologies. These technology connections and the trend of urbanization are pulling individuals away from nature. The study goes on to state that half the adults surveyed spend 5 hours or less in nature each week; the children of those in the study spent three times more time on technology than time outdoors. The participants acknowledge that along with technology pulling them from nature, workplaces and schools do not encourage contact with the natural world (Yale School of the Environment, 2017). This shift in lifestyles has changed the landscape of our interaction with our environment. Long work hours and increased cognitive demands have caused increased stress levels, mental fatigue, and even mental exhaustion.

A growing number of research studies suggest that exposure to nature has numerous benefits for health and well-being (Grinde & Patil, 2009; Kaplan & Kaplan, 1995; Louv, 2005). Connecting with nature is associated with greater life satisfaction, improved vitality, decreased anxiety, improved meaningfulness, happiness, creativity, and pro-social and pro-nature behaviors (Van Gordon et al., 2018). Thus, the disconnect with nature is a growing concern but not a new one. In 2005, Louv created the term nature-deficit disorder to describe the concept that humans, children, in particular, were spending less time outdoors than they had in the past. This shift is primarily due to

electronics, decreased open spaces, poor urban planning, street traffic, parental fear magnified by media outlets, and the diminished importance of the natural world (Driessnack, 2009). In the absence of nature, humans are losing the opportunity to experience the natural world and understand the perspectives of others. Additionally, suppose one does not go outside. In that case, one cannot benefit from the rewards of nature, such as enhanced cognitive function, increased attention span, ability to focus, creative thought processes, problem-solving, self-discipline, and self-regulation, as well as reduction of stress (Driessnack, 2009).

It is impossible to talk about nature connectedness without recognizing the connection between nature and mindfulness. Nature has the ability to capture our attention. Many of us have found ourselves mesmerized by the colors in a rainbow, captivated by the sound of moving water or the smell of pine trees, hypnotized by moving cloud formation, or a number of other observations of the natural environment. This innate human instinct to connect with nature and other living things is called biophilia, a concept developed by Edward O. Wilson in 1984 (Wilson, 1984). Nature has a way of connecting us with our senses, causing us to pause and be in the moment. In nature, we more often than not allow ourselves to take a deep breath and be more present and mindful. The mindful state heightens our observations, allowing us to notice patterns and rhythms of the environment around us. Mindfulness in nature can help support our inner resilience, connection with the world around us, and capacity to support one another.

Mindfulness

Mindfulness is being aware and attentive to the present moment without judgment but acceptance of the experience (Ingram et al., 2019). Originating from Buddhism, mindfulness has been recognized as a beneficial practice by Western society. There are a variety of mindfulness practices that are proven successful coping strategies. These practices are as follows: mindful meditation, walking meditation, mindful eating, loving-kindness meditation, breathing techniques, body scans, yoga movements, walking, sitting, eating, Holistic Arts-Based Program (HAP), art-making, and Mindfulness-based Art Therapy (MBAT) (Beerse et al., 2020; Coholic et al., 2021; Corti & Gelati, 2020; Ingram et al., 2019; Zabelina et al., 2020). The intervention for this research project will include one-minute breathing meditation, an exercise to connect students to the moment, and Mindfulness-based Art Therapy.

Mindfulness-based Art Therapy

Mindfulness-Based Art Therapy (MBAT) derives from the Mindfulness-Based Stress Reduction (MBSR) Program developed by Jon Kabat-Zinn. MBAT integrates art with mindfulness skills with a focus on wellness and aligns with each individual's innate capacity for well-being. Additionally, the creativity component of MBAT contributes to self-regulation, consciousness, openness, and open-hearted playfulness (Peterson & Rappaport, 2014). MBAT was found to be beneficial to individuals displaying signs of "negative bias in attention and memory, behavioral inhibition, negative emotions, hyper-vigilance, and disruptive ruminative thinking" (Peterson & Rappaport, 2014, p. 65). While university students were not the focus of the study, stress-related variables are

comparable to those observed at the university level. The study acknowledges the benefits of activating the body's rest and repair system, which is associated with improving self-regulation, attention, memory, and decision-making. Also noted as positive byproducts of MBAT are positive emotional states and enhanced immune function.

The consequences of stress among university students that are not addressed can lead to mood disorders, risk of cardiovascular disease, autoimmune diseases, gastrointestinal problems, sleep quality, weight gain, and cognitive functioning health (Beerse et al., 2020). Stress and anxiety also impact academic success, GPA, and dropout rates. When art and mindfulness are combined (MBAT), research has shown a significant reduction in perceived stress and anxiety, benefitting the mental health of university students (Beerse et al., 2020).

MBAT is typically done in a therapeutic setting, but some non-clinical applications and exercises exist. For example, MBAT may be incorporated at home to regulate emotions or express feelings. An MBAT exercise may include a breathing meditation or body scan in conjunction with a drawing or painting. Art medium may vary depending on the activity and may consist of drawing or painting materials, playdough, clay, chalk, pastels, or other art materials. MBAT exercises connect the body with the mind through creative expression and reflection. They often include connecting to the individual's senses to deepen awareness and keep them in the present moment. For this study, MBAT will be modified from the clinical approach to a self-administered, non-clinical approach, as documented in this paragraph.

Theories and Implications

Nature and mindfulness are the primary focuses of this study. As mentioned in Chapter 1, university students demonstrate signs of stress, indicating a need for additional support systems via coping strategies for stress management. Students at the university level come from various cultural backgrounds and life experiences. Life experiences and exposure to information make each student unique, making it difficult to educate individuals with "a one-size-fits-all" approach. Understanding human development and the theoretical perspectives that guide the learning process is essential to increasing the probability of impacting the students I serve. Based on this knowledge, my research has suggested that two theoretical perspectives will help support the needs of the student population I serve: Sociocultural Theory and Attention Restoration Theory.

Sociocultural Learning Theory and Situated Learning

History and Related Studies

Sociocultural Learning Theory is one theoretical perspective in which this project will be viewed. Vygotsky's (1920) sociocultural theory suggests that learning is not individualized; learning occurs during interactions. During these social interactions, humans rely on tools, such as symbolic signs, to mediate or regulate their relationships so that they can interact and learn about the world around them (Lantolf, 2000). Vygotsky argues that the human mind is a functional system that organizes information and experiences based on culture by integrating symbolic artifacts into thinking (Lantolf, 2000). This functional system has been documented over time, from indigenous people to current cultures. The physical and symbolic artifacts created by humans establish a

culture and cultural norms. Cultures are passed down from generation to generation with slight modifications as they transform from one generation to another.

As students are the focus of this study, cultural diversity must be considered. Sociocultural components such as communication influence learning (Englund et al., 2018). Culture and communication patterns positively and negatively impact learning. On a positive note, these components offer support, while the negative impacts impede change. Englund et al. (2018) examine the sociocultural and structural context in which teachers in higher education identify the differences in learning. Individual perceptions influence their approach to teaching and learning, and so does collaboration. Each of these components impacts cultural construction and education.

Vygotsky acknowledged that through others, we become ourselves (Vygotsky & Cole, 1978). Culture plays a critical role in students' interpretations of lived experiences. In this study, the students' culture will likely affect how they experience the mindfulness practices implemented in Environment Education certificate program courses. Likewise, culture will influence students' views and perspectives on nature. Whether the EE course is online or in-person, culture will play a key component in students' interpretation of the information. Additionally, in-person or online courses may integrate discussion (or reflection) components that may include peers. Thus, peer interactions will be inevitable, supporting learning as an inherently social process.

The Sociocultural Theory notes that the social process is activated through the Zone of Proximal Development (ZPD). Vygotsky defines the ZPD as "It is the distance between the actual development level as determined by independent problem solving and

the level of potential development as determined through problem-solving under adult guidance or in the collaboration with more capable peers" (Vygotsky & Cole, 1978, p.86). Based on this definition, there is evidence that learning depends on context, experience, and relationships with peers or other individuals and is, therefore, a social process. The Zone of Proximal Development is where learning takes place through opportunities created by interactions, collaboration, and relationships.

Each student brings a pre-structured cultural experience that will impact their learning**.** Their learning is based on social experiences that existed throughout their lives. Through life experiences, individuals gain knowledge, perceptions, values, beliefs, stereotypes, and misconceptions. These "frames of reference" guide an individual's development and decision-making process. As individuals are exposed to new concepts, thoughts, and ideas, they are pushed outside their current level of understanding (ZPD). As students explore and evaluate these new concepts, they try to reach equilibrium and a new level of understanding.

With the understanding that changes occur within a community (social) setting and cultural influences, students will have the opportunity to reflect on and share their experiences with mindfulness practices and nature. The peer discussions will allow students to hear the perspective of others' experiences and learn from those experiences, utilizing the ZPD and peer interaction. "By giving our students practice in talking with others, we give them frames for thinking on their own" (Vygotsky & Cole, 1978, p.19). Along with the learner-centered, collaborative approach to learning, the environment plays a role in the learning process (Bashir-Ali, 2007). Sociocultural theory indicates that

teaching and learning activities should occur in an environment where the community operates or gathers (Bashir-Ali, 2011). The students will have the opportunity to choose an environment to conduct the intervention, allowing them to meet their needs in a community environment where they feel safe and supported. The importance of collaboration and environment will be considered in this study as social and cultural aspects of student learning.

Criticism of Theory

Other learning theories contradict the sociocultural approach. Ozola and Purvins (2013) examine teaching and learning theories in an educational setting, such as Piaget (1936), who hypothesized that individuals are responsible for their own knowledge instead of receiving it from others. Piaget also notes that learning is universal. This perspective contradicts the sociocultural learning theory that suggests that learning can differ between cultures and incorporates peers or other individuals into the students' learning process. The sociocultural theory acknowledges that culture plays a vital role in understanding the world around us. Critics argue that sociocultural theory is not equal to all in the culture; social groups may not experience equivalent learning experiences or gain the same meaning from an experience.

Another criticism of Sociocultural Theory centers around the Zone of Proximal Development (ZPD). Ameri (2020) says that ZPD is unclear, and there is no clear explanation for its use. ZPD does not consider learning needs, capability levels, or motivational influences. Ameri further states that the ZPD does not explain the learning process. Critics demonstrate concern that Vygotsky's sociocultural theory disregards the

role of the individual and only considers the collective perspective (Ameri, 2020). Furthermore, introducing individuals to the knowledge they are not prepared to engage in or are beyond their knowledge capacity means they are more influential to the beliefs and perspectives of others.

Combating the critics and building on Vygotsky's ZPD, Wenger and Lave (1991) propose the Situated Learning Theory. Situated learning suggests that learning occurs within a context, culture, and within activities. Northern Illinois University Center for Innovative Teaching and Learning (2012) documents that situated learning takes place "through the relationships between people and connecting prior knowledge with authentic, informal, and often unintended contextual learning (p. 1). Often times, through the collaborative learning experience, learning becomes unintentional rather than deliberate as new individuals in the community of practice learn from the more experienced. As members of the community learn more, they become mentors as new members join. The collaborative process encourages critical thinking and hands-on learning. The information learned is applicable and transferable to students' homes and communities.

Although some criticize the Sociocultural Theory, this theory focuses on the experiences and perspectives of the participants, which will be impacted by their cultural background. Experiences form who we are and what we believe. Additionally, culture provides individuals with beliefs and perspectives that form their worldviews. Worldview is the lens through which students look at the world, interact with people, view others' perspectives, and incorporate knowledge. Furthermore, the study has a discussion

component that will require students to respond and share thoughts with other students, engaging in the social aspect of learning as stated in the Sociocultural Theory. The sociocultural lens, combined with the knowledge that situated learning is a collaborative process that takes place in a relevant environment – a concept that will be revisited in the Attention Restoration Theory discussion - will be a focal lens for this study.

Relevance to Problem of Practice

University students have stated that they are experiencing increased stress levels. Evident through conversations and interactions with students, students are challenged by integrating work, life, and school. Managing time to give each portion of life the attention that meets the students' expectations elevates student stress levels. Sociocultural theory indicates that individuals learn through experience and the people around them. Therefore, through experiencing mindfulness practices together and engaging in nature together, students will learn a coping strategy to help them manage their daily life stressors.

Some benefits of learning coping strategies include reducing stress levels, which can improve the quality of physical and mental health. In a Mindfulness-based College study that included 96 participants, Loucks, Nardi, Gutman, Saadeh, Li, Vago, Fiske, Spas, and Harrison (2021) found that mindfulness can improve "self-regulation pathways, including attention control, interoceptive awareness, and emotion regulation" (p. 610). Louck et al. noted that the students exposed to mindfulness interventions had increased resilience in stressful situations such as final exams and term papers.

The study also acknowledged that students in the control group with no mindfulness training had increased stress during final assignments. Increased stress levels can lead to adverse health habits such as alcohol and drug use, sedentary behavior, or decreased sleep quality (Louck et al., 2021). Acquiring and implementing mindfulness practices into everyday life "can positively affect loneliness, depressive symptoms, sedentariness, and sleep quality" (Louck et al., 2021, p. 610). In higher education, there is potential for exposure to experiences and environments that may induce a stress reaction. Presenting students with mindfulness practices that encourage a positive response to stressful situations rather than an adverse reaction would benefit student success. Sociocultural theory suggests that experiences and culture shape our response to the world around us. Thus, the Environmental Education certificate curriculum will embed mindfulness practices that encourage new thought processes and potential coping strategies. Whether a student attends class in person or online, existing relationships and new relationships will impact the learning process. Additionally, for a student to learn, it will be necessary to create relationships that encourage the learning process.

Along with the sociocultural theory lens to analyze students' experiences with mindfulness, this lens will be used to examine students' experiences with nature. Research indicates that nature is good for health and well-being (Van Gordon, Shonin, & Richardson, 2018). The intervention for this study will have a nature component. Van Gordon et al. (2018) acknowledge that nature connectedness is associated with one's emotions, beliefs, attitudes, and behavior towards nature. Individuals' upbringing and cultural identity will directly impact how they view and believe about nature. Likewise,

discussions will allow students to share perspectives and learn from each other, incorporating a situated learning perspective that will identify what students learn in this situation.

My problem of practice exists within the university context. ASU has a diverse student population. Students will vary in gender, ethnicity, special needs, socioeconomic status, and other demographic identifiers. Likewise, student experiences will vary. Any exposure to exclusion, oppression, discrimination, or life experience will shape the lives of the ASU students. Viewing my research through a sociocultural and situated learning theory lens gives a voice to our diverse ASU population and their perspectives on mindfulness and nature connectedness. Attitudes and perceptions toward nature are not universal; they are "influenced by a wide range of factors, like individuals' experience in their home environment, safety concerns, and various other sociocultural factors" (Sedawi et al., 2021, p. 193). In addition to attitudes and perceptions that influence nature connectedness, other sociocultural factors are critical contributors to our views of nature. For example, all individuals may not have the same access to nature or the same understanding of the benefits of nature.

Attention Restoration Theory

History and Related Studies

Attention Restoration Theory (ART) is a theory that Rachel and Stephen Kaplan developed in the 1980s. Similar to E.O. Wilson's (1984) biophilia concept, Kaplan and Kaplan argue that nature is a basic need. Over the years, technology and urban development have replaced exposure and engagement with nature. The theory suggests

that exposure to natural environments may restore one's ability to concentrate; it proposes that exposure to nature is enjoyable and can also help us improve our focus and ability to concentrate (Ohly et al., 2016). While this theory applies to any individual, this study will reference "students" as the study focuses on university students' mental health and well-being. ART acknowledges that there are two kinds of attention: involuntary attention and directed attention. Directed attention requires students to focus on content that may not be particularly interesting to them or consists of demanding stimuli. In the case of university students, some of these demanding stimuli consist of listening to lectures, studying for exams, preparing for presentations, sitting for tests, working on a project or assignment, or even receiving repeated phone notifications that may distract from the task at hand (Yusli et al., 2021). Involuntary attention requires little to no effort at all, occurring when "something exciting or interesting happens, and we look to discover what is going on" (Kaplan & Kaplan, 1995, p.179). Some examples of involuntary attention are our fascination with clouds in the sky, waterfalls, or tranquil bodies of water. Humans can often easily focus on natural elements. Nature captures someone's attention and engages them without using directed attention, allowing restoration to occur.

Directed attention and involuntary attention are used throughout the day. Of these two types of attention, our directed attention is a limited resource. Mental fatigue emerges when students deplete this resource due to high cognitive demand. Mental fatigue causes students to have a lapse in attention, challenges with self-regulation, cooperation, work performance, and problem-solving and increases irritability (Kaplan & Kaplan, 1995; Yusli et al., 2021). To replenish students' directed attention and reduce

mental fatigue, students need to use involuntary attention, which is effortless (Kaplan & Kaplan, 1995). Nature is a stimulus that captures students' attention without taxing students' directed attention; thus, looking at natural environments allows students to achieve cognitive restoration. Research shows that each attention mechanism impacts the brain differently. Viviers (2016) notes that the two attention mechanisms established in the Attention Restoration theory require "different neural signatures allowing different sets of neurons to function and rest in alternate fashion" (p.5). Viviers' study demonstrates that activating students' involuntary attention will give them the opportunity to restore their directed attention, increasing their working memory, problem-solving skills, and self-regulation capacity.

Knowing that involuntary attention is necessary to replenish optimal cognitive function, students will need to be introduced to environments that welcome restoration. Therefore, to activate involuntary attention, one must find a restorative environment. According to Kaplan's theory, there are four properties of a restorative environment: 1) "Being away" or providing an escape from routine, ordinary, daily activities and concerns; 2) "Extent" refers to the scope to which one feels immersed and engaged in the environment; 3) "Soft fascination" is the aspects of the environment promote involuntary attention or captures attention effortlessly; 4) "Compatibility" refers to the individual's willingness or want to be exposed to and appreciate that particular environment (Ohly et al., 2016).

Nature meets the four properties of a restorative environment and assists with cognitive restoration. There are four contributions that natural environments make toward

restoration. These contributions consist of clearing one's head, mental fatigue recovery, soft fascination, and reflection and restoration (Kaplan & Kaplan, 1995). The first level, "clearing the head," is achieved when the individual daily thoughts, worries, or concerns are allowed to pass through the mind and fade away naturally. It is important to note that this needs to be a natural process; thoughts should not be "pushed away" but instead be allowed to naturally leave the brain or fade away (Kaplan & Kaplan, 1995). The second level, "mental fatigue," marks the beginning of restoration. Mental fatigue recovery allows directed attention to be restored. The third level of restoration is "soft fascination." Soft fascination quiets internal noise and allows a quiet mental space to relax, clearing the "clutter." Finally, the last level of restorativeness is restoration. In cases where deep restoration is achieved, reflection is often involved in the process. The restorative process will allow students to "relax, restore their attention, and reflect on their life, priorities, actions, and goals" (Han, 2003). Each student's level of restoration will be dependent on their experience. If a student is not able to "let go" of internal thoughts and concerns, they will not move past the first level, and restoration will be minimal. However, the restoration will be more successful if students can embrace the process and are fully engaged in nature.

Criticism of Theory

Critics argue that Kaplan and Kaplan make many assumptions in the Attention Restoration Theory and that the characteristics of a restorative environment are not clearly defined (Neilson et al., 2019). Notably, there is a focus on soft fascination and the lack of research noting that there is no obvious environment that captures involuntary

attention (Neilson et al., 2019). The authors also suggest that the majority of studies evaluating the theory are quantitative and use a self-support system. Neilson et al. (2019) describe self-report systems as inconsistent; thus, there are no accurate measurements of directed attention depletion or restoration. Without accurate measurement, researchers question the validity of the need for the characteristics for restoration.

Criticism extends beyond the Neilson et al. study. Joye and Dewitte (2018) also document that the Attention Restoration Theory is based on assumptions. The authors acknowledge that Kaplan and Kaplan suggest nature has the capacity to restore one's attention to baseline levels. The lack of evidence on recovery leads the authors to question the lack of explanation of restoration beyond those baseline levels. The overall analysis of Joye and Dewitte is that the Attention Restoration Theory needs "further theoretical development of the framework and points to the importance of additional empirical verification of central theoretical assumptions" (2019, p. 5).

While these two studies question the validity of the Attention Restoration Theory, many studies have found the theory applicable. Of particular interest to my research is the 2021 study by Yusli, Roslan, Zaremohzzabieh, Ghiami, and Ahmad. This cross-sectional study looks at 192 postgraduate Malaysian students to assess the relationship between perceived restorativeness and psychological well-being, using Kaplan's four properties of a restorative environment: being away, extent, soft fascination, and compatibility. Multiple reliable measurement scales were used to determine that three of four properties – being away, soft fascination, and compatibility – were predictors of well-being among postgraduate students (Yusli et al., 2021). This study examines the possibility that

viewing nature through a window is a method for restoring students' attention. The positive outcomes of this study will be revisited in my research as I examine viewing nature from a window and engaging in nature outdoors as part of the innovative project experience.

Relevance to Problem of Practice

University students encounter stressors throughout their collegiate academic careers. Many students encounter various life circumstances for the first time, such as being away from home, living with roommates, managing finances, and adjusting to new academic standards. Academically, students are asked to use their direct attention mechanism to listen to lectures, compose presentations, complete assignments, study for exams, problem-solve, and complete projects. As stated previously, directed attention is a limited resource that can be exhausted. As this resource is depleted, human error occurs, and emotional regulation is impacted by work completion and collaboration processes. To replenish and restore cognitive function, students need to use involuntary attention.

Involuntary attention is a coping strategy that can combat the stressors that university students encounter, increasing students' mental health and well-being. The Attention Restoration Theory suggests that there are four properties of a restorative environment as well as four levels of restoration. As part of the innovation design plan, students will be given the opportunity to view nature from an indoor and outdoor vantage point. This exposure to nature in different environments will allow the researcher and the students to identify which environment is more restorative for students and what levels of restoration are accomplished in each environment.

While restoring students' cognitive abilities is one reason ART is a lens for this study, there is another consideration. Nature connection starts as a child when parents take their children to green spaces, impacting the child's preferences, attitudes, and behaviors toward the natural environment (Sociocultural Theory). However, with shifts in parental focus and priorities, many children never receive the opportunity to engage with the outdoors and form those connections with nature (an example of Richard Louv's nature deficit disorder and sociocultural influences on learning). Universities have landscaped their campuses with aesthetically pleasing green spaces to appeal to students and maintain student retention. While these landscapes make the campus a pleasure to view, the natural environment is widely underutilized by university students, faculty, and staff for nature's positive benefits on health and well-being. This study states that exposure to and engagement with nature are linked to positive health and well-being. If we do not utilize the natural environment and expose students to multiple outdoor opportunities and experiences, they cannot benefit from what nature offers. Thus, the innovative project for this study seeks to implement nature and mindfulness in university courses.

CHAPTER 3

METHODS

The previous sections of this paper documented the problem of practice, larger context, local context, theoretical perspectives, and the research guiding this project. This section will discuss methods used in earlier cycles of the study and those used to collect further data in this action research, mixed methods study. The section will begin with a brief introduction and then discuss the setting, participants, the role of the researcher, the innovation design plan, the qualitative and quantitative strategies used in this research, and the timeline and procedures being used.

This project used action research to examine mindfulness and nature as effective coping strategies for students enrolled in two of the MLFTC Environmental Education certificate program courses. Action research is a cyclical process, which includes identifying a focus area, collecting data, analyzing and interpreting that data, and developing a plan of action (Mertler, 2019). In the educational field, this process is continual as educators constantly look for ways to improve student outcomes. The process of action research is essential because the research connects theory to practice, improves education, and advances educators' practice by empowering teachers, supporting professional growth, as well as supporting social justice advocacy (Mertler, 2019).

Cycle 0 and Cycle 1 Overview

Cycle 0 occurred during the initial discovery phase of the study when I was an administrative specialist on the Polytechnic Campus. A problem (a need for coping

strategies for university students) was identified through preliminary observations and discussion. During Cycle O, to gain further insight, five MLFTC faculty/staff members and four MLFTC students from the Polytechnic campus were contacted to participate in Cycle 0 interviews. The student and colleague interviews consisted of ten questions composed to better understand the initial problem of practice involving Polytechnic MLFTC students. The details of Cycle 0 will be discussed later in this chapter's qualitative and quantitative strategies section. The goal of the interviews was to gain an understanding of the challenges that the Polytechnic students faced.

Understanding that MLFTC students might benefit from additional support, a small-scale innovative project introducing mindfulness practices and nature as potential coping strategies was implemented during Cycle 1. The program consisted of seven mindfulness practice sessions administered throughout the Fall 2021 semester. Three of these sessions were mindfulness walking (in nature), and four were Mindfulness-based art therapy. Mindfulness walks consisted of short ten-minute walks around the Polytechnic campus. Mindfulness-based art therapy (MBAT) consisted of a variety of art-based activities. MBAT activities were set up in the conference room with quiet, calm music playing on the TV as it displayed a screen saver (waterfall, fireplace, nature). The diffuser diffused “stress away,” “peace and calming,” or “thieves” essential oils. Fluorescent lights were replaced with natural lighting bought in from the large windows.

In Cycle 1, I used a mixed-method approach by collecting qualitative and quantitative data to answer the following research question: How do mindfulness practices influence students’ ability to effectively manage life stressors? Quantitative data

were collected via the Perceived Stress Scale (PSS) and the Intervention Activity Survey (IAS). The PSS was given to the two participants for Cycle 1. This survey used a Likert scale to determine the students' perceived stress levels. At the end of the innovation, the students were given the PSS to determine if mindfulness practices supported their stress management and decreased their perceived stress levels. The PSS determined that both students had a high level of perceived stress before the innovative project. The post-PSS survey also indicated that both students' perceived stress levels remained high. In fact, each student's PSS increased by at least one point. These findings may have been due to a number of contributing factors: 1) Mindfulness practices were not adequate coping strategies for university students; 2) The practices may have been effective, but students did not implement them outside scheduled event time; 3) With two participants, the low sample size may have influenced the findings; 4) Mindfulness is a practiced skill and requires time to become a routine (change takes time); students may not have had enough time interacting with the practice for them to become life practices; 5) The lack of reflection and peer collaboration may have impacted the learning process; concepts were not transferred to background knowledge.

The information provided in the Intervention Activity Survey (IAS) was analyzed to help determine if mindfulness practices were effective methods for decreasing student stress levels or if outside event implementation was the challenge. The IAS was administered during each mindfulness practice session. The IAS used a Likert scale to evaluate student stress levels before and after a session and the session's effectiveness. The first two questions were answered before the innovation was administered to

determine existing stress levels and anxiety in participation in the mindfulness session; the remaining question determined the project's impact and asked the students to rate their experience and effectiveness of the session. Student A showed decreased stress levels after each mindfulness practice session, while Student B remained at the same level. Speaking to Student B, I discovered she was experiencing significant health concerns with her heart, which may have required surgery. When participating in the mindfulness practices, Student B indicated that she could not "stop thinking" or "stop worrying." These findings may have suggested that there was an insufficient explanation of mindfulness and how it is used to focus on the current moment instead of past or future concerns. These considerations were noted as the research continued, and a more sufficient explanation of mindfulness was provided.

At the time of Cycle 0 interviews and Cycle 1 implementation, this study solely focused on MLFTC students at the Polytechnic campus. Since the initial discovery of the problem, the focus of the study has shifted to include a larger student population due to a change in employment. As an instructor with access to a larger student population, initial observations still indicated that students would benefit from mindfulness and nature as a potential strategy for managing stress levels. The initial discoveries and new observations were used to inform and plan the action research, implement the plan, and analyze the innovative project to identify success. The analysis allowed the researcher to modify the plan; modifications enabled the researcher to improve the plan's design and increase the positive impact on students.

My current role as an Environmental Education (EE) Certificate program instructor, combined with past research cycles and observation of students enrolled in EE courses, were the foundations for this action research. The EE certificate program offers multiple courses; however, two have been selected due to their current format and course content. The focus courses for this study were Nature Journaling and Ecology and Natural History of the Sonoran Desert. Each of these courses had a built-in "journaling" component, explained in the following paragraphs. Journaling supports learning by engaging both sides of the brain and encourages observation and curiosity while supporting the development of nature connectedness, positive attitudes towards nature, and naturalist skills. Nature Journaling and Ecology and Natural History of the Sonoran Desert already had assignments consistent with journaling.

Ecology and Natural History of the Sonoran Desert (SCN 301) is a four-credit science course where students learn content about the Sonoran Desert flora and fauna. Students completed several DIFA (Desert Investigation Field Activity) assignments throughout the course. The DIFA assignment requires students to go outside and make detailed observations about specific Sonoran Desert flora. Students must draw the species' overall picture and two focal area pictures. Students make detailed quantitative and qualitative observations. The qualitative observations are connected to students' sense to increase connectedness and observation. SCN 301 students are also required to research the specified species.

Additionally, the SCN 301 students keep a scientific notebook, a space for them to take notes about the SCN 301 course content. The DIFA and the science notebook are

learning techniques to document student learning, data collection, observations, support writing skills, vocabulary, scientific language development, and real-world application. The DIFA already contained fundamental pieces of the sit spot protocol – art, nature, observation – thus, it was selected for use in this study. In addition to the already established components, mindfulness techniques such as one-minute box breathing, connecting with their senses, drawing (already included), and reflection were included in the DIFA assignment so that they aligned with the study's sit spot protocol.

Nature Journaling (SCN 309) is a one-credit course offered through the EE certificate program. The course is an introduction to nature journaling. SCN 309 introduces students to drawing and journaling techniques while allowing them the freedom to creatively produce a journal entry. Assignments for this course require students to draw or paint natural elements, document observations (qualitative and quantitative), and reflect on their experiences. Currently, the course has mindfulness and nature connectedness components but does not explicitly name what each is and why they are purposeful. Like SCN 301, modifications were made for this study. Sit Spot protocol was introduced, and mindfulness components were identified and explained.

Setting

ASU is ranked number one among the state's public universities for first-year student retention rate at 86.2% (ASU, n.d.). The large university has campuses at multiple locations as well as online. In the Fall of 2021, there were 135,729 students enrolled at ASU (ASU, n.d.). Of those students, 54,866 attend classes at Tempe, 5,545 at Polytechnic, and 57,848 students enrolled online (ASU, n.d.). Demographics document

that the Fall 2021 students were the most diverse class in ASU history, with 46% of ASU's incoming first-year students from minority backgrounds (ASU, n.d.). ASU offers more than 400 academic undergraduate programs and majors and more than 450 graduate degree programs and certificates.

The EE certificate program is housed in MLFTC; however, the certificate is available to all ASU students. In the Fall of 2022, the EE Certificate program had an enrollment of 370 students. Students taking EE courses come from various academic degrees housed in multiple colleges offered by the university. The innovative plan for this study was embedded in two courses offered in the EE certificate program: Nature Journaling and Ecology and Natural History of the Sonoran Desert. Currently, nature journaling is solely offered on an online platform, although face-to-face options are being explored; the Ecology and Natural History of the Sonoran Desert classes are provided digitally and in-person on two ASU campuses: Polytechnic and Tempe. While the course is offered on the Polytechnic campus, in the Spring of 2023, when the innovative project was implemented, the Polytechnic course had low enrollment and was canceled. Therefore, the innovation was implemented in two locations: Tempe and online.

The first location for the plan took place online in two Nature Journaling classes. Nature Journaling is seven and a half-week Session A or Session B course. Session A and Session B classes are offered during each 15-week semester. Over the development and growth of the course, enrollment numbers for Nature Journaling have varied. Numbers have ranged from as low as five students in the developmental stage to thirty-two students enrolled in the Spring 2022 Session B course. The course content is distributed

on Canvas, a learning platform that organizes content via weekly modules. Nature Journaling is an online course that may have students attending from all around the world due to its online access.

The second location was an Ecology and Natural History of the Sonoran Desert in-person class offered on the Tempe campus. Tempe is a larger campus, which is reflected in class size. Student enrollment for an Ecology and Natural History of the Sonoran Desert class averages twenty-five students per semester. The course is a hybrid structure where students review and learn course content prior to scheduled class time. Content is reviewed during class, and content application becomes the focus. As a four-credit general science (SG) course, the Ecology and Natural History of the Sonoran Desert course also has a field lab component. The lab component requires students to venture outdoors to complete assignments. Course content is in-person and via Canvas. Content is organized in the same manner as Nature Journaling.

Participants

Students enrolled in two EE certificate program courses, Nature Journaling and Ecology and Natural History of the Sonoran Desert, were recruited to participate in this study. Surveys and the innovative project were embedded in the course content and completed by all students enrolled in the two courses. Students taking Nature Journaling and Ecology and Natural History of the Sonoran Desert were asked to join the study with the understanding that their participation was optional; there was no penalty for not participating. Because all the students were required to complete the incorporated activity components as assignments, there was no additional work to complete in the course if a

student decided to participate. Likewise, there were no repercussions if students did not choose to participate in the study. As the instructor in the courses, the workload remained the same, thus negating any emotions attached to the workload. Additionally, as part of the analysis protocol, the analysis only took place once the innovation had ended. This policy kept the participants and non-participants anonymous until the project was complete and grades had been entered in Canvas.

Students were recruited on four platforms: 1) two online Nature Journaling classes and 2) two Tempe Ecology and Natural History of the Sonoran Desert classes. Participants' demographics varied based on the diverse student population at ASU. The online platform for Nature Journaling was available to students worldwide. Recruitment started a week before the class with an email that included an explanation of the action research and a recruitment letter (see Appendix G). A follow-up email was sent during Module 1 of the course. The goal was to recruit a minimum of thirty-two participants between the two EE courses (consisting of four classes). The goal number was reached at the conclusion of Module 1, and no additional emails were distributed to students for recruitment purposes.

Role of the Researcher

My research was grounded in mindfulness practices and exposure to nature as potential coping strategies for managing life stressors. Mindfulness and nature are adaptive coping strategies that have been proven to be beneficial to student success. Mindfulness is a Buddhist-based practice that focuses on being aware and present in the moment with no judgment and an acceptance of your experiences. Mindfulness practices

include Mindfulness-Based Art Therapy (MBAT), meditation, mindful eating, mindful walking, and perspective (looking at challenges with compassion and optimism). Nature was broadly defined in this study. Exposure to nature activates involuntary attention, allowing students to replenish their directed attention and restore their cognitive abilities. This study introduced students to mindfulness practices that included MBAT, one-minute breathing meditation, 54321, and nature connectedness so that students could find the most effective method or methods for personal use.

In this project, I was a participant observer, where I participated in some activities; however, my primary role was an observer. As a participant, I walked with students in the natural environment, demonstrated using a one-minute meditation, and demonstrated the sit spot protocol. As the observer, I organized the innovative project's sit spots, integrating mindfulness and nature. I developed the sit spot protocol and curriculum incorporated into course content. Because both classes had an online component, the sit spot procedures were embedded in the Canvas course shell and reinforced during modules that focused on the activities for this research project.

While mindfulness practices were in progress, I took on an observer role to collect qualitative data. I gathered pre-project information through literature research and interviews. The interviews formerly conducted with students, faculty, and staff assisted in informing decisions about the practices and activities incorporated in this study. During the project, I used pre- and post-surveys to determine student stress levels and student perspectives of nature connectedness. I also used observation to collect qualitative data via anecdotal notes. Qualitative data played an instrumental role in determining the

sociocultural and restoration aspects of the student's experiences. The reflection component that was embedded into EE courses was also used to collect qualitative data. Data was analyzed to gain a better understanding and determine if common themes emerged.

The participant-observation role required me to use direct observations and participate in various study activities. This form of qualitative field research allows practitioners to adapt research to meet unique research needs (Robey & Taylor, 2018). Participant observation as a data collection method gives the researcher a better understanding because the researcher builds a relationship with the participant. Relationships were crucial to understanding student experiences throughout this study. My immersion into the study allowed for culturally relevant content and language to be developed while documenting non-verbal data through observations (Kawulich, 2005). This form of data collection supported the sociocultural and attention restoration lens by supporting learning as a social process, meeting the needs of diverse cultural backgrounds, and observing varying levels of restoration in university students.

The relationship-building component of this data collection method was ideal for establishing trust between the researcher and the students; a crucial attribute considering I am the researcher on this project and an instructor for the EE courses where the innovative project occurred. The combination of the two roles might have deterred students from participating or might have created a situation where students felt pressured to participate for fear of possible repercussions. Therefore, my role as a researcher remained separate from my instructor role. Furthermore, my explanation of the study was

presented in a way that emphasized the benefits of participation and highlighted volunteer participation with no consequences to coursework.

As the researcher, a participant, and an observer, the multiple sources of data collected gave me an opportunity to triangulate the data. This mixed-method research collected quantitative data from several Likert scale surveys and qualitative data from open-ended questions, discussions, and student reflections. The data was then triangulated to determine if the quantitative data was supported by the qualitative data or if the qualitative data provided more meaning to the findings of the quantitative data. As mentioned previously, the quantitative data collected in Cycle 1 concluded that students' PSS numbers increased. The reason for the increase was discovered with the qualitative data collected. The triangulation of data added validity to the findings. The triangulation of data added validity to the findings.

Innovation: An Innovative Project

The following portion of this paper will discuss the proposed innovative project for this action research study. The innovative project was the treatment or action that was implemented. This paper will discuss the preliminary design, supporting studies, and theories that support change.

Purpose of Innovative Project: Problem of Practice

Based on previous research cycles, participants in this study have documented high levels of stress and limited strategies for coping with that stress. The small-scale innovative projects to this point have identified two potential strategies that have alleviated student stress levels: mindfulness and engaging with nature. This study

continues to identify if mindfulness and nature are beneficial coping strategies for university students to manage their stress levels. The current iteration of this study was on a much larger scale than past iterations. Embedded in courses offered by the EE certificate program, the current study and its findings have the potential to impact more students.

As previously mentioned, in the Fall of 2022, the EE Certificate program enrolled 370 students from varying colleges across the ASU campuses. Of the multiple courses offered by the EE certificate, two were selected to incorporate the practices selected for this study. In the Fall 2022 semester, twenty-six students were enrolled in Nature Journaling, and forty-five were enrolled in the History and Ecology of the Sonoran Desert (in-person classes on Tempe). Throughout the semester, students attending History and Ecology of the Sonoran Desert were asked to identify their mental health status by holding up their fingers. Five indicated that everything was great; one indicated they were not doing well and needed to be elsewhere. A large portion of students indicated scores of three or less, with very few students displaying a five. The information provided by this informal data collection indicated there was still a substantial need for student support and therefore acknowledged the necessity for continuing this action research study.

Innovative Project: Preliminary Design

Mindfulness means maintaining a moment-by-moment awareness of our thoughts, feelings, bodily sensations, and the surrounding environment through a gentle, nurturing lens. Mindfulness practices and nature exposure were coping strategies for the innovation for this study. The project was embedded into courses so students engaged with the

strategies as part of completing Nature Journaling and Ecology and History of the Sonoran Desert.

The innovative project for this study took place over a semester. It included a Session A and B class, which was approximately seven and a half weeks in duration, as well as a Session C class, which was a 15-week course. The project consisted of a 6-week program incorporating one-minute breathing meditation, a "54321," and MBAT into four sit spot assignments that exposed students to nature on varying levels. The practices were incorporated into two EE courses: Nature Journaling and Ecology and History of the Sonoran Desert. Nature Journaling was a seven-and-a-half-week course offered in Sessions A and B each semester. It was an online course. The Ecology and History of the Sonoran Desert was a four-credit Session C course that ran for 15 weeks. This course was offered as an in-person and online course. However, the in-person course was the only platform included in this study.

Sit Spot: An Innovative Project

Students located a spot to complete the sit spot journal entry. Two sit spots took place inside, viewing natural elements indoors or "nature" through a window, and two took place outdoors. Once a site was identified, students were able to get comfortable in the environment. The one-minute breathing meditation was accessed via students' electronic devices. The link to the video was provided via the Canvas module and via a QR code. The video could also be accessed on YouTube by searching for the title "Box Breathing – 1 minute in length." Students followed the prompts on the video, breathing in for a five-count, holding for a five-count, and then exhaling for a count of five. This

breathing format continued for the duration of the one-minute video.

Upon completing the breathing meditation, students took a few minutes to connect with their surrounding environment using their senses. Students identified What they saw, what they heard, what they felt, and what they smelled. The students' sense of taste was excluded as a safety precaution. Using one's senses allowed students to make detailed observations and connect to the surrounding environment. To help students connect to their senses, part of the sit spot protocol included a 54321, which asked students to identify five things they saw, four things they could touch, three things they could hear, two things they could smell, and one emotion they could feel. This mindfulness practice helped the students focus on being in the moment. The sit spot activity concluded with the student making sketches (or paintings) in their journal (the journal may be a nature journal or a DIFA). To distinguish these sketches and paintings as MBAT, I instructed students to focus on their senses during the activity. If, at any time, they found themselves drifting to outside thoughts, I instructed them to conduct a 54321 to bring them back to the present and connect to their current moment.

The sit spot protocol remained the same throughout the study. However, there were some differences between Ecology and History of the Sonoran Desert and Nature Journaling. Participants enrolled in Nature Journaling were able to choose the location and content for each of their sit spots, as long as it met the expectation of the location (indoors or outdoors) indicated on the Canvas shell. Because Ecology and History of the Sonoran Desert was a four-credit science course, different parameters were needed to integrate the sit spot within the course content. While students still participated in four sit

spots – two indoors and two outdoors – the locations and flora were predetermined to meet content and class requirements.

The socio-cultural aspect of incorporating sit spots into these particular EE courses also differed. Nature Journaling was an online course, which means participants were located around the world. Thus, students learned from each other via discussion boards, sharing their experiences, thoughts, and ideas. Students were required to respond to two peer posts, which engaged students and furthered the discussion and learning process. The Ecology and History of the Sonoran Desert classes met face-to-face on the ASU Tempe campus. There was a 10:30 a.m. to 1:15 p.m. course and a 1:30 to 4:15 p.m. course. For this course, the breathing meditation and the 54321 were components done independently by each student. Once completed, students were able to work together with their group to complete the DIFA assignment (see Appendix E). Groups varied from week to week as I randomly placed nametags on tables at the beginning of each class. The four nametags situated at each table determined the groups for the day, allowing for varying group dynamics and conversations each week.

The sit spot design plan also integrated a final reflection component for both EE classes that was uploaded to the Canvas module. At the conclusion of each module where the project was implemented, students were asked to reflect on the breathing meditation, MBAT, and their connectedness with nature. During the final reflection of what students experienced, students were asked two questions: 1) What is your perception of mindfulness practices experienced in a natural environment? 2) What do you identify as the effects of incorporating nature and mindfulness into your EE curriculum/classes?

(How do nature and mindfulness impact you and your university curriculum/courses?).

A short survey was given at the beginning and end of the sit spot to determine student stress levels and the effectiveness of the innovation. The Activity Survey (AS), formerly known as the Intervention Activity Survey (IAS), was given to (or accessed electronically online) students before the sit spot. The first question was answered before the sit spot activity to establish the student's current stress levels. The remaining questions were answered at the end of the sit spot to determine the effectiveness of the innovation.

Supporting Studies

Research has shown that mindfulness is associated with well-being, including depression and anxiety, bolstering coping, and improving quality of life (Ingram et al., 2019). Mindfulness practices allowed students to focus on a narrow or broad spectrum based on the stimuli they were experiencing (Flook, Goldberg, Pinger, Bonus & Davidson, 2013). This training of one's attention "enables the deliberate cultivation of positive qualities through specific practices designed to promote empathy and prosocial attitudes" (Flook et al., 2013, p. 3). The increased empathy and compassion promoted by positive thinking may decrease the students' reactions to adverse situations. These types of thought processes will be highlighted throughout the innovative project by embedding mindfulness practices into the sit spot protocol.

Meditations were implemented four times throughout the study during sit spots, which required a one-minute breathing meditation. Practicing meditation has positive benefits such as less anxiety, less emotional exhaustion, reduced stress, and a greater

level of acceptance without judgment (Flook et al., 2013). The non-judgmental attention to stimuli and experiences developed through mindfulness practice techniques are linked to social emotions such as compassion and resting brain activity related to mental health and cognition (Flook et al., 2013).

A second component of the innovative project consisted of connecting to nature. Like E.O. Wilson and Richard Louv, Nisbet, Zelenski, & Grandpierre (2019) acknowledge the importance of contact and connectedness. Nature is essential to human flourishing and well-being; therefore, disengagement with nature negatively impacts an individual's mental and physical health and the environment, promoting positive emotions. During the sit spot, students were asked to make observations using their senses. When students used their senses, there was the potential to notice more details. Observations increased as students paid closer attention to colors, shapes, and interesting characteristics. The sit spot activity encouraged the students to incorporate their senses and used the students' artistic abilities to observe the natural environment. Instructing students on how to engage with their outdoor environment increased their satisfaction with their surroundings (Nisbet et al., 2019). Students who engaged with their environment were less frustrated, more content, and paid more attention to the environment around them (Nisbet et al., 2019).

A third component that was embedded in this project embraced Wenger's (1998) thought process that no one person has all the answers or expertise needed to be successful. Wenger discussed that communities work together to share experiences, ideas, values, and beliefs, allowing others to gain knowledge. Every student had a

preconceived idea about nature and mindfulness based on their previous experiences. Sociocultural learning theory impacted their perception, views, and understandings. These preconceived thoughts supported and/or challenged their learning depending on their views about the value of nature connectedness and mindfulness practices. However, peer interactions allowed every student to hear varying perspectives and determine whether that information expanded their thought processes. Furthermore, whether through discussion boards or face-to-face interactions, the study introduced students to potentially new coping strategies through mindfulness and allowed them to reflect and share with others. This process allowed students to share thoughts and experiences with others within their community.

The final component of this sit spot plan was implementing Mindfulness-based Art Therapy into the innovative project. Art and mindfulness practices, like meditation, have been known to decrease anxiety and stress symptoms while promoting positive psychosocial adjustment and overall well-being (Beerse, Van Lith, & Stanwood,2020). Mindfulness-based art therapy incorporates these practices. Art techniques such as clay, drawing, painting, collage, music, sand, and more help improve self-awareness and develop self-compassion and empathy (Coholic, Hardy, Goeldner, & McMahon, 2021). MBAT is an instrumental technique used by social workers and in education for individuals who may struggle with traditional ways of practicing focus, engaging in homework, and the demanding act of sitting still. Art has the ability to increase self-awareness and understanding, as well as support self-regulation.

In the context of this study, MBAT took on a non-clinical, self-administered

approach. As outlined earlier in this study, MBAT is a combination of mindfulness techniques and creative art practices. Students completed a breathing meditation and a 54321 as part of their sit spot protocol. These mindfulness practices were designed to help students focus on the moment instead of ruminating about the past or being anxious about the future. I guided students to revisit the 54321 when their thoughts drifted to the past or future, which allowed students to remain mindful during their MBAT exercise of drawing or painting. Additionally, the 54321 engaged students' senses. As noted previously, connecting to an individual's senses during MBAT is one of the distinguishing features as it focuses on the mind and body connection. MBAT also contained a reflective component. These reflections were documented in the Activity Survey, where students were asked about their experience.

Fostering Change

Knowing that university students were experiencing stress, coping strategies were needed to support student success. In previous sections of this study, it was noted that a student's mindset during any given situation determines the stress levels associated with that situation. van Wyk, van Wyk, Phillips, and van der Walt (2022) describe resilience as an adaptive coping strategy that allows students to adjust, cope, and learn to face challenges and adversity. Thus, university students need to gain resilience and adaptive coping strategies to manage stress. While this change is necessary to support student success, change can be challenging on a large systems scale, such as at the university level. This study implemented small-scale changes to positively impact students. Weick developed a concept noted as "small wins, significant gains" (Rog, 2015). The small steps

mentioned by Weick were concrete, minor improvements that foster forward movement (Rog, 2015). Alone, these small wins may not seem like significant accomplishments; however, a series of small wins may result in visible patterns that become the building blocks for future innovations. Small changes/wins are less overwhelming than larger-scale changes (Rog, 2015). The feeling of not being overwhelmed contributes to the participation of others and reduces stress levels. Thus, small changes such as implementing mindfulness practices and nature components embedded in EE course content to support students enrolled in those classes had the potential to make a significant impact not only for students but also for future courses offered by MLFTC and ASU.

The practices mentioned in the innovation section supported different coping strategies that allow students to manage their stress levels. By increasing exposure and practice with coping strategies, university students enrolled in Nature Journaling or Ecology and History of the Sonoran Desert who participated in this research were exposed to an arsenal of coping strategies for future use. Whether the students choose to practice mindfulness through breathing meditation, connecting with nature, Mindfulness-based art therapy, or other mindfulness practices, students were exposed to more strategies to manage their stress levels during this study. Using coping strategies to decrease students' stress levels improved focus and academic performance. Additionally, mindfulness practices have the potential to reduce anxiety and depression, increase compassion and empathy, and allow individuals to develop self-awareness and self-

regulation of emotions. While this innovative project was a small-scale change, the impact on students may be lifelong.

Quantitative and Qualitative Data Collection Strategies

Where This Research Started: Cycle 0 and Cycle 1

This study was a mixed-method design; qualitative and quantitative data collection were essential. Mixed-method design requires additional time to implement the qualitative and quantitative data collection and analysis of that data (McKim,2017). However, research indicates that there is strength in combining two methodologies and understanding the results of the data collected (McKim, 2017). In previous cycles of research, qualitative data were collected via interviews and observations. The interview process generates data from the social world by asking people to talk about their lives (Holstein & Gubrium, 2003). The data collected in Cycle 0 and Cycle 1 added additional information that quantitative data alone could not have provided. Interview questions in Cycle 0 aimed to better understand campus dynamics and personal perspectives on the challenges students faced. Interviews were conducted with both faculty and staff and with students. These interviews provided a broader view and understanding of the problem and what current coping strategies were being used.

Colleagues who participated in the interview process included five MLFTC faculty associated with the Polytechnic campus. Four staff members, such as advisors, were also included in the colleague interviews. Colleagues were asked, "What makes the Polytechnic campus unique? What advantages, if any, do students gain by attending classes on this campus?" to identify the environment and benefits of attending classes on

the Polytechnic campus. The interview process also aimed to discover personal challenges faculty and staff face; "What are some of the challenges you face in the same university education environment?" Another critical question was, "How/what do students in your classrooms do to decrease stress? How do you support this?" This question aimed to address the coping strategies students are currently using. (Additional interview questions can be found in Appendix A).

Similar goals were set for the five student interviews. Student interviews were conducted to gain a broader understanding based on student perspectives. For student interviews, the questions about the Polytechnic environment were, "What makes the Polytechnic campus unique? What are the benefits you gained by attending classes on this campus?" Questions were also asked about challenges, resources, and coping strategies. For a complete list of interview questions, please refer to Appendix A. The data collected in these interviews assisted with making decisions about future design plans for this study.

Current Cycle of Research

A mixed method approach continues to be the method used in this current iteration of the research. Qualitative data was collected via observation, student reflections, and open-ended questions on the Activity Survey (AS). Student reflections consisted of student narratives. These narratives gave the researcher a better understanding of the student's experience from their perspective. Students were asked to reflect on the one-minute breathing meditation, MBAT, the 54321, and nature connectedness. The final innovative project reflection assignment asked students to

reflect on two questions: 1) What is your perception of mindfulness practices experienced in a natural environment? 2) What do you identify as the effects of incorporating nature and mindfulness into your EE curriculum/classes? (How do nature and mindfulness impact you and your university curriculum/courses?). The qualitative data was inserted in to a table with four columns. Each students' answer/comments were inserted into the first column on the left of the table. The next two columns to the right of students' statements, documented comments noted by the researcher. The remaining two columns were for themes and assertations. Qualitative data collected were analyzed through a dual coding process where the researcher determined codes at two separate times. Coding twice helped establish a reliable coding system. As the process revealed commonalities, emerging themes were recorded. As mentioned above the emerging themes were documented in the right column next to the second coding session.

This innovative project was integrated into four classes: two courses in Ecology and History of the Sonoran Desert and two courses in Nature Journaling. Eight participants were selected from each of these four courses. To identify participants, all those who agreed to be in the study were evaluated for completion of all components of the study. Then, from those participants meeting all the study requirements, eight were randomly selected from each class. This process identified thirty-two participants for this study. Quantitative data (N=32) were collected to provide descriptive and inferential statistics. Descriptive statistics were used to describe the visible characteristics of the participants, for example, the range of stress levels. Inferential statistics were used to make inferences about the population and determine if the data gathered has any

significant relationships. Surveys using a Likert scale were used before the activities and post-innovation to collect quantitative data. Likert scales as rating scales used to measure people's attitudes, opinions, or perceptions using statements such as "strongly agree," "agree," "neutral," "disagree," and "strongly disagree" (Boslaugh, 2008). These statements were given a numeric value as a coding system. The Perceived Stress Scale (PSS) (see Appendix B) was used to identify students' perceived stress levels. The PSS was developed by Rennis Likert in 1932 and remains a consistent measure "for helping us understand how different situations affect our feelings and our perceived stress" (EAP, n.d.). The PSS scale had participants rank their perceived stress on a scale ranging as follows: 0 - never, 1 - almost never, 2 - sometimes, 3 - fairly often, and 4 - very often. Sample questions include 1) In the last month, how often have you felt that things were going your way; 2) In the last month, how often have you found that you could not cope with all the things that you had to do? The remaining questions are located in Appendix B. Scoring the PSS allowed the researcher to determine where the student population was on a scale from low to high. Scoring information can be found in Appendix B as well.

Another quantitative data collecting tool used in this study is the Nature Relatedness Scale (NR). The NR scale used 21 statements to measure a person's emotional, cognitive, and physical connection to nature. Responses were recorded using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. "The NR scale measures the overall construct, but three subscales or dimensions can also be calculated: Self (emotional), Perspective (cognitive), and Experience (physical)" (Salazar, Kunkle, Monroe, 2020, p. 44). The "self" subscale demonstrated internal,

personal identity and connection to nature. The "perspective" component identifies an individual's external worldview about nature and how that relates to the person's behavior. Finally, the "experience" portion of the survey described an individual's familiarity with nature and that person's desire for and comfort with being outdoors (Salazar, Kunkle, Monroe, 2020). The NR can be seen in its entirety in Appendix D. Comparison statistical analysis was conducted through Statistical Package for the Social Sciences (SPSS) to compare the mean values of groups.

The final qualitative and quantitative data collection strategy was the Activity Survey (AS). The mixed-method survey assessed the stress levels of participants before and after mindfulness practices and the effectiveness of the activities. This survey asks questions such as 1) What was your opinion of the mindfulness experience? 2) How often do you engage in mindfulness practices during a given week? 3) What practices do you engage in? 4) What was your connection to nature during this activity? 5) What would you change about your experience? These questions gave the researcher a better understanding of student stress and the impact of mindfulness practices. This survey can be seen in its entirety in Appendix C.

Current Research: Data Analysis

Data analysis varied for the research analysis for this study. Quantitatively, SPSS was used to document the mean in association with many factors of the project. Means were used to document the effectiveness of each mindfulness technique, the environment (nature connectedness) of each sit spot, and the participants' mental restoration. Qualitative data was analyzed using an inductive analysis process. The inductive process

allowed for the data to reveal concepts, ideas, themes, or categories in order for the data to be organized and interpreted (Given, 2008). Throughout this research, I focused on the data rather than using preconceived themes. The initial coding process analyzed the data through an open coding method. The open coding allowed the data to reveal thoughts based on participants' experiences. During the initial coding, memos documented thoughts, ideas, and concept that emerged. After initial coding, the concepts were color-coded based on similarities during the second round of coding. For example, comments related to "benefits of mindfulness and nature" were highlighted in green; "connectedness" statements were colored blue; "social-cultural" was pink; "ART" was teal. The color-coding process continued as similar concepts emerged. Givens (2008) notes that the initial coding process assists the researcher in identifying and arranging ideas, concepts, and categories. The double-coding for this analysis occurred with a three-week interruption in coding. The first two rounds of coding allowed me to document numerous ideas and concepts.

After the second round of coding, a more focused coding analysis occurred. This more refined coding process allowed me to organize the ideas and concepts from the first two coding rounds. These more refined concepts were analyzed further to discover that all of the concepts fit into three categories: Enhancing well-being, cultivating connection, and links to learning. The qualitative data inductive analysis process is documented below.

Qualitative data inductive analysis process:

1. Initial coding – Open coding
    a. Memos were used to document initial thoughts and ideas.
2. Second round of coding
    a. Reoccurring words/ideas were color-coded.
    b. Memos were used to document thoughts and ideas.
3. Focused coding
    a. Initial coding was evaluated looking for similar themes that emerged.
    b. Emerging themes were organized into similar categories.
4. Pattern coding
    a. The focused categories were evaluated to determine if an overarching theme existed. Three overarching themes emerged:
        i. Enhancing well-being
        ii. Cultivating Connection
        iii. Links to Learning

The implementation of all of the above data analysis processes supported the validation and reliability of the coding process. This was important to this research as there was a considerable amount of qualitative data collected through surveys, discussions, reflections, and researcher observations. The quantitative data was combined with the qualitative analysis to synthesis the findings documented in Chapter 4.

Current Research: Participants

The goal was to recruit a minimum of thirty-two participants (N=32) for this

study. As described above, these thirty-two participants were selected randomly from students who agreed to participate and had completed all components of the study. Enrollment for the Ecology and History of the Sonoran Desert class was 41 students (a combined total of the two classes). Nature Journaling in Session A had 15 students and 21 students in Session B. Given the enrollment numbers, there was a potential for 77 participants. Thus, eight participants were selected from each EE course. To select participants, I created a table that documented the components of the study: participant consent form, pre-PSS, pre-NR, 4 sit spots, 4 Activity Surveys, any discussion boards, post-PSS, post-NR, and final reflection. I then evaluated all the students in each class and marked if each component was completed. Eight students who completed the study requirements in their entirety were randomly selected from each course.

Timeline and Procedure

The study was conducted during a 6-week time frame during the Spring 2023 semester. The procedure and timeline are visually displayed in the table below (see Table 1). Prior to student enrollment in EE courses, the researcher developed the sit spot protocol as part of the innovation to coincide with Nature Journaling and Ecology and History of the Sonoran Desert curriculum. The sit spot was embedded in the Canvas course shells. As students enrolled in EE courses, students were contacted and asked to participate in the study. Thirty-two students were secured as participants. Then, the participants were given the PSS to establish perceived stress levels and a Nature Relatedness Scale (NR).

Both EE courses had online platforms. Thus, Module One of the innovation projects was integrated into the course Module One content. Module One included PowerPoints on mindfulness, one-minute breathing meditation, and the sit spot protocol. Surveys were also introduced in the PowerPoint. Surveys to be included were the Perceived Stress Scale (PSS), Nature Relatedness Scale (NR), and the Activity Scale (AS). A detailed explanation of the survey, its purpose, and the protocol for completion was included in the PowerPoints provided in the Canvas shell. The PSS and NR were administered as pre- and post-tests to determine if any significant changes occurred.

Before each activity, the participants were given the Activity Survey. This survey was collected after each sit spot. The data collected in the Activity Survey was used to assess participant stress levels before and after mindfulness practices. The Activity Survey was also used to analyze the effectiveness of the activities and nature connectedness. Sit Spots differed slightly for each course and are outlined below. Sit spot procedures were implemented throughout the duration of the study in Modules 2 – 5. Module 6 was dedicated to having participants take the PSS and NR post-innovation, and data analysis began. In Modules 7 and 8, I analyzed the data via SPS and data coding. SPSS is statistical software used to manage and analyze quantitative data.

Sit Spots: Nature Journaling

Chapter One documented the broad definition of nature, stating nature refers to any natural elements. Whether indoors or outdoors, nature has beneficial characteristics that impact student well-being. During Module 2 and Module 4, students engaged with nature from an indoor location; in Modules 3 and 5, students picked a location outdoors

to engage with nature. The sit spot protocol remained the same for all sit spots. The goal was to allow students to experience nature and mindfulness in different environmental contexts.

Sit Spots: The Ecology and History of the Sonoran Desert

Consistent with Nature Journaling, the goals, and procedures of the sit spots remained the same for both EE courses. Being a four-credit science course, the Ecology and History of the Sonoran Desert had different content expectations, and therefore, some modifications were necessary to successfully complete the sit spot in this course. Sit spots were predetermined in this course. The following outlines the process and procedures for the Ecology and History of the Sonoran Desert course.

- Sit spot #1 was an outdoor sit spot experience. Students were introduced and reminded of the sit spot protocol available on the Canvas shell. Activity surveys and DIFA worksheets were provided. I took the students to a location on the Tempe campus where there were several Palo Verde trees. Students completed the first question on the survey, participated in the breathing meditation, and 54321 on their own, and then completed the DIFA with their peers. Upon completion of the innovative project, students completed the remaining portions of the survey.
- Sit spot #2 was an outdoor sit spot experience. In this sit spot, students were taken to a location where three Mesquite trees were located. The same procedures were completed as sit spot #1.
- Sit spot #3 was an indoor sit spot experience. Cross-sections of a saguaro cactus were brought to class and put on science trays for students to explore. Saguaro

boots and saguaro skeletons were also brought to class for exploration and observation. A tray was placed in the center of each table with saguaro specimens and tools to interact with the flora. I turned off the lights, and as a class, we participated in the breathing meditation. While students engaged with nature on the science trays, a saguaro screensaver playing nature sounds was displayed on the classroom screen. The remaining sit spot protocol stayed consistent with the previous sit spots.

- Sit spot #4 was consistent with #3. The indoor sit spot examined prickly pear cacti. For this sit spot, each science tray had a picture of a prickly pear cactus, a whole prickly pear cactus pad, a cactus pad cut in half lengthwise, a prickly pear fruit, prickly pear fruit cut in half, a prickly pear pad with cochineal (a parasitic insect that infects prickly pear cactus) and instruments to engage and explore the specimens. The remaining procedure was consistent with sit spot #3.

Figure 1

Process Diagram

The remaining innovative project procedures remained consistent with Table 1 below. A developmental Canvas shell was developed prior to the Spring 2023 semester. The innovative project was implemented with the modules listed in the Table. Data was

collected throughout the courses. However, data analysis was not completed in Module Seven as indicated in the timeline. The methods identified above note that for privacy and non-biased purposes, data and analysis did not occur until grades had been submitted in Canvas. Thus, the analysis occurred after the Nature Journal Session B course had concluded.

Table 1

Timeline and Procedure of the Study

Time frame	Actions	Procedures
Pre-semester	➔ Developed curriculum ➔ Embedded curriculum in Canvas	Developed curriculum: • Nature journaling – o aligned with course content o extended sit spot assignment to four modules – 2 inside; 2 outside • Sonoran Desert – o aligned with existing course content (DIFA) o added sit spot protocol/assignment to four modules – 2 inside; 2 outside • Created a PowerPoint to explain Mindfulness and sit spot procedures o Explained MBAT, one-minute breathing meditation, and 54321 Embedded in Canvas o Uploaded curriculum onto Canvas shell
Module 1	➔ Recruited students ➔ Marketed study via Canvas shell and emails ➔ Administered Perceived Stress Scale (PSS) and Nature Relatedness Scale	Recruited students: ● Sent emails to students ● Asked students to participate in the study ● Recruited 32 students Marketed study:

	(NR)	• Made announcements for all four courses – introduced the study, asked for participants, and explained volunteers are appreciated, but participation was not mandatory Administered Perceived Stress Scale and Nature Relatedness Scale (NR): • Administered pre-assessments to students participating (PSS and Nature Connectedness Survey)

Module 2	➔ Sit Spot #1
	➔ Reflection #1
		• Administered Activity Survey (AS)
		• Collected survey at the end of the module
		
		Sit Spot Protocol: (indoor)
		• Answered the first question of AS
		• <u>One Minute Box Breathing</u> (used a phone to access video)
		• Connected to the surrounding environment using your senses
		  o What did you hear?
		  o What did you smell?
		  o What did you feel?
		  o What did you see?
		• 54321
		• Drew/Painted and journaled MBAT:
		  o Made observations using their senses
		• Answered remaining questions in AS
		
		Reflection Protocol:
		• Reflected on their experience
		  o Included reflection on one-minute meditation, MBAT, and the surrounding environment

Module 3

➔ Sit Spot #2
➔ Reflection #2

Recruited students:

- Sent emails to students
- Asked students to participate in the study
- Recruited 32 students

Marketed study:

- Made announcements for all four courses – introduced the study, asked for participants, and explained volunteers are appreciated, but participation was not mandatory

Administered Perceived Stress Scale and Nature Relatedness Scale (NR):

- Administered pre-assessments to students participating (PSS and Nature Connectedness Survey)
- Administered Activity Survey (AS)
- Collected survey at the end of the module

Sit Spot Protocol: (indoor)

- Answered the first question of AS
- One Minute Box Breathing (used a phone to access video)
- Connected to the surrounding environment using your senses
    - What did you hear?
    - What did you smell?
    - What did you feel?
    - What did you see?
- 54321
- Drew/Painted and journaled MBAT:
    - Made observations using their senses
- Answered remaining questions in AS

Reflection Protocol:

- Reflected on their experience
    - Included reflection on one-minute meditation, MBAT, and the surrounding environment

Module 4

➔ Sit Spot #3
➔ Reflection #3

- Administer Activity Survey (AS)
- Collect the survey at the end of the module

Sit Spot Protocol: (indoor)

- Answer the first question of AS
- One Minute Box Breathing (used a phone to access video)
- Connect to the surrounding environment using your senses
    - What do you hear?
    - What do you smell?
    - What do you feel?
    - What do you see?
- 54321
- Draw/Paint and journal MBAT:
    - Make observations using your senses
- Answer remaining questions in AS

Reflection Protocol:

- Reflect on your experience
    - Included reflection on one-minute meditation, MBAT, and the surrounding environment

Module 5

➔ Sit Spot #4
➔ Reflection #4

Recruited students:

- Sent emails to students
- Asked students to participate in the study
- Recruited 32 students

Marketed study:

- Made announcements for all four courses – introduced the study, asked for participants, and explained volunteers are appreciated, but participation was not mandatory

Administered Perceived Stress Scale and Nature Relatedness Scale (NR):

- Administered pre-assessments to students participating (PSS and Nature Connectedness Survey)

- Administered Activity Survey (AS)
- Collected survey at the end of the module

Sit Spot Protocol: (indoor)

- Answered the first question of AS
- One Minute Box Breathing (used a phone to access video)
- Connected to the surrounding environment using your senses
    - What did you hear?
    - What did you smell?
    - What did you feel?
    - What did you see?
- 54321
- Drew/Painted and

		journaled MBAT: o Made observations using their senses • Answered remaining questions in AS Reflection Protocol: • Reflected on their experience o Included reflection on one-minute meditation, MBAT, and the surrounding environment
Module 6	➔ Post – Perceived Stress Scale ➔ Post – Nature Connectedness assessment ➔ Final Reflection	• Administered Post-PSS • Administered Post Nature Connectedness • Had the students complete a final reflection Reflection Protocol: • Reflected on their experience o Included reflection on one-minute meditation, MBAT, and the surrounding environment
Module 7-8	➔ Analyzed Data	Analyzed Reflection Data • Coded reflections • Looked for common themes • Composed interpretations Analyzed Survey Assessment Data • Used SPSS to analyze

Study Results: Need for Flexibility During Implementation

As the innovative project was implemented, flexibility was needed based on the courses, and the requirements of each of the courses. While the initial procedures seemed applicable to both courses, Ecology and History of the Sonoran Desert (SCN 301) and

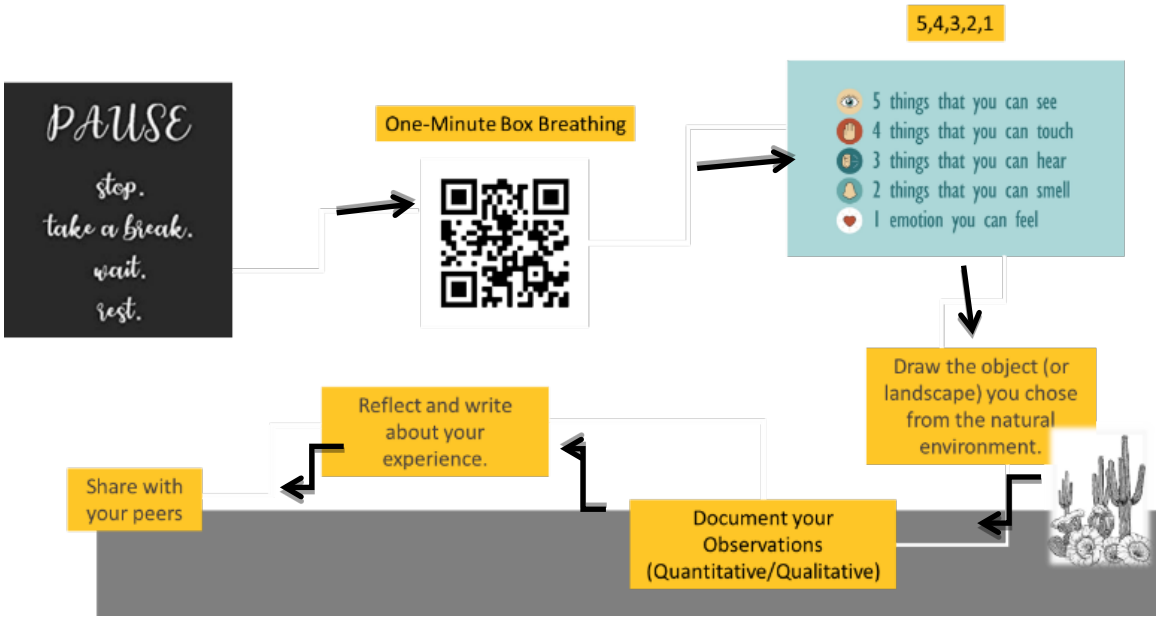
Nature Journaling (SCN 309), modifications were needed for the in-person Ecology and History of the Sonoran Desert class. Additionally, the participants become more clearly defined with the collection of demographic data integrated into the study. Thus, the following sections discuss the procedures and the demographic information produced by implementing the project.

Current Study: Procedure Modification During Execution of Innovative Project

All students enrolled in SCN 301 and SCN 309 were introduced to the same procedure via PowerPoints in their Canvas course shell. To keep the process comparable in both the in-person SCN 301 class and the online SCN 309 class, Canvas was the primary method of introduction and instruction for the research conducted in each course. Figure 2 demonstrates the sit spot protocol administered during the study. The students were instructed to find a spot and sit. Students answered question number one of the Activity Survey (AS). They then self-administered a one-minute box breathing exercise followed by a 54321 mindfulness exercise. Students were allotted the creative freedom to draw an object from the natural environment (MBAT) with the instruction to return to the 54321 practice if they drifted from the present moment. The drawing portion of the sit spot was followed by documenting observations, reflecting on the experience, and sharing with their peers. Finally, participants completed the remaining Activity Survey questions. The sit spot protocol is documented in Figure 2 below.

Figure 2

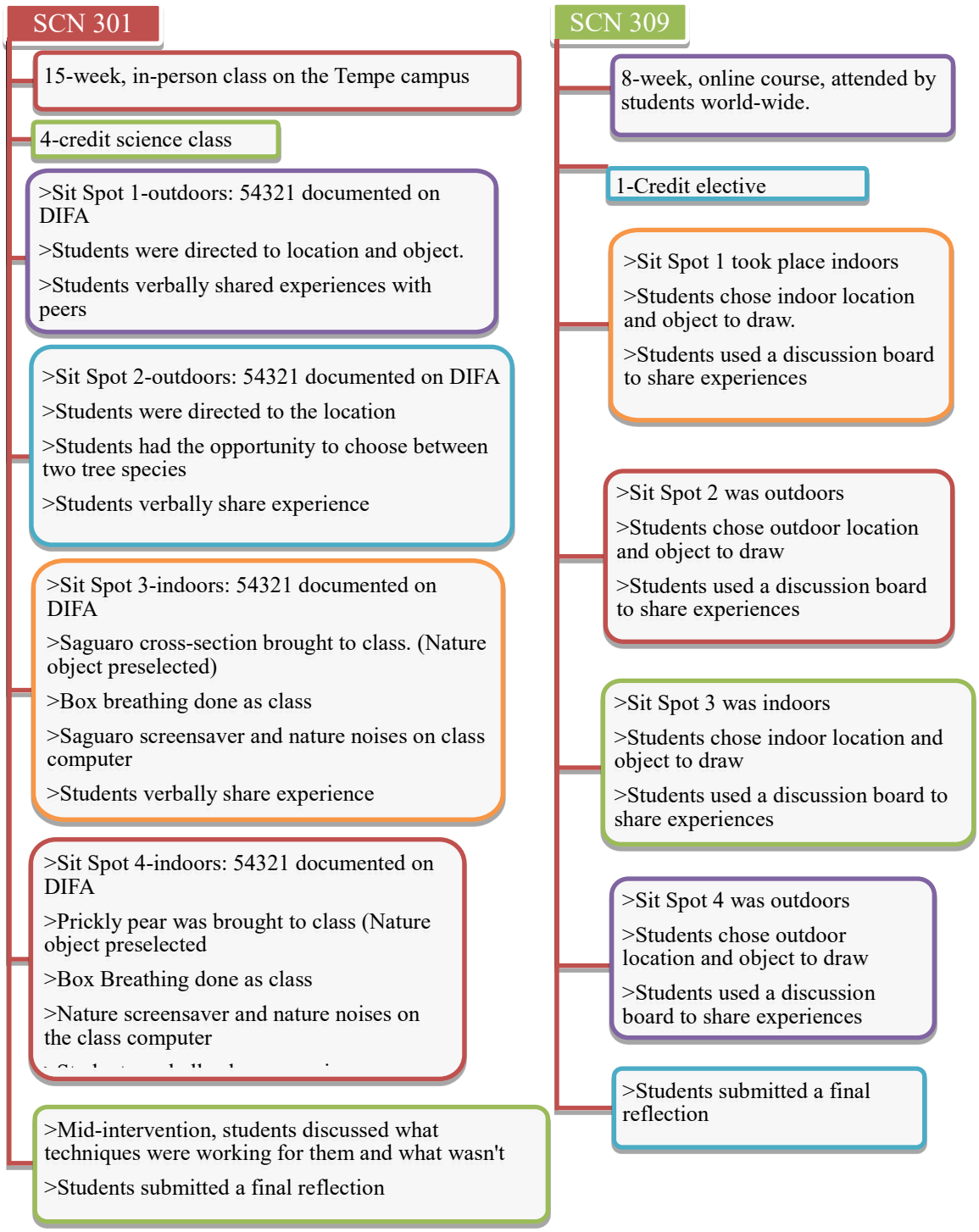
Sit Spot Protocol



While the study aimed to be comparable in the integrations of the innovative project, there were some differences due to class structure or curriculum circumstances. Figure 3 demonstrates the variations in implementation to meet the needs of each course. You will see from Figure 3 that indoor and outdoor sit spots did not always align in SCN 301 and SCN 309. However, each course did complete two of each. Also, the locations and discussions differed in each course.

Figure 3

Differences in the Execution of Innovative Project



Demographic Data Retrieved from Study

Based on the information collected in the study, the participants were clearly defined. Please see the information below and meet the participants.

Descriptive Data

In the Spring of 2023, forty-one students attended the two in-person Ecology and History of the Sonoran Desert (SCN 301) courses monitored for this study; thirty-six students were enrolled online for the two Nature Journaling (SCN 309) courses. While the majority of the students agreed to participate in the study, the study was limited to 32 (N=32) participants: eight from each of the four classes – two SCN 301 classes and two SCN 309 classes. Participants were selected by establishing which students completed the consent and determining if all the data sources were submitted. More than eight students from each of the four classes met the criteria for the study, thus, eight participants were randomly chosen. The names were submitted to a randomizer program which selected what became the thirty-two participants for this study.

The majority of the participants were female (23), eight were males, and one participant chose not to respond to the gender demographic question. Participants predominately identified as White (20), followed by Asian (4), Other (3-Latino/Hispanic; 1-Northern African Egyptian; 1-Middle Eastern), Multiple races (1-White, Latino/Hispanic), and American Indian or Alaskan Native (1). One participant chose not to respond. Participants were enrolled in varying credit hours. Most of the students - fourteen participants - were enrolled in sixteen credits or more for the Spring semester. Participants ranged in age and education level. The demographic data on the survey asked

participants to mark their corresponding age category. Categories consisted of 17 or younger, 18-20, 21-29, 30-39, 40-49, 50-59, or 60 or older. Fifteen participants reported ages ranging from 18-20 years, sixteen participants documented ages ranging from 21-29 years, and one chose not to report. Likewise, education levels varied. All higher education levels were represented in this study: Freshmen (2), Sophomores (8), Juniors (8), Seniors (11), and Graduate students (2); one participant chose not to support.

Participant Profiles

There were 32 participants in this study—sixteen participants from SCN 301 and sixteen from SCN 309. The descriptive data section above was a generalized overview representing all participants. Tables 2 through 5 provide specific information on each participant. Students were assigned unique identifiers to keep their identities anonymous. When mentioned in this study, the participants will be given a pseudonymous name to protect confidentiality and acknowledge they are more than numbers in this research. Participants answered demographic questions identifying age, ethnicity, gender, education level, enrolled credits, employment status, and living conditions. The Tables documented below are broken down by classes: Table 2 is Ecology and History of the Sonoran Desert (SCN 301) 10:30 AM class participants; Table 3 is Ecology and History of the Sonoran Desert (SCN 301) 1:30 PM class participants; Table 4 is Nature Journaling (SCN 309) Session A participants; Table 5 is Nature Journaling (SCN 309) Session B participants. Here are the participants of the study based on the self-reported demographic information.

Table 2

Ecology and History of the Sonoran Desert (SCN 301) 10:30 AM Class Participants

	P1	**P2**	**P3**	**P4**
Name	Cindy	Sylvie	Kate	Rick
Age Range	18-20	18-20	21-29	21-29
Ethnicity	White	White	NR	Asian
Gender	Female	Female	NR	Male
Education Level	Sophomore	Junior	NR	Senior
Credits	11-15	6-10	NR	16-20
Employ: Hours/ Week	I am taking a break from work but always work during school breaks.	16-20 hours	NR	I do not work.
Marital Status	Single	Single	NR	Single
Housing	Live with roommates with parental financial support	Live on my own with parental financial support	NR	Live at home with parental financial support
	P5	**P6**	**P7**	**P8**
Name	Kara	Max	Josie	Amy
Age Range	21-29	18-20	21-29	18-20
Ethnicity	White	Asian	White, Hispanic or Latino	White
Gender	Female	Male	Female	Female
Education Level	Grad Student	Sophomore	Grad Student	Freshman
Credits	6-10	11-15	6-10	16-20
Employment: Hours/Week	25-30 hours	I do not work.	16-20 hours	I do not work.
Marital Status	In a relationship	Single	Single	Single
Housing	Live at home with my partner, and we support each other financially	Live on my own with parental financial support	Live on my own and am responsible for myself financially	Live at home with parental financial support

Table 3

Ecology and History of the Sonoran Desert (SCN 301) 1:30 PM Class Participants

	P1	**P2**	**P3**	**P4**
Name	Ian	Fay	Grant	Lydia
Age Range	18-20	18-20	18-20	18-20
Ethnicity	White	Hispanic	Hispanic	White
Gender	Male	Female	Male	Female
Education Level	Junior	Junior	Junior	Sophomore
Credits	16-20	16-20	16-20	16-20
Employment: Hours/Week	16-20 hours	25 hours	30 hours	25+ hours
Marital Status	Single	Single	Single	Single
Housing	Live with roommates and am responsible for myself financially	Live at home with parental financial support	Live with roommates and am responsible for myself financially	Live with roommates and am responsible for myself financially
	P5	**P6**	**P7**	**P8**
Name	Allie	Claire	Gwen	Seth
Age Range	18-20	21-29	NR	18-20
Ethnicity	White	White	White	White
Gender	Female	Female	Female	Male
Education Level	Sophomore	Senior	Sophomore	Junior
Credits	16-20	16-20	11-15	16-20
Employment: Hours/Week	6-10 hours	16-20 hours	1-5 hours	16-20 hours
Marital Status	Single	Single	Single	Single
Housing	Live at home with parental financial support	Live on my own with parental financial support	Live with roommates with parental financial support	Live with roommates and am responsible for myself financially

Table 4

Nature Journaling Session A Participants

	P1	**P2**	**P3**	**P4**
Name	Andy	Ken	Trina	Mandy
Age Range	18-20	21-29	21-29	21-29
Ethnicity	North African Egyptian	Middle Eastern	White	White
Gender	Male	Male	Female	Female
Education Level	Junior	Junior	Senior	Senior
Credits	11-15	18	16-20	11-15
Employment: Hours/Week	24 hours a week	20 hours a week	I do not work.	Full time 40 hours per week
Marital Status	Single	Single	In a relationship	Single
Housing	Live at home with parental financial support	Live at home with parental financial support	Living with roommates and a sports scholarship financially	Live with roommates and am responsible for myself financially
	P5	**P6**	**P7**	**P8**
Name	Sarah	Nina	Sav	Abby
Age Range	21-29	21-29	21-29	18-20
Ethnicity	White	White	White	White
Gender	Female	Female	Female	Female
Education Level	Senior	Junior	Senior	Sophomore
Credits	11-15	16-20	11-15	11-15
Employment: Hours/Week	25-30 hours	I do not work.	35+ hours typically	I work 25 hours a week
Marital Status	Single	Single	Single	Single
Housing	Live with roommates with parental financial support	Live with roommates with parental financial support	Living with roommates and sports scholarship financial	Live at home with parental financial support

Table 5

Nature Journaling Session B Participants

	P1	**P2**	**P3**	**P4**
Name	Kylie	Kevin	Kelsey	Rebecca
Age Range	21-29	21-29	21-29	21-29
Ethnicity	Asian	American Indian or Alaskan Native	Asian	White
Gender	Female	Male	Female	Female
Education Level	Senior	Senior	Senior	Senior
Credits	6-10	11-15	11-15	1-5
Employment: Hours/Week	16-20 hours	Employed Full Time 30-40 hours	I do not work.	40+ hours a week
Marital Status	Single	Single	Single	Living w/ my boyfriend and puppy
Housing	Live at home with parental financial support	Live with roommates and am responsible for myself financially	Live at home and am responsible for myself financially	Live on my own and am responsible for myself financially
	P5	**P6**	**P7**	**P8**
Name	Jayda	Karly	Emily	Oakley
Age Range	21-29	18-20	18-20	18-20
Ethnicity	White	Latino/Hispanic	White	White
Gender	Female	Female	Female	Female
Education Level	Senior	Sophomore	Freshman	Sophomore
Credits	6-10	11-15	taking 21 to graduate early	16-20
Employment: Hours/Week	I do not work.	I do not work.	1-5 hours	1-5 hours
Marital Status	Single	Single	Single	Single
Housing	Live at home with parental financial support	Live with roommates with parental financial support	Live at home with parental financial support	Live at home with parental financial support

The thirty-two participants selected and highlighted above were based on the submission of all the required documents for the study and their random selection. During this study, these participants submitted the quantitative and qualitative data that were analyzed in Chapter 4.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

The previous sections of this paper documented the problem of practice, larger context, local context, theoretical perspectives, the research guiding this project, and the methods used to conduct this research. This section provides information about the data analysis procedures and the actual outcomes of the data collected in this action research, a mixed methods study.

Introduction

This mixed-methods action research study examined mindfulness and nature connectedness and the effects on university students' mental health and well-being based on students' experiences. To explore the outcomes of this innovative project for this study, two research questions were explored:

RQ 1: What is the perception of mindfulness practices experienced in a natural environment by students enrolled in Environmental Education (EE) Certificate courses?

RQ 2: What do student participants identify as the effects of incorporating nature and mindfulness into their EE curriculum? (How do nature and mindfulness impact university students and the university curriculum/courses?)

Mindfulness and nature connectedness were examined through the documented experiences of university students enrolled in Ecology and History of the Sonoran Desert (SCN 301) classes and Nature Journaling (SCN 309). As noted in previous chapters, humans have an innate sense that draws them to nature. We experience moments that

capture our attention, connect us to nature, and immerse us in the moment (mindfulness). This non-judgmental moment in time exemplifies the interconnectedness between mindfulness and nature connectedness. Van Gordon, Shonin, and Richardson explain this interconnection as follows:

> "Perhaps the best way of appreciating how the principle of interconnectedness relates to our lives as human beings is through our connection with nature. When we breathe in, we breathe in the out-breath of plants, shrubs, and trees. When we breathe out, we breathe out the in-breath of flowers, animals, and birds. When we drink water, we drink the clouds, rivers, and oceans. When we eat a meal, we eat plants, vegetables, and fruits that have grown out of the earth."

This relationship between mindfulness and nature is the foundation of this project. Those moments where a cloud or a rainbow is so memorizing that your focus is solely on what is in front of you, or that the sound of a river or the movement of water draws you in and captures your soul. These moments of mental restoration and well-being are the backbone of this project.

The innovative project was implemented during the Spring 2023 semester. The project consisted of two indoor and two outdoor sit spots that were implemented into two courses: Ecology and History of the Sonoran Desert and Nature Journaling. Each course had two sections, totaling four classes: two Ecology and History of the Sonoran Desert (SCN 301) and two Nature Journaling (SCN 309). The findings as a result of the sit spots are discussed below.

Findings and Analysis

The data results will be represented and analyzed in the following sections. Data findings and analysis will then be organized by research questions. Each research question is discussed in relation to the mindfulness and nature components integrated into

the study. Finally, there will be a discussion of findings with regard to the theories grounding this research: Sociocultural Learning Theory and Attention Restoration Theory (ART).

Three themes emerged during the data analysis: 1) *Cultivating connection.* This study determined that mindfulness and nature cultivate a more mindful way of connecting with oneself, individuals, and nature. With respect to connections with oneself, self-exploration empowered students to connect with their inner self, reflect on thoughts and feelings, and consciously act accordingly. In this study, this connection took the form of focusing or refocusing, recognizing feelings and practicing breathing to relax and calm, or using mindfulness practices to clear one's mind. Cultivating connections with individuals encouraged prosocial behaviors, built relationships and community, supported communication and collaboration, and enabled creativity, problem-solving, and critical thinking. The connections with nature in this study elicited awareness and appreciation as students became focused, observant, and connected to details via their senses. 2) *Enhancing well-being*. As participants documented their experiences, it was found that nature and mindfulness influenced their well-being. Students discovered coping strategies for reducing stress and anxiety, reducing mind clutter, supporting self-regulation, and positive emotions such as increased energy and happiness. 3) *Links to Learning*. Incorporating nature and mindfulness into the curriculum resulted in many positive learning components, thus, providing academic benefits. This ranged from shifting perspectives about the classroom from stressful to engaging and curious, students seeing the bigger picture, and positive impacts on education. Where applicable, the findings will

be organized into three themes: 1) Cultivating connection. 2) Enhancing well-being. 3) Links to learning.

The 32 participants are described in detail at the closure of Chapter 3. Please, revisit that section if you are curious about demographic information throughout this chapter. In this study, participants were asked to take a pre- and post-NR survey, a pre- and post-PSS, four Activity Surveys (AS), complete discussions, and a final reflection documenting their experiences. The NR and PSS are quantitative data sources that use a Likert scale to determine students' connection to nature and their perceived stress levels. Quantitative data was also collected via the AS, which asked students to document their stress levels before and after the sit spot and rate varying aspects of the innovative project based on their experience. Qualitative data sources included recorded observations noted by me - the researcher - open-ended questions on the AS, group discussions, and information provided on the submitted assignments. Table 6 displays the data sources and their contribution to this study.

Table 6

Instrument and Data Sources Overview

Instruments and Data Sources	Data Type	Details	Research Question(s)
Nature Relatedness Scale (NR)	Quantitative	• Pre/Post-innovative practice • 5-Point Likert Scale • 21 Questions • 32 Participant responses pre- • 32 Participant responses post-	RQ2

Perceived Stress Scale (PSS)	Quantitative	• Pre/Post-innovative practice • 5-Point Likert Scale • 10 Questions • 32 Participant responses pre- • 32 Participant responses post-	RQ 2
Activity Survey (AS)	Quantitative Qualitative	• Pre/Post-Sit Spot • 4-Point Likert Scales • 12 Likert scale questions • 3 Open-ended questions • 32 Participant responses to sit spot 1 • 32 Participant responses to sit spot 2 • 32 Participant responses to sit spot 3 • 32 Participant responses to sit spot 4 • Researcher observations/notes	RQ1, RQ 2

Class Discussions	Qualitative	• Open discussion on the sit spot experience
		• 32 Participant responses
		  • 16 Verbal responses (SCN 301)
		  • 16 Written responses (SCN 309)
		  • Researcher observations/notes
			RQ1, RQ 2

Final Reflections	Qualitative	• Open reflection on mindfulness, nature connectedness, and incorporating these components into the course curriculum • 32 Participant responses • Researcher observations/notes	RQ1, RQ 2

The data sources will be analyzed and address the two research questions. The findings will be discussed in the following sections.

Perception of Mindfulness Practices: Quantitative and Qualitative Data

Research question one states, "What is the perception of mindfulness practices experienced in a natural environment by students enrolled in Environmental Education (EE) Certificate courses?" The goal was to identify students' perceptions of mindfulness and being exposed to nature. The following findings were established by examining the data collected in the AS, class discussions, reflections, and researcher observation. An overview of the mindfulness activities organizes the results and then the level of effectiveness according to the data collected in the participants' documented experiences. The themes are introduced when applicable.

Mindfulness Activities Overview

This study has four mindfulness components integrated into the sit spot protocol: box breathing, 54321, MBAT (drawing), and reflection. Additionally, connecting with nature has mindfulness characteristics and benefits. As mentioned in previous chapters, humans have a natural curiosity and love for nature; the connection is intuitive and natural. The connection to nature grows deeper and stronger the more mindful humans are in the natural environment. Emily and Sav expressed their connection with nature below:

> I believe mindfulness practices in nature can help bridge a connection between people and the natural world. Nature offers ecosystem services such as cultural services, where people directly benefit from activities done in nature out of pure enjoyment for the natural world. After practicing our mindfulness techniques in nature, I would say I did feel as though I received this ecosystem service from nature and felt my connection restored, even in my own backyard. - Sav

> My overall experience with this class was very positive since I feel that it allowed me to restore my connection with nature and be able to have the tools to distress with a natural outlet. I actually found the sit spot activities to be the most helpful for this. This course showed me how beautiful nature truly is, how relaxing it is to be in its present, and that all it really takes is a couple of minutes to sit outside and simply observe natural things to begin to relax. - Emily

This section of the research examines the mindfulness properties incorporated in this study. Table 7 displays the AS questions pertaining to the mindfulness activities and participants' responses based on their experience. The main mindfulness components examined in the study included box breathing, 54321, MBAT (drawing), and reflection. The mean scores reflect the combined responses of all participants and all four sit spots. Several Likert scales are used to analyze the participants' experiences on the AS. The first five questions asked participants to choose from the following alternatives: 0 - no help; 1 - very little help; 2 - fairly helpful; and 3 - very helpful. Question six uses a Likert scale associated with the following responses: 0 - not calming; 1 - somewhat calming; 2 - fairly calming; and 3 - extremely calming.

Table 7

Activity Survey Means for All Participants

	N	Mean	SD
1. How would you rate the mindfulness activity you participated in?	128	2.34	.69
2. How would you rate box breathing on reducing stress?	128	2.37	.73
3. How would you rate the 54321 on reducing stress?	128	2.07	.82
4. How would you rate drawing/sketching (MBAT) on reducing stress?	128	2.34	.81
5. How would you rate reflecting on your experience in reducing stress?	128	1.94	.91
6. How would you rate the mindfulness activities?	128	2.27	.64

*Data for all 32 participants and all four sit spots

Results of the Activity Survey indicate that participants found the mindfulness activities fairly helpful (M=2.34); 54321 (M=2.07); box breathing (M=2.37); MBAT (M=2.34); and reflection (M=1.94). The activities were also considered fairly calming (M=2.27) by participants. Detailed numeric responses associated with each question and category are located in Appendix H. The 32 participants responded to four Activity Surveys, totaling 128 responses for each question (N=128). Appendix H shows that on 62 occasions, participants noted that mindfulness activities were fairly helpful (this included a self-reported score of 2.5), and 54 responded that the activity was "very helpful" (including a self-reported score of 4.0). The additional scores reported were self-report scores: each of the self-report scores was handwritten on the AS by the participant. For convenience, Table 8 documents the mindfulness components and the reported scores for the "fairly helpful" and "very helpful" categories. Any self-report score is referenced below the table.

Table 8

Activity Survey: Documented Responses

	Fairly Helpful	Very Helpful	Total
Box Breathing	52	61*	113
54321	61**	40	101
MBAT	42***	63	105
Reflection	48	39****	87

* Box Breathing "Very Helpful" included two self-report scores of 4
**54321 "Fairly Helpful" had two self-report scores: 2.5 and 2.75
***MBAT "Fairly Helpful" had three self-report scores: 2.5 and 2.75, and "Very Helpful" included four self-report scores of 4
****Reflection "Fairly Helpful" included one self-report score of 2.75, and "Very Helpful" included one self-report score of 4

The combined totals of the "very helpful" and "fairly helpful" categories demonstrate that breathing and drawing were the most helpful components of the mindfulness activities. However, when specifically looking at the most beneficial ("very helpful"), MBAT was the most helpful, followed by box breathing. The lowest-scored technique based on student responses was the reflection strategy. Of the one hundred twenty-eight possible options (32 students times four sit spots), reflection received 87 responses in the fairly helpful or very helpful categories. Regardless of the mindfulness activity, more than half of the participants' responses had positive results.

Cultivating Connections

With Self. Participants found the mindfulness activities advantageous. Overall, positive statements using words such as "calming" and "relaxing" (or a variation of these words – calm, relaxed) appear 290 times in participants' reflections, discussions, and on their activity surveys. These positive states of mind allowed for connections with oneself, individuals, and nature.

Students found that being present in the moment permitted them to reflect on how they felt and how their surrounding environment impacted their feelings. When their mind was focused on being present in the moment and connecting with nature, participants found there were potentially life-altering consequences. Kylie shares:

> My main takeaway from this activity was that being present with yourself is more necessary than you realize, and just spending those 15 minutes with yourself can shift your day towards a more positive path. I noticed that the nature around me has been underappreciated, and I want to be more mindful about setting aside time to be outside. – Kylie

Emily confirms the importance of mindset, stating:

> I noticed that I am transported into a different world when drawing natural things due to it, allowing me to put myself in a different mindset. I also noticed throughout this course that mindfulness can be found in many aspects of your life, and it's not as extraneous as you might think it would be. – Emily

Results indicate that participants' experiences with mindfulness and nature produced positive outcomes. This study aimed to introduce multiple mindfulness strategies to students so participants could identify which techniques worked the best for them. To examine the effectiveness of this project, the remaining portion of this data section is organized by an overall perception of mindfulness, then by the self-reported efficacy of each mindfulness component based on the "total" column in Table 8; the results acknowledging that students found box breathing most effective, followed by MBAT, 54321, and reflection. The techniques and outcomes are discussed below. When applicable, the three themes – enhancing well-being, cultivating connections, and links to learning are used to organize the findings further.

Box Breathing

Box breathing was the first technique students were introduced to and participated in for each sit spot. A QR code was provided to students that directed them to a YouTube video, "Box Breathing – 1 minute in length," which visually guided students through the breathing meditation. Most participants had positive responses; however, on one occasion, a student found the breathing challenging: "I felt pretty calm, but sometimes felt that holding my breath was making me a bit more anxious" - Gwen. Despite some challenges, most participants found the box breathing meditation helpful, enhancing their well-being and cultivating connections to themselves.

Enhancing Well-being

Students' well-being depends on how they feel about themselves and their lives. The breathing meditation was meant to connect students' bodies and minds, making them aware of what they are thinking, and feeling and how each makes them feel in that moment. The results were feelings of calm, relaxation, engagement, and reward.

> I enjoyed the breathing part as I was fully engaged and felt automatically calmer. - Trina

> My experience was very nice and relaxing this time. The box breathing method is probably my favorite part because I can see/feel the results very soon after stopping. - Allie

> My dad always tried to get me to practice box breathing to help me become more mindful, but I always avoided it because I felt awkward. But after the box breathing exercise we did as a class, I realized it is not awkward and actually very rewarding. I also showed my friends the box breathing exercise, and they loved it! - Cindy

Participants appreciated the immediate results affiliated with box breathing. The calming sensation grounded them and helped them focus on the task at hand. This technique also allowed participants to connect with nature and themselves.

Cultivating Connections

With Self. Beyond relaxing, breathing meditation is meant to connect the individual with their body, making them aware of their feelings and thoughts that are capturing their attention. This was noted on numerous occasions throughout the study. Some comments were as simple as referring to the state of calm or relaxation, while others described the release of body tension and the mind finding ease. Here are two examples of students' connection to their body through meditation:

> I felt my body getting more relaxed, as well as my mind. - Fay

> During this activity, I felt more calm and in touch with my senses. I didn't feel my brain running a mile a minute, especially during the breathing exercise. - Abby

Participants noticed physical and mental advantages as well as heightened senses. Students reported that box breathing allowed them to increase their focus and be more observant of their surroundings: a cognitive, academic, and environmental stewardship benefit.

> For my sit spot experience, I found the breathing exercises to be quite nice. It makes you reflect on the moment and do nothing else but focus on breathing. This is something I do plan on including in my life as it made me feel more relaxed and in the moment. - Sav

> I felt really calm and observant of my surroundings. I really enjoyed the box breathing technique, followed by trying to immerse myself in my senses. - Andy

Box breathing was noticed by students as immediately gratifying and one of their most liked strategies in this project, followed by MBAT.

MBAT

This project implemented a self-administered Mindfulness-based Art Therapy (MBAT) component. MBAT was the third mindfulness technique introduced in the sit spot protocol. This portion of the project gave participants creative freedom to draw or otherwise document their objects from nature. The drawings were "graded" with a non-judgmental mindset, understanding that drawing is a learned skill that takes practice. Additionally, MBAT is a forum for freedom of expression, requiring a mindful approach to assessment. Students acknowledged this mindset: "It is kind of nice being in a class when you have to draw and just let go of any preconceived ideas of what your drawing should look like to create a raw image you produced" - Kylie. MBAT connects students

with their creative side and enhances their well-being.

Enhancing Well-being

Overall, participants found the drawing portion of the innovative project very helpful, calming, and a mechanism for gaining focus and seeing details not only in nature but in themselves and life in general.

> Before this activity, I had a bit of stress and anxiety because of all the schoolwork I had to get done but failed to time manage well. As I did the activity, I forgot about everything that I had to do. My whole mind was blank, and I only focused on the drawing. - Kelsey

> I think drawing helps me become more mindful and stress-free because it provides me with time and space to not only be focused on my drawing but my personal well-being through my senses. – Kevin

> I do believe there are mindfulness and stress-relieving components associated with drawing since I think it puts you in a different headspace that calms you since you don't have the busy world overwhelming your senses. - Emily

> The reflection of the outside nature and the transferring of it into a drawing would be worth incorporating into my life since I feel that it reconnects me with the fundamentals of life and also with myself since it brings me back to a simplified state. - Emily

54321

Ecology and History of the Sonoran Desert (SCN 301) was the only class required to document the 54321 activity in a written format. Nature Journaling had an open design to add these details to the reflection. In SCN 301, the Desert Investigation Field Activity (DIFA) assignment had a section that required a written response to meet the rubric expectations. In the sit spot protocol, 54321 occurred after the first question of the AS was answered, a location was determined, and the box breathing meditation had concluded. Of the sixteen participants in SCN 301, only one submitted assignment had no

response for the one emotion felt by the participant during the 54321.

Enhancing Well-being

The 54321 had mixed perspectives as to the effectiveness. The quantitative data shows that this technique was fairly helpful (see Table 3 and Table 4). However, my researcher observation notes that on indoor sit spots, SCN 301 students were challenged by the 54321 commenting, "There's nothing to smell inside," "There are not many things can I come up with inside," and "This is so much easier outside." Furthermore, participants' reflections note that:

> As for the 54321 activity, I don't really see many results, if any at all. – Amy
>
> Sitting at the table being in the classroom made 54321 less calming/restorative. - Kate.

Despite a few challenges, overall, SCN 301 participants had positive emotional responses documented on the 54321 mindfulness activity. Of the 65 words (some terms were replicated) that participants used to record emotions, 55 had positive emotions or reactions. Figure 4 represents the words participants used to express the one emotion they felt at the end of the 54321. Written in a larger font, the top three words reported by participants were the words calm (referenced 20 times), relaxed (referenced 10 times), and peaceful (referenced four times). Please see Figure 4 for the emotions the SCN 301 participants documented during their 54321 mindfulness activities throughout the innovative project.

Figure 4

Visual Representation of 54321 Responses in SCN 301

Participants also recorded emotions such as anxious, distracted, fatigued (2 times), frazzled, hungry, nervous, overwhelmed, stressed, and tired. Participants commented on stressors that occurred before class in these ten cases. Further analysis of these ten cases noted that participants recorded negative emotions during their 54321. However, their stress levels decreased after concluding the sit spot on every occasion. Furthermore, their sit spot experience produced positive results. Two examples of these results are displayed below. Cindy is a White female attending the 10:30 SCN 301 class. She is between 18-20 years old. During sit spot four, she felt fatigued when completing the 54321 but relaxed and mentally restored at the end of the activity. Cindy wrote:

> My opinion of the mindfulness experience has not changed, as I feel I have been relaxed and benefitted from all of them. Especially this one because I had a very long and stressful morning before coming into class. Then when being class, I was tuned in and forgot about my chaotic morning. After this activity, my mental

fatigue was restored, and I think the background music enhanced that. – Cindy

Allie is 18-20 years old and identifies as a White female. The sophomore stated that her emotion was frazzled during her second sit spot. Her reflection on their sit spot documents:

> The mindfulness experience was a lot more useful for me this time (2nd time). I started off a lot more stressed-out last time and ended up feeling a lot calmer at the end than I had before. I experienced a very marked change, albeit a gradual one. The things that were causing my stress were still there at the end; however, I was more calm and able to have a level head when thinking about them. - Allie

Some participants saw the 54321 as a strategy to clear their minds and relax. The Canvas PowerPoints instructed students to return to and complete the 54321 activity if participants felt disconnected or started thinking about past or future events. Some students even found the non-judgmental moment achieved during the 54321 worthy of life application. Abby described how the 54321 impacted a typically stressful situation.

> I enjoyed doing the 54321 in traffic, I might start doing that because I felt more clear-minded and distracted from being stuck in traffic. I noticed how relaxed I felt without music on and with the windows down, which I didn't expect. I also realized that traffic noises didn't bother me too much. - Abby

Abby chose to shift her focus and see the positive things in her environment rather than focus on the traffic that typically frustrated her, causing stress. The 54321 provided opportunities for students to gain awareness of their feelings and react differently than their normal responses had been in the past. This acknowledgment and response to feelings require students to cultivate connections with themselves.

Cultivating Connections

With Nature. The 54321 was also a productive technique for helping participants become grounded, aware, and connected to their surroundings. The 54321 required

students to pause and identify five things they could see, four things they could feel, three things they could hear, two things they could smell, and one emotion they were feeling. This process allowed participants to connect with their surroundings on a different level. Students noted how the activity made them more observant about their surroundings.

> Getting outside the classroom and really talking in nature made me feel at ease, especially during the 54321 activity, where I really took in my surroundings. – Max

> Overall, I felt grounded. Being outside often has that effect on me. I really enjoyed the 54321 activity, and it helped me become acquainted with my surroundings. - Gwen

With Self. As mentioned throughout this study, the number of university students that experience anxiety and depression is significant. The findings of this study indicate that mindfulness practices can contribute to students' positive mental health by reducing stress and anxiety. However, unless students are able to connect with their minds and body, it will be difficult for them to become aware of their thoughts and feelings so they can process them and self-regulate accordingly. The 54321 empowered participants to let their worries effortlessly pass while their attention pivoted to alternative tasks at the present moment. The participants below explain their ability to gain focus.

> What worked for me to really get in the mindset was the 54321 method because it allowed me to let go of any worries I had and focus on simply the task at hand. I don't think anything didn't work, except that I did have trouble with my mind shifting to different topics at the beginning of the activity; however, using the 54321 method helped me with that issue. – Kylie

> I did like the structure of 54321; it helped me refocus the activity at hand if I got distracted by other stimuli. - Josie

> The 54321 exercise helps you be present and focus on what is around you rather than in your head. - Ken

> The 54321 method really helps me center myself and focus, which I struggle with. I have ADHD and anxiety, so I tend to feel frazzled and felt like this prior to the activity. During the activity, I had difficulty settling in, but once I did I felt calm throughout the exercise and after. – Kate

With a "Total" mean (see Table 6) of M=2.07, participants found the 54321 technique "fairly helpful." The participants were able to use the 54321 to their academic advantage, reducing distractions and gaining focus. This leads us to the project's final mindfulness strategy or technique: reflection.

Reflection

The reflection component of the mindfulness activities received the lowest scores of the innovative project. Some participants disliked the reflection process stating they would change "the required reflection as I always feel my stress resume" – Sav. Along with challenges came success. Reflection was identified as a means to enhance student well-being and cultivate connections.

Enhancing Well-being

The reflection component was integrated into the sit spot protocol to allow students to evaluate what worked for them and what did not. The goal was to help participants gain an understanding of nature and mindfulness and how those practices influence them. Self-reflection permits individuals to gain insight into how they are feeling and what they think about their experience. Participants found value in the reflection components, saying that reflections highlighted academic, mental health, and organizational benefits:

> I was able to hear birds and feel some light wind. Really took time to study/appreciate the species. Reflect on the facts about Palo Verdes and examine the structure/how they survive. Nature has so many intricate details; it was cool to

try and draw what I saw. - Josie

> I discovered that I really do enjoy reflecting on my experiences, as well as physically writing them down. Having to think and remember, organize my thoughts, and focus while writing them down is very therapeutic for me and requires me to be present in the moment instead of thinking about the future. – Allie

Cultivating Connections

With Nature. With Self. Being in nature or exposed to nature has the ability to reduce negative feelings and increase positive feelings. However, they may only identify these benefits if students pause to reflect. In this study, reflection allowed students to gain a connection to nature and supported a connection to themselves. Practicing mindfulness encouraged participants to take a deeper look at themselves.

> I often like to be alone and reflect and absorb nature since my thoughts tend to clear themselves better with no background noise. - Emily

> I felt that the breathing and mindfulness activities allowed me to relax and reflect on how I have been doing. - Jayda

> My experience with connecting to the waterfall was enjoyable since it did allow me to clear my mind and focus on what was directly in front of me rather than things that I had to do by the end of the day or week. It took me back to the mindset that assignments aren't everything since you'll eventually graduate, but connecting to nature can give you a stronghold on our future since it's ever-revolving and will always be there for you and one way or another. – Oakley

Additionally, my researcher observations indicated that reflections were vital components of this research. My research notes document a conversation where a participant suggested that he wished the indoor sit spots could be as productive as outdoor sit spots. He continued the conversation by stating that more outdoor sit spots should be implemented. I asked the student if he thought he would have come to that conclusion without experiencing both indoor and outdoor sit spots and reflecting on his

experiences. The student acknowledged that he would only have noticed the significant impact of each by participating in each and taking a moment to reflect, confirming that reflection is critical to understanding.

Integration of Nature and Mindfulness in Curriculum: Quantitative and Qualitative

The second research question examined in this study is "What do student participants identify as the effects of incorporating nature and mindfulness into their EE curriculum? (How do nature and mindfulness impact university students and the university curriculum/courses?)." The goal was to examine participants' experiences and determine what they identified as hindrances or benefits of integrating nature and mindfulness into the university curriculum. The data sources were analyzed to produce the following findings concerning integrating nature and mindfulness into the course curriculum. Like the first research question, where applicable, three themes will organize the findings: 1) Cultivating connection. 2) Enhancing well-being. 3) Links to learning.

Overall, integrating nature and mindfulness into the course curriculum had positive results. Students gained focus and decreased stress levels. Table 9 demonstrates the results of the pre- and post-NR scores, the pre- and post-PSS scores, and the pre- and post-stress levels for each sit spot. Surveys are organized in the table below and display how many participants' scores increased, decreased, or remained the same based on their responses. Red indicates that the participant's NR score decreased (less connection to nature) or the participant's stress level increased. Yellow indicates there was no change in the score from pre- to post-test. Finally, green shows the number of participants who had

positive changes in their scores, meaning their connection to nature increased, or their stress levels decreased.

Table 9

Overall Results

NR Pre/Post	PSS Pre/Post	SS1	SS2	SS3	SS4
9	9	2	1	0	0
9	3	5	8	12	11
14	20	25	23	20	21

Enhancing Well-being

As shown in Table 9, the data reveals that fourteen participants increased their connection to nature. The table also shows that more than half decreased their stress levels during all four sit spots from the pre-PSS survey to the post-PSS surveys. The findings indicate that stress levels increased on three occasions during sit spots one and two. These increases occurred in the in-person Ecology and History of the Sonoran Desert. On further analysis of the data, this increase was due to "first day of class jitters," as stated by Ian. During the second sit spot, Kara documents that her stress increased. However, upon further analysis, Kara's results are contradictory. The quantitative results show an increase, but the qualitative results demonstrate that she was "relaxed" during her 54321. Kara states, "I was feeling pretty good and in my zone during the sit spot." However, after the sit spot and leaving the natural environment, she recognized her stress increased: "All my juice and mindfulness practice escaped me when we had to leave the space." Thus, the

innovative project was successful, but the results for Kara were not sustainable after this sit spot. As the sit spots continued throughout the innovation, increases in stress dissipated, resulting in no participants noting increased stress levels in sit spots three and four.

Further analysis of the stress scores notes that based on the PSS pre-test scores, students who participated in this study were moderately stressed (M=20). Table 10 below displays the mean pre-and post-test scores and the difference in the averages upon completion of the post-test. The PSS is broken into three categories: low stress (0-13), moderate stress (14-26), and high perceived stress (27–40). The table contains the mean of all participants and then breaks down by each class and male and female participants. The green areas recognize outdoor sit spots; the red demonstrates a negative result (nature connection decreasing or stress increasing). The table also exhibits arrows. The arrows visually document increases and decreases in the score with the numeric difference stated under the arrow. The arrows are also color-coded, indicating negative (red) or positive results (green).

Table 10

Pre- and Post-Survey Scores by Class and Gender

	NR			PSS			SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	PRE	PST	DIFF	PRE	PST	DIF	PRE	PST	DIFF	PRE	PST	DIFF	PRE	PST	DIFF	PRE	PST	DIFF
SCN 301A 5 Female 2 Male	3.4	3.55	↑ 0.15	14.13	16.88	↑ 2.75	1.25	0.88	↓ 0.37	0.63	0.5	↓ 0.13	1.13	0.25	↓ 0.88	1.38	0.75	↓ 0.63
SCN 301B 4 Female 4 Male	3.8	3.23	↓ 0.57	22.25	23.38	↑ 1.13	2	1	↓ 1.0	1.88	0.88	↓ 1.0	1.38	0.88	↓ 0.5	1.88	1.06	↓ 0.82
SCN 309 6 Female 2 Male	3.93	4.5	↑ 0.57	21.13	16.38	↓ 4.75	1.75	0.56	↓ 1.19	2	0.63	↓ 1.37	1.38	0.63	↓ 0.75	1.81	0.81	↓ 1.0
SCN 309B 7 Female 1 Male	3.55	3.75	↑ 0.2	22.5	15.25	↓ 7.25	1.88	0.75	↓ 1.13	2	0.63	↓ 1.37	1.5	0.63	↓ 0.87	1.13	0.5	↓ 0.63
FEMALE ALL (23)	3.76	4.01	↑ 0.25	20.91	18.97	↓ 1.94	1.9	0.93	↓ 0.97	1.77	0.72	↓ 1.05	1.36	0.59	↓ 0.77	1.65	0.79	↓ 0.86
MALE ALL (8)	3.46	3.16	↓ 0.3	17.8	14.9	↓ 2.9	1.37	0.48	↓ 0.89	1.36	0.57	↓ 0.79	1.34	0.66	↓ 0.68	1.35	0.73	↓ 0.62
ALL AVG	**3.67**	**3.76**	↑ **0.09**	**20**	**17.97**	↓ **2.03**	**1.72**	**0.8**	↓ **0.92**	**1.63**	**0.66**	↓ **0.97**	**1.34**	**0.59**	↓ **0.75**	**1.55**	**0.78**	↓ **0.77**

Negative Results (Decrease in Nature Connectedness or Increase in Stress)

Sit Spots in an Outdoor Environment

***One participant did not report gender.

The overall mean for all participants in terms of their PSS decreased, reducing by 2.03 points. The quantitative data also show that on completion of all four sit spots, indoor or outdoor, stress levels dropped by a minimum of 0.75 points. When comparing males to females in this study, the data show that females were more stressed based on their PSS and each sit spot's AS (which documented their stress level). However, while females reduced their stress scores during each sit spot at a higher rate than males, when looking at the overall PSS taken at the conclusion of four sit spots and during week six of the semester, males decreased their PSS stress score by 2.9 points compared to the females at 1.94 points.

It is interesting to note that by week six of the semester, students are in the routine of attending classes and know the expectations. This is also heading towards mid-terms, which may require increased focus on academics, causing additional stress. Thus, based on the findings, stress levels did not increase during this time but instead decreased.

Mindfulness and nature have been found to be successful coping strategies for stress. Participants reported on several occasions that the techniques integrated into this project helped them self-regulate their emotions. While documented here, under the "enhancing well-being" theme, it is also essential to acknowledge that recognizing and understanding your emotions and feelings also requires a "cultivating connection" to oneself. The qualitative data discovered that students evaluated themselves and processed their emotional and mental state, finding they were less stressed and calmer when exposed to nature and mindfulness in class. Fay explains the impact on her emotions:

> I really enjoyed my experience as it allowed a way for me to be relaxed and forget the issues before the class. The slow decline of negative feelings was nice, as it allowed me to focus better. – Fay

Allison also shares the impact the innovative project has had on her.

> I think that introducing nature and mindfulness is helping me become a more well-rounded student as it applies to how I can better the world in my career. I think that the time spent in class practicing mindfulness has helped with my stress levels in my other courses. - Allison

Self-regulation was an ongoing theme throughout the study, whether students were stressed, anxious, or overwhelmed. During the first sit spot (the first SCN 301 class), Cindy was overwhelmed by the expectations of the course based on the syllabus. The action of going outside to learn and connect with nature, plus mindfulness strategies, helped her recognize and regulate her emotions. She shares:

> I had no idea that we would be going outside for this class, and I am so pleased that we get to enjoy the fresh air and try to be more in tune with nature. At first, I was intimidated by the class from the syllabus, but the mindfulness experience calmed me down and took my stress away, and I could really appreciate the outdoors, my surroundings, and the plants. I would love to keep doing this activity as I really like that everyone's mental health could benefit from it. I felt a sense of calmness and peacefulness after this activity. - Cindy

Often the data in this study is intertwined with multiple themes. For example, the statement above is stated in this section as correlating with the "enhancing well-being" theme; however, it also demonstrates how these positive feelings align with cultivating connections with nature and oneself because Cindy became aware of your feelings and how mindfulness and nature influenced those feelings.

Cultivating Connections

With Nature. Statistically, the data show that when examining the mean for combined participants (SCN 301 and SCN 309) in the study, the mean slightly increased in terms of nature connectedness by a difference of 0.09 (see Table 10). Further analysis indicates that when analyzing the data by gender, males decreased their connectedness,

and females became more connected to nature based on the NR. Regardless of gender, the qualitative data suggested that students increased their observation skills when engaging with nature, thus, cultivating connections.

> I was sitting in desert breeze park, and it felt amazing. I was very connected to nature, surrounded by trees, birds, and bugs. I had a great view. – Andy

The acknowledgment of elements from their natural environment. Cindy suggested that the increased awareness of her surroundings made her more "in tune" because she took time to observe—the mindfulness practices and being present cultivated connections.

With Self. As mentioned in previous chapters, an individual's mindset determines how individuals will respond to this stress. Students' mindsets are essential in deciding how they manage their stress levels. Mindset and mindfulness may seem similar; however, they do differ. Therefore, it is important to distinguish between mindfulness and mindset. Ben Salem and Karlin (2023) note that mindfulness is a state of awareness and noticing, while mindset centers around the thought and action process. Mindfulness is a practice that allows you to pause and be present so that you can observe your thoughts, feelings, and the surrounding environment with curiosity and non-judgment. A positive mindset is an active process where students replace negative thought patterns with positive more supportive thoughts. Mindsets will differ from student to student. Seth and Cindy are examples of various ways students perceive situations. Seth and Cindy explain their mindsets during a portion of this project.

> This has been my most stressful semester yet, and I feel that I'm handling it quite well, as well as getting all my assignments done on time. I feel that being mindful is the true way to becoming a better student and a happier person. - Seth
> Honestly, my mindfulness experience has not been as good today as it has been in the past just because I am so tired and stressed and can't seem to shake it. I pretty

> much felt the same for before, after, and during the activity, and that was extremely tired and out of it. – Cindy

Seth looked at the challenges, thought of and focused on the positives, while Cindy struggled to have a mindset that let her find the positives, resulting in stress. Stress can have physical ramifications, as in the case of Cindy, who could not let go and be present. However, mindfulness can make students aware of their feelings and support a positive mindset which can present a different outcome, such as in Seth's case. Several participants in this study embraced mindfulness. Take Ken, for example. Ken demonstrates a positive mindset when he writes about being stressed out but acknowledges that he's "got this." He writes:

> Midterms are coming this week, so I was feeling a little stressed out, but I honestly got this, and I know I will do good. The mindfulness activity is something that I do a couple of times per week to make myself relax more, as doing 18 credits can get to you from time to time. After this activity, I felt refreshed and ready to do more assignments. – Ken

Ken realized that mindfulness and mindset impacted his mental health and incorporated them into his weekly self-care routine. Self-care and life applications became one of the life lessons participants identified as they cultivated a connection with themselves.

Throughout the study, students found "The grounding abilities of Mother Nature cannot be found elsewhere" – Rebecca. Grant added, "Overall, I felt grounded. Being outside often has that effect on me." Sav continues the conversation by stating, "Sitting outside in my yard in a rural area, I always feel very connected to nature as I hear the birds singing, the leaves rustling, and feel the cold air that grounds me and surrounds me." This "grounded" state helps with stress and anxiety. Kevin shares, "I think incorporating this daily or at least weekly would improve much of my anxiety, enable me

to reflect, and then plan how to move forward." The grounding component and reflection allowed participants to recognize life implications. Kylie was quoted in this paper's "Mindfulness Activities Overview" section. Her experience also demonstrated a life lesson. She is re-quoted below for convenience.

> My main takeaway from this activity was that being present with yourself is more necessary than you realize, and just spending those 15 minutes with yourself can shift your day towards a more positive path. I noticed that the nature around me has been underappreciated, and I want to be more mindful about setting aside time to be outside. – Kylie

Students began to recognize that they became more aware of their well-being as they connected with themselves. This awareness gave them the opportunity to change previous behavior and incorporate new life skills. Some of these reflections on life lessons are noted below:

> I think drawing helps me become more mindful and stress-free because it provides me with time and space to not only be focused on my drawing but my personal well-being through my senses. There's added self-awareness and regulation, or at least identification of my own emotions and how I cope with those feelings. Yes, absolutely worth incorporating into my life. I think incorporating this daily or at least weekly would improve much of my anxiety, enable me to reflect, and then plan on how to move forward after the activity. – Kevin

> Before this class, I hadn't really spent much time on myself or my mental health. My life is very fast-paced, and it feels like I'm always busy with a million things to do. When I take time to slow down during this class, it reminds me that I need to take time for myself and how beneficial mindfulness can be to my mind, body, and soul. – Sav

Participants found that the mindfulness and nature components incorporated into the curriculum gave them a moment to be present. Jayda discusses her continuous inner monologue below. Inner monologue can be either positive or negative. Mindfulness and

nature reduced rumination and thinking about the future, which led to a quiet inner monologue providing opportunities to focus on the present.

> Practicing mindfulness during the sit spot was definitely helpful because it helped me turn off my never-ending inner monologue a bit. I will be incorporating this practice into my life more often because I find it calms me down and helps me focus on what is in front of me instead of whatever has been making me anxious lately. This is a difficult thing to do, so I would like to start practicing this more, even if it just helps a little. – Jayda

Along with enhancing well-being and cultivating connections with oneself, mindfulness and nature were contributing factors and influential components of forming a positive learning environment.

Links to Learning: Academic Benefits

Data documented by participants noted that some university students consider university classrooms stressful. Discussing classroom spaces with Ian showed that students often associate university classrooms with adverse learning environments. He says classrooms require him to perform at a highly stressful level, demand his attention for extended periods, and are often sterile, non-personable spaces. The stress and anxiety experienced by students affect their academic and social capacity. By incorporating nature and mindfulness into the course curriculum, participants found that they alleviated some stress and anxiety associated with their daily activities. Nina speaks about mindfulness and nature below:

> I think it helped align my headspace and bring me back to a less anxious state because, beforehand, I was experiencing a lot of mental anxiety that was turning into physical stress on my body. – Nina

The physical ramifications of stress on a student decreased during this study as students became calm and relaxed. Furthermore, students gained a different perspective

when participating in mindfulness and nature practices. Referring back to Ian in the above paragraph, his course reflection notes that classrooms can go from stressful to enjoyable. When he was asked about integrating nature and mindfulness into the university course curriculum, Ian wrote the following in his final class reflection:

> I think incorporating nature and mindfulness into college courses makes students more willing to attend. Oftentimes students associate their classes with stress and other negative feelings. By incorporating mindfulness into classes, students will begin associating that class with stress reduction and feelings of being calm. I also think incorporating nature makes learning more enjoyable for students, as it makes the environment feel less like a typical classroom and more like a calming space. I do better in my classes when I have a positive association with the class and being there, as I'm more inclined and excited to go to class and learn. – Ian

As Ian mentions above, classrooms with learning environments associated with stress reduction and feelings of being calm are preferable learning spaces for students; students' attitudes shift from stress to curiosity and engagement. Positive learning spaces are essential to learning, especially in the years following Covid-19. Students have been challenged by the reintegration into the academic arena after Covid-19 caused education to default to a strictly online platform. When asked about integrating mindfulness and nature into the university course curriculum, Allie comments that mindfulness and nature should be a consideration.

> I think it is something that should really be considered, especially now after COVID, so many people (myself included) struggle with reintegration, and this could really help. No class is ever worth the loss of a life. – Allie

Allie's reference to "loss of life" is a genuine concern. Arizona State University's Wellness page displays alarming statistics. In the last 12 months, 48.5% felt so depressed it was difficult to function; 15.4% seriously considered attempting suicide, and 2.2% reported attempting suicide (ASU, n.d.). Integrating nature and mindfulness helped build

the community and relationships that support students, nurture positive mental health, and enhance student well-being. Cindy writes:

> I enjoy this activity and appreciate that our professors care enough and consider students' well-being/mental health. Before this activity, I was pretty lethargic and not in tune with my emotions. During this, I felt more awake, in the moment, and joyful. Walking away from this activity, I definitely feel more in tune with my emotions and felt more alive. – Cindy

Max supports Cindy's thoughts by discussing how incorporating mindfulness and nature into the university course curriculum produces a positive environment.

> It's fun. And definitely nice to know that some people do care about the mental restoration aspect in such a stressful environment. So, they give you a more positive and lovely one. - Max

> I feel like incorporating nature into university classes proves to me that my teachers care about my well-being. There was a big focus on mental health in this class, and while a lot of teachers say that they prioritize mental health, this is one of the few classes that I've seen mental health restoration actually implemented into the class. Teachers allowing us to go outside proves to me that the teachers actually want us to absorb the desert environment. Practicing mindfulness exercises outside definitely helped me destress and focus on what is in front of me. I definitely believe that nature and mindfulness should be incorporated into other classes' curriculum. Not only does it help you destress, but it helps you focus on the bigger picture. – Kate

Max and Kate attended SCN 301 in person on the Tempe campus. The in-person class benefitted from sociocultural learning, where peer interactions guided their learning process and introduced them to new perspectives and understandings. The class became a community where relationships were appreciated, valued, and welcomed. The peers and instructors encouraged students to speak up, participate, and interact with others. The positive learning environment became a safe space for these social interactions. Students noted in their reflections their appreciation for being noticed and the investment in their well-being. Sylvie and Lydia acknowledge the value of cultivating connections with

others and the potential impact of investing in students by incorporating mindfulness and nature into the curriculum at a university level.

> I believe they make me more excited about the course and motivated while doing the work. Incorporating nature made me feel like my professors cared about my well-being and mental health. It taught me more how to handle my stress with college and school work in general. I believe this should be incorporated into every class and might show huge benefits with the moods and overall performance of every student. – Sylvie

> I think incorporating nature and mindfulness is really important and should be included in more classes. They are both proven to reduce a significant amount of anxiety and for me personally, it shows that the instructors care and are aware of my well-being and want me to succeed. This is an important reminder and makes me feel more comfortable in class. Being in nature helps ground me and reminds me of all the beautiful things around me that are much bigger than any worries or stress. – Lydia

While these comments intertwine with the "enhancing well-being" (e.g., stress reduction, reduced anxiety, mental restoration) and "cultivating connections" (i.e., connections with peers and professors), they are stated here to embrace the views of students' appreciation and preference for positive learning spaces. The classroom environment that was created made students feel appreciated, supported, and valued. This is an academic benefit and a testament to cultivating connections. In this case, those connections are to individuals. This connection builds relationships and fosters community. Along with a supportive learning environment, students found other benefits to participating in this project.

The innovative project granted participants the opportunity to recognize that there are academic benefits to incorporating mindfulness and nature into the course curriculum. Kate reports that she is once again engaged in learning: "I really like these activities. I get to feel like a kid excited to learn again." Along with engagement, participants attributed mindfulness to their enjoyment of observing details. "I like the mindfulness experience

where we can be up close with the plants and see the insides" – Grant. Grant's quote is in response to observing a cross-section of a prickly pear cactus and its fruit. Grant was able to activate involuntary attention, per the attention restoration theory. He was fascinated by observing something new and seeing it from a different perspective allowed Grant to explore and engage with nature. While eager to learn, students also acknowledge being more focused, observant, and aware of their surroundings.

Participants often spoke about the activities allowing them to focus or refocus. These words (focus or refocus) are used 206 times throughout the qualitative data. Kevin admits that his mind easily wanders, but "Using the 54321 technique, though, helped me re-focus." Claire states that the activities allowed her to "focus harder and learn with less resistance." Claire says, "I find myself to be more open to learning class content when I do not feel drained already." The innovative project permitted students to be present and not ruminate on past situations. Take Fay, for example. Fay shares:

> I think that the mindfulness activity is extremely helpful in being grounded. Before, I was highly annoyed due to something that happened before. During the activity, I felt myself forgetting about what happened before class. Afterward, I was very calm, ready to go home and do my homework, completely forgetting about how annoyed/angry I was before. – Fay

The focus, as well as the participants' ability to refocus, had substantial benefits. Their newly acquired focus assisted students in concentrating and completing assignments; it also allowed them to retain information which could result in higher comprehension of course content. Student focus and a peaceful atmosphere encouraged problem-solving and critical thinking. Karly and Josie share their nature and mindfulness experiences and how they inspired focus and think creatively.

> Incorporating nature, or at least some aspects of it, in addition to mindfulness activities such as the box breathing activity, is overall positive on my ability to perform academically. It encourages calmness which helps me to think more creatively and intuitively about problems and assignments. - Karly

> The mindfulness experience helps me prepare to focus on the activity/being immersed in the nature around me. Although this week/weekend was very long/stressful/tiring for me, I was looking forward to the class and nature activity. This time, I wasn't really worried about the sound/loud noises; I was able to just focus on my drawing/ noticing/ writing. After, I felt accomplished and less stressed. - Josie

While some participants found immediate gratification and results, others needed time to reflect on the impacts of integrating the innovative project strategies into other courses. Amy talked with her peers about incorporating nature and mindfulness into the curriculum. During the discussion, Amy thought that there was no room to incorporate nature into academic courses not pertaining to nature, such as statistics. Another student reminded her that we incorporated nature into our indoor classes by using nature screensavers on the class computer and playing nature music in class. The conversation continued with someone asking if that would help her in courses like statistics. Part of Amy's final reflection is documented below:

> I think overall, the quality of work done inside the classroom really improves because it aids in getting people ready and in the headspace without being too distracting. Overall, the degree of how much nature and mindfulness are incorporated should depend on the class and the topic it focuses on. It would possibly be super beneficial in classes that are more stressful, like math or statistics. – Amy

Amy talks about "headspace," acknowledging the mental restoration (ART) achieved while participating in mindfulness and nature. Sylvie confirms that the activities in this study helped her achieve a mental state conducive to completing her upcoming

assignments, in this case, her lab. Sylvie was stressed prior to the lab but was able to use box breathing to reduce her stress and focus on the assignment.

> I felt that the mindfulness experience helped with my stress levels and helped create a more peaceful environment before starting the lab. I found that the box breathing exercise helped me the most. – Sylvie

When students are stressed, overwhelmed, or experiencing mental fatigue, their mood and the quality of their academics are influenced. This is documented in the Chapter 2 literature review section of this study. As mental fatigue increases, our ability to manage our emotions decreases, impacting our academic performance. Cindy adds to Sylvie's conversation below, stating that focus and calm support her academics.

> Nature and mindfulness are great ways to stay calm and stay focused. I believe it helps me complete more of my schoolwork on time and helps me get good grades. I think it should be incorporated into classes to increase the productivity and happiness of students because students' mental health is the most important factor. - Cindy

The academic benefits continue as participants reported heightened critical thinking skills, an openness to perspectives, and seeing that we are all part of a more extensive system at work. The connection between nature and mindfulness led to some more profound levels of reflection, which involved critical thought processes that considered the larger systems we are all a part of:

> I think that the connection between nature and being mindfully in the present moment relates heavily to the fact that everything is one and comes from a single source of consciousness and that everything around us, even to the extent of neighboring cities or states, having even the slightest impacts on us that literally changes us unknowingly or subconsciously over time. - Seth

> I believe that being present in nature will make you feel more relaxed and present. We often spend a lot of time and energy worrying about small meaningless things. Being present in nature reminds us that we are part of a bigger system, and it takes us out of our own heads. – Kara

Mindful moments and deep reflection support active listening, understanding, and exploring other perspectives. This non-judgmental practice increases students' awareness and provides an opportunity for students to understand the world around them. When we look at the world (or nature) with a non-judgmental practice and remain in the moment, we allow ourselves to see things differently, think differently, and act differently; if students change the way they look at things, the things they look at will change. Emily found that an everyday feature in her life changed meaning when she took some time to be present outdoors. Here is what Emily writes:

> I also have a waterfall in front of my house, and at first, I thought of it as annoying since it runs pretty loud and always interrupted my tv audio, but the activity allowed me to just focus on it, and I found it pretty relaxing. When you single out the busyness of your house you can appreciate the natural water flow more, allowing for stress relief and a clear mind. - Emily

When her mind was focused on technology, the waterfall was a hindrance; however, Emily connected with the waterfall differently, saw the details, and shifted her mindset, becoming more appreciative and aware. This shift is a mindful moment where Emily embraces what is. Emily found that her increased attentiveness provoked new thought processes. She shared:

> This week I really noted how nature is so diverse but so similar at the same time and how different perspectives of the same things can change the whole foreground of your observation. - Emily

Jayda found that her perspective changed throughout the innovative project. She entered the project with preconceived ideas about mindfulness. Looking through a sociocultural lens, Jayda's previous experiences and background knowledge about mindfulness influenced her initial response to this project. We practiced mindfulness techniques as a class, and they became part of the class culture. Jayda gained a new perspective and

understanding of mindfulness through these cultural interactions. Jayda elaborates below:

> At first, I didn't like doing mindfulness practices in the classroom or outside of the classroom. I had the perception that it wouldn't help, and I was embarrassed to participate in public. Now, I have been doing the 54321, journaling, and box breathing during class and in other situations at school and work. I have even recommended to my coworkers and interns to complete the mindfulness practices as they have really helped me. - Jayda

A change of perspective was seen in other students' experiences as well. Emily found that her viewpoint changed concerning the MBAT. She found the MBAT was a strategy for expressing her perspective. She shares with her class on a discussion board:

> Another similarity we share is that we have similar journaling processes since we both focus on drawing. I believe it allows for creative freedom to be spread more easily and allows my perspective to be better understood. – Emily

Students' openness to seeing their surroundings differently allowed them to apply course content to real-world applications. Rick explains, "I really enjoyed incorporating nature into this class because it helped me substantially. This helped me learn things that I would have NEVER learned without putting the picture and image into real life." Trina says she enjoyed "The ability to go outside and learn and see things from another perspective. Also, the opportunity to do mindfulness incorporated into my school too as it somewhat benefitted me in other courses I'm taking." The life skill application seen here extends to other positive outcomes of this study. Participants were able to settle, calm, and clear their minds. Students were then able to show reflective thought processes and critical thinking. Cindy comments about the history of a tree below:

> I felt more in tune with nature during this activity because it allowed me to take my time and really observe the trees and plants rather than just quickly looking at them in passing. This assignment offered for you to touch the tree, and I thought that was special because I never really thought to do that and interact with a tree. It was a new and fun experience. Also, by touching the tree, I could really see and

> feel the tree's unique details, and helped me see that there is more to trees than branches and leaves, but there can be a story and history behind it. – Cindy

Jayda engages multiple senses while reflecting on her SCN 301 experience with the Palo Verde tree below. While focusing on the details, she can think critically about concepts explored in class and course content for real-life application.

> I was able to hear birds, feel some light wind. Really took time to study/appreciate the species. Reflect on the facts about Palo Verdes, examine the structure/how they survive. Nature has so many intricate details; it was cool to try and draw what I saw. - Jayda

With focus and a clear mind, students start to wonder and become more curious about their surroundings: they notice more, ask more questions, and become more appreciative and aware of their environment. Sarah and Abby share their thoughts on connecting with nature more deeply.

> I found that I was much more curious about my surroundings and even thinking more about the patterns. Again, I will continue to include box breathing into my life, and ideally same with the 5,4,3,2,1 technique. My main takeaway is that there is a lot more to observe in nature than meets the eye, and nothing is as simple as it appears on first glance. - Sarah

> My connection to nature was through my hearing. All of the noises outside of my window made me very aware of the fact that I am just one person in this whole vast universe and how there are so many different life events happening around me at this moment that I am unaware of. - Abby

This re-ignited curiosity creates opportunities to learn and grow. Part of that growth occurs when students acknowledge their strengths, limitations, and requirements for success. One discovery for success was that the students recognized that there is a need to connect with nature and disconnect with technology. Amy speaks about technology in her life. She was asked, "What do you identify as the effects of incorporating nature and mindfulness into your university curriculum/classes?" Amy responded:

> Overall, I would say this would help connect students with their surroundings, especially because a lot (of curriculum) is done online through our laptops and such. It would give them an opportunity to relieve that physical and mental load that is built up over time. –Amy

Amy is one of many who have noticed the amount of time spent on digital media. The university uses technology as its digital platform and learning spaces. Additionally, social media and smartphones are part of students' daily routines. Claire acknowledges screen time as she shares the following during one of her SCN 301 sit spot experiences:

> Students (including myself) become very burnt out by constant screen time and little regard for our mental well-being, both inside and outside of the classroom. Nature and mindfulness impact me and my courses for the better. It helps to break up monotony and leads to a more positive and beneficial learning environment and overall experience. – Claire

This sentiment is also expressed in the nature journaling course. After expressing concern about leaving her phone for 15 minutes to complete a sit spot, Mandy writes, “I felt amazed that I ended up having my phone completely turned off for almost an hour, and I didn’t even know it.” Mandy reiterates her “escape” from technology during a conversation with Ken on the discussion board.

> Ken: I think the biggest takeaway would be how this exercise helps one another and how drawing nature to connect ourselves more to it to escape reality and the digital media and actually live in the moment.
>
> Mandy responds: I agree that these exercises are helping to escape technology, I was stressed about turning my phone off for fifteen minutes, and it ended up being off for an hour while I was drawing...not sure how that happened, but grateful that I could be so focused, I honestly had no idea that I could get so lost in a drawing that time would pass so fast.

The findings from this study indicate that students are aware of their attachment to digital media and screen time. There also appears to be an underlying fear or unwillingness to remove themselves from technology. Participating in mindfulness and nature activities

revealed to students their reliance on technology and the need to separate themselves from that connection and connect with alternative environments.

Challenges

Participants found many positive benefits with the innovative project; however, there were also some challenges. As described in the previous chapter, this study uses a broad definition of nature provided by Kaplan and Kaplan (1995): nature includes natural things and places one has experienced. The definition was introduced and explained in the Canvas PowerPoints for each course in the study. This broad definition produced varied interpretations of what students considered nature. Emily was enlightened during one of her sit spots and defined her experience with nature as:

> You can find natural things inside, so you can take a piece of nature with you wherever you go. Basically, I realized that nature is not confined to the outside world, and you can incorporate it into merely every aspect of your life and bring its calming effect with you whenever and wherever. -Emily

Emily found her definition of nature; however, students in this study had contradictory reactions to the indoor sit spots. Some students commented, "We weren't very connected to nature because we were indoors" – Sarah. Gwen shares that she was "largely disconnected since we were in an indoor setting." While students speak of a disconnect, some observations show information that opposes these statements. My notes from the sit spot where Gwen shares that she is disconnected indicate that Gwen was found gazing at the screen that displayed nature scenery on several occasions, even turning her head completely to the side to view the screen. My notes state, "Next week, change Gwen's seat position for easier screen viewing." The following week, Gwen

could glance up and see nature on the screen instead of having to turn completely. The connection to nature is addressed further in the next section.

Table 11 shows that the SCN 301 participants were most connected to nature when they were outdoors (see question 9). These same results are replicated in SCN 309: participants connected more to nature during the outdoor sit spots. See Table 12. In Tables 11 and 12, green indicates outdoor sit spots.

In Table 13, all participants reported scores are considered, producing the mean score for each sit spot as a combined total. The Likert scale for this question is as follows: 0- not connected, 1- somewhat connected, 2-fairly connected, and 3- extremely connected. Results indicate that participants found they could "fairly" connect to nature in indoor and outdoor sit spots. The highest connectivity (M=2.28) was during sit spot two when all classes were documenting an outdoor sit spot. Participants reported the lowest overall mean (M=1.62) in sit spot three. In this particular sit spot, all classes conducted an indoor sit spot. Please see Tables 11, 12, and 13 below.

Table 11

SCN 301 Activity Survey Sit Spot Results

SS	Question	M	SD
Sit Spot 1	6. How would you rate the environment in which the mindfulness activity took place?	2.13	.81
	7. How would you rate the mindfulness activities?	2.25	.78
	8. How would you rate your exposure to nature?	2.47	.64
	9. How would you rate your connectedness to nature based on this activity?	1.81	.75
	10. How would you rate mental fatigue (mental health) based on this activity?	1.69	.79
Sit Spot 2	6. How would you rate the environment in which the mindfulness activity took place?	2.00	.82
	7. How would you rate the mindfulness activities?	2.06	.57
	8. How would you rate your exposure to nature?	2.31	.95
	9. How would you rate your connectedness to nature based on this activity?	2.00	.82
	10. How would you rate mental fatigue (mental health) based on this activity?	1.63	.72
Sit Spot 3	6. How would you rate the environment in which the mindfulness activity took place?	2.31	.87
	7. How would you rate the mindfulness activities?	2.31	.60
	8. How would you rate your exposure to nature?	2.00	.73
	9. How would you rate your connectedness to nature based on this activity?	1.69	.79
	10. How would you rate mental fatigue (mental health) based on this activity?	2.13	.89
Sit Spot 4	6. How would you rate the environment in which the mindfulness activity took place?	1.69	1.01
	7. How would you rate the mindfulness activities?	1.81	.40
	8. How would you rate your exposure to nature?	1.75	.93
	9. How would you rate your connectedness to nature based on this activity?	1.62	.72
	10. How would you rate mental fatigue (mental health) based on this activity?	1.63	.89

N=16 (All SCN 301 Participants)

Table 12

SCN 309 Activity Survey Sit Spot Results

Sit Spot	Question	M	SD
Sit Spot 1	6. How would you rate the environment in which the mindfulness activity took place?	1.66	.91
	7. How would you rate the mindfulness activities?	2.31	.60
	8. How would you rate your exposure to nature?	1.84	1.06
	9. How would you rate your connectedness to nature based on this activity?	1.47	.76
	10. How would you rate mental fatigue (mental health) based on this activity?	1.56	.73
Sit Spot 2	6. How would you rate the environment in which the mindfulness activity took place?	2.55	.743
	7. How would you rate the mindfulness activities?	2.31	.60
	8. How would you rate your exposure to nature?	2.69	.70
	9. How would you rate your connectedness to nature based on this activity?	2.56	.81
	10. How would you rate mental fatigue (mental health) based on this activity?	2.25	.78
Sit Spot 3	6. How would you rate the environment in which the mindfulness activity took place?	1.98	1.16
	7. How would you rate the mindfulness activities?	2.44	.63
	8. How would you rate your exposure to nature?	1.63	.89
	9. How would you rate your connectedness to nature based on this activity?	1.56	1.09
	10. How would you rate mental fatigue (mental health) based on this activity?	1.81	.66
Sit Spot 4	6. How would you rate the environment in which the mindfulness activity took place?	2.63	.62
	7. How would you rate the mindfulness activities?	2.69	.60
	8. How would you rate your exposure to nature?	2.81	.40
	9. How would you rate your connectedness to nature based on this activity?	2.66	.60
	10. How would you rate mental fatigue (mental health) based on this activity?	2.38	.81

N=16 (All SCN 309 Participants)

Table 13

Activity Survey Sit Spot Results

Sit Spot	Question	M	SD
Sit Spot 1	6. How would you rate the environment in which the mindfulness activity took place?	1.89	.88
	7. How would you rate the mindfulness activities?	2.28	.68
	8. How would you rate your exposure to nature?	2.15	.92
	9. How would you rate your connectedness to nature based on this activity?	1.64	.76
	10. How would you rate mental fatigue (mental health) based on this activity?	1.62	.75
Sit Spot 2	6. How would you rate the environment in which the mindfulness activity took place?	2.27	.82
	7. How would you rate the mindfulness activities?	2.19	.59
	8. How would you rate your exposure to nature?	2.50	.84
	9. How would you rate your connectedness to nature based on this activity?	2.28	.85
	10. How would you rate mental fatigue (mental health) based on this activity?	1.94	.80
Sit Spot 3	6. How would you rate the environment in which the mindfulness activity took place?	2.15	1.02
	7. How would you rate the mindfulness activities?	2.37	.61
	8. How would you rate your exposure to nature?	1.81	.82
	9. How would you rate your connectedness to nature based on this activity?	1.62	.94
	10. How would you rate mental fatigue (mental health) based on this activity?	1.97	.78
Sit Spot 4	6. How would you rate the environment in which the mindfulness activity took place?	2.16	.95
	7. How would you rate the mindfulness activities?	2.25	.67
	8. How would you rate your exposure to nature?	2.28	.89
	9. How would you rate your connectedness to nature based on this activity?	2.14	.84
	10. How would you rate mental fatigue (mental health) based on this activity?	2.00	.92

N = 32 (All participants)

While there were some challenges with understanding that nature has a broad definition, there were instances where participants took the opportunity to focus entirely on the nature they observed indoors. Trina writes, "As I was in my room, I was isolated from nature, but this little pot plant brought a little bit to me, and I automatically felt connected and calm because of it." Some participants found that being indoors gave them a chance to focus on the details:

> Overall, I found this to be a pleasant experience. As I mentioned before, it was nice to get outside of my head and sit without distractions for some time. I found that I noticed things about my environment that I had never seen before, and enjoyed the opportunity to look at things with more curiosity and in more detail. – Sarah

Others found indoor sit spots made them curious about the outdoors because they noticed things for the first time while looking out the window.

> My connection to nature was definitely strengthened because I took time to look at little details that I hadn't noticed before, such as how many trees were in my backyard or the new flowers that had grown. It was interesting because I don't usually watch the rain as it falls, but it was really relaxing and made me want to go outside because I had never danced in the rain before. – Kevin

This contradictory view of nature and the broad scope of what nature is defined as led to another discovery. The environment and the conditions in that environment influence how students feel about the space. Thus, the environment matters.

Environment Matters: Challenges with Finding the Right Location

Weather conditions during the Spring semester of 2023 and the location of the sit spots on the Tempe campus were another challenge in this study, particularly for those enrolled in SCN 301. The weather will be discussed in this section, while the location of the sit spots will be addressed in the theories section.

The Spring semester started January 9, 2023, for Session A and Session C

students. Session A was completed on Tuesday, February 28th. Session B began Monday, March 13th, and ended on April 28, 2023, along with Session C. The SCN 301 courses were scheduled on Tuesdays during this semester. The weather for the four sit spots for SCN 301 happened to be on days that were cold, cloudy, and sometimes rainy. Students enrolled in SCN 301 are required to do a lab portion of the class. Labs typically occur outdoors, where students can apply class content to real life. The following participants reflect on weather conditions during their sit spot experiences:

> Most of the days we had labs this semester have been cold and rainy, though, so not ideal and also not normal for Arizona. – Grant

> The only thing that I thought was challenging was trying to manage all of our outside time with the crazy weather that we had. I think if the weather was better this course would have been even better! -Allie

The attention restoration theory indicates that location is critical to discovering a restorative environment. If students are uncomfortable in the space, the site is not an environment where extreme mental restoration can occur. Lydia adds to the conversation by stating:

> One thing I would want to change is my comfort level. Since it was cold outside, I think it affected my ability to focus and put in the most effort. It also limited my time outside. – Lydia

Weather is a factor that cannot be controlled. It also impacted students' comfort level, which was apparent during the SCN 301 sit spots and in my research notes. In sit spot two, my notes indicate, "Today we are examining the mesquite tree and the desert willow. The sky is full of grey clouds, and the wind is visible in the rapid movement of the tree branches. Students are talking about being cold and rushing to get their assignments done so they can get out of the cold." A student comments, "Hurry! Measure

it. I'm cold!" My notes state, "Two females are standing closely together. Arms and legs are tightly aligned with the rest of their body, but their bodies are in a constant bouncing motion." As a class, we eventually surrendered to the cold, and students were allowed to take their measurements and return to class to finish the assignment. Under conditions like these, students are not receiving the full benefits nature offers; nor are they in a learning environment producing optimal results.

Summary: Integrating Nature and Mindfulness – Students' Experiences

Exposed to many personal growth opportunities while participating in this project, participants were asked during this study to keep an open mind, try different strategies that may impact their mental health, and evaluate what worked for them and what did not. At the end of the study, I asked them to identify the effects of incorporating nature and mindfulness into their university courses/curriculum. Fay associated incorporating nature and mindfulness into the curriculum with assisting students' communication skills. "I enjoyed the breathing exercises and being able to interact with peers comfortably and with plant life. During this, I felt relaxed, having enough energy to communicate effectively." The responses to adding nature and mindfulness into the curriculum were positive and ranged from reducing stress and increasing focus to supporting the learning process and students feeling valued. Several participants' experiences are documented below.

> Andy writes: I never expected incorporating nature into a class to possibly work, but if anything, it makes the class way more enjoyable and allows me to learn in a less stressful way. With courses outside of this one, the time in nature does help me relieve stress and allows me to adopt a better mindset when working. If I were to change anything about this course, it would be to give less indoor sit spots, or at least when those do occur, I would focus more on the meditation aspect rather than the observation, as it is hard to focus on anything indoors. Otherwise, this

> course was amazing, and I love how it has helped me improve myself for the better.

The desire to be in nature is a highlighted component of this research. E.O. Wilson, Kaplan, and Kaplan argue that connecting to nature is a vital need for individuals. The findings of this study also indicate that students preferred being outdoors when engaging with nature. The removal from the typical classroom setting is the first level of restoration in Kaplan and Kaplan's attention restoration theory. Removing oneself from the typical environment in which stress occurs gives individuals the chance to begin the restorative process, which if achieved, relieves mental fatigue and restores their ability to function at a higher academic level. Max acknowledges how nature and mindfulness support his learning process, expressing:

> I think the effects of incorporating nature and mindfulness into our curriculum is overall a very positive effect and should be incorporated into more curriculum. It helps the student leave a confined area such as a classroom to clear their mind and then return which allows them to maximize their learning. The only challenge I see is if students aren't open to nature or don't take it seriously because this is only gonna benefit you if you give it a chance. - Max

Clearing the mind is one of the levels of restoration in ART. The findings of this study demonstrate that one of the benefits of incorporating nature and mindfulness into the course curriculum is that participants became more attentive with less internal clutter. The reduction of distractions and gained attention supported the learning process. Claire talks about the learning process and how that learning expands to life lessons. Claire states:

> I believe that mindfulness is an essential part of success, which extends far beyond just that of academics. I think it should be incorporated into more classroom curriculums and seen as a more important part of the learning process. - Claire

The learning process was noted during several participants' experiences. Students enter the university with the goal of achieving a degree and acquiring new information. Along with these academic skills, there is an opportunity to increase life skills, while supporting students' health and well-being. Mandy is a single, White female who is a senior working full-time while being enrolled in 11-15 university credits. Financially responsible for herself, Mandy has many stressors in her life. Practicing mindfulness and nature permitted her to calm herself and focus on academic tasks. Mandy commented on stress reduction and mental health benefits:

> Incorporating nature and mindfulness into class curriculums would help a lot with the high-stress levels of students. Personally, it helps me calm down and focus better. If all my classes incorporated nature or mindfulness on some level, I think the days would be a lot more enjoyable and calm. Right now, it feels like there's pressure to always be doing something and to do things as fast as possible instead of focusing on the process and the moment. I think other classes should incorporate nature or mindfulness for these reasons. It may be difficult timing-wise to fit these things in, but I don't think much is more important than the mental state of students for learning. I also think that calming down can make students kinder because it calms our nervous systems! - Mandy

Mandy acknowledges the potential benefits of more professors integrating nature and mindfulness into the curriculum. She expresses a concern for pressure associated with academics, noting the focus should be on process. Professors want students to increase their knowledge and understanding of the academic topic they are instructing. Students like Mandy recognize that their learning process is equally important. Focusing on the learning process will extend beyond the university classroom. Furthermore, as indicated in the research in Chapter 2, it is difficult for students to focus and concentrate on the academics they are trying to learn about if they are not in a state of mind conducive to learning.

Kate attended one of the in-person Ecology and History of the Sonoran Desert classes. The SCN 301 in-person courses provided many opportunities for sociocultural learning, as well as exposure to nature to explore ART. Analysis of the qualitative data submitted by SCN 301 students acknowledged their preference for collaborative assignments and peer interactions. Students are social beings that appreciate and develop understanding by interacting with their peers. Vygotsky suggests that through peer interactions students can learn from others (Zone of Proximal Development). The findings in this study confirm Vygotsky's theory. Students interacted with each other and were able to answer questions and support each other's learning. Kate's experience below shares her motivation to come to class to interact with her peers. She also shares how the structure of the class supports her learning process.

> I think the main effect of incorporating nature and mindfulness into my courses and classes is that it provides a temporary break and some relief when I am faced with a very busy day soon. It also helps me take some focus away from my other classes and stressors and puts it (focus) onto nature and objects found in nature. This helps with my stress a little over time and makes me remember that it's not worth getting super stressed about. I also think it helps my mind wake up a little. When I wake up for this course in the morning, I am very tired and even debate getting out of bed. However, talking with my friends in the course and hanging out in nature helps me energize myself for the rest of the day." - Kate

Kate's change in perspective about coming to class is associated with a shift in mindset. Through mindfulness, Kate is aware of how her mind and body feel. Mindset is how Kate responds to this awareness. In this case, her positive mindset encourages her to get out of bed and proceed with her day. These skills will assist her in managing her future stress levels if she remains in a positive mindset. Additionally, nature energizes and prepares her for the rest of her day. Allie expresses how nature also supports her energy levels.

The effects of incorporating nature and mindfulness into university classes helped

> a lot more than I initially thought. After the class ends, I find myself less stressed and tired than when I first entered the classroom. If possible, other courses should incorporate some kind of mindfulness and nature, even if it is in small doses. Of course, not every class is about nature like this one, but going outside for a little bit can provide a lot of benefits. – Allie

Incorporating nature and mindfulness into the curriculum allowed students to assess themselves and their well-being, which is a focus of this study. Self-assessment helps individuals determine their abilities. Identifying strengths and weaknesses provides an opportunity for improvement. Continuous improvement is the foundation for lifelong learning which will support student growth and development beyond the university, especially when stress and challenges arise.

Findings produced by this study support previous chapters that illustrated that university students are stressed and need support. Many of our students are challenged by managing stressors in their lives. Stress can lead to debilitating depression. As mentioned previously, in the last twelve months, 48.5% of the ASU student body has reported experiencing depression to a level that makes it difficult to function (ASU, n.d.). Participants in this study self-reported moderated stress and experiencing anxiety. Additionally, conversations with students reveal that many of the students are struggling. Josie, a graduate student, reflects on her time enrolled in courses at ASU.

> Part of the problem in university is that there are high expectations, competition, and deadlines that are unattainable or over-stressful most of the time. With the rush to get everything done and likely do more of the work side of "work-life balance," there isn't a lot of scheduled time to wrap your head around what you are being taught and reflect on your learning experience. When professors incorporate nature and mindfulness activities in university curricula and classes, they help connect content with principles for lifelong learning. For me, this has been one of the most enjoyable classes of my 5 years at ASU, even though I chose it as an elective. This is one of the classes that I will take with me in the future to continue field journaling, designing curricula for students, and stewarding local desert ecosystems. -Josie

Josie's reflection on her learning experience validates the continued need to evaluate students' mental health and well-being. This process should include strategies to support students' learning. The techniques and strategies should consider students' frame of mind and emotional needs. Without positive mental health and well-being, students are challenged to focus, communicate effectively with peers, and perform their best academically. Integrating mindfulness and nature into EE courses produced positive results that would create an environment conducive to a productive learning environment that values students and their well-being.

Discussion of Results in Relation to this Study's Theories

This study is founded on Sociocultural Learning Theory and Attention Restoration Theory (ART). The two theories are discussed in detail in Chapter 2. This section will give a brief overview of each theory. Then, discuss the findings in relation to these theories. Where applicable, the findings will be organized by the three themes associated with this study: 1) Cultivating connection. 2) Enhancing well-being. 3) Links to learning.

Sociocultural Learning Theory

Vygotsky's 1920s Sociocultural Learning Theory suggests that learning occurs through social interactions. These interactions allow us to create a frame of reference. As we interact with others, we are introduced to different perspectives that expose us to new concepts, thoughts, and ideas. This new information increases our understanding of the world. These interactions are also influenced by culture. Culture is the customs, communications, thoughts, actions, artifacts, and other interactions passed on from generation to generation. Culture not only exists at home but within social groups. Every

social group has a culture that provides unique learning opportunities. This study demonstrated that participants came into the study with preconceived ideas. As mentioned in the box breathing section, Cindy's dad tried to incorporate mindfulness during her childhood, but it wasn't until she was exposed to the classroom culture that her learning transpired. Here is a reminder of what Cindy reported:

> My dad always tried to get me to practice box breathing to help me become more mindful, but I always avoided it because I felt awkward. But after the box breathing exercise we did as a class, I realized it is not awkward and actually very rewarding. I also showed my friends the box breathing exercise, and they loved it! – Cindy

Participants in the study were predominately white; however, each student, despite ethnicity, brought to this study individual perspectives based on their sociocultural learning. While many students found peace in the outdoors quiet, Karly was challenged. Karly is a Latino female who grew up in a culture where her family was large and loud. This constantly busy environment is what she is accustomed to. During SCN 309 sit spots, Karly discovered that being alone is not a familiar place; nor does she enjoy complete silence. Karly writes:

> The main takeaway I noticed was having to be alone with yourself and thought but also realizing how this is different from days when we don't just sit down. Throughout the course, I noticed that I don't really like having complete silence. I grew up with a big family, so silence was never really common around me. When I go outside, it at least provided the sounds of birds that calm me down. My brain cannot be comfortable with itself, it might be healthy for some, but I think it would be better if I was in a space where air conditioning and house appliances sounds aren't in my hearing area. The thoughts this gives me for nature is knowing I really appreciate it. I like hearing birds while walking and watching the different leaves on plants. - Karly

The preconceived thoughts and ideas of participants will influence attention restoration theory as well. This will be discussed in detail in the following section. However, briefly,

some students have been previously exposed to nature and/or mindfulness; some students have not had the opportunity to be exposed. Their experiences were the foundations for their responses to the incorporation of mindfulness and nature into their course curriculum. One student even documented that students will have "to be open" to mindfulness and nature if they are going to benefit from them—furthermore preconceived ideas about areas of nature. Students with limited exposure may not be compatible with nature, reducing the possibility of extreme mental restoration. Sociocultural learning will influence all components of this study.

Sociocultural learning theory includes more than family culture. The peer interactions and classroom culture in this study have been critical components. Participants communicated throughout the study that through experiencing mindfulness and nature with their peers, relationships were built, learning took place, and students felt valued and appreciated. These findings are examined in the sections below.

Cultivating Connections

With Individuals. One of the highlights of examining mindfulness and nature through a sociocultural lens is seeing relationships develop. Students not only connect with the mindfulness and nature components but also with each other. Claire shares, "I had a really nice mindfulness experience. I felt like I really connected with my classmates and found it to be an overall relaxing experience." Fay also acknowledges that she enjoyed "being near other students and hearing them talking and living their lives" while participating in the mindfulness and nature activities. Josie found the fun in learning again, "Sharing facts with classmates. Learning from the instructor is fun." For Josie, integrating mindfulness and nature meant that "class was especially pleasant because of

my classmates, as they all seem to be kind, funny, and really welcoming."

Relationships developed throughout the classroom culture appeared on multiple levels. Participants connected with their peers but also connected with their instructors. The conversations in the classroom changed. Students openly interacted with peers and the instructors. The collaborative, positive learning environment encourages students to interact with each other. Cindy reflects on how mindfulness and nature impacted her learning experience.

> I think all classes should try to add mindfulness activities or go outside by nature at least once or twice a month because it shows the professors care about the student's mental health and may encourage students to come to class more. - Cindy

Students' experiences document multiple times that they appreciated the relationship built with instructors. They felt valued and cared for. Students reported that they felt like people instead of statistics or numbers in a classroom. Sarah's documented experience touches on feeling valued by her instructors and her beliefs about the benefits of incorporating mindfulness and nature into the course curriculum.

> I believe they make me more excited about the course and motivated while doing the work. Incorporating nature made me feel like my professors cared about my well-being and mental health. It taught me more about how to handle my stress with college and schoolwork in general. I believe this should be incorporated into every class and might show huge benefits with the moods and overall performance of every student. – Sarah

The connections students have to their peers and their instructor, combined with a positive mindset, mindfulness, and the calming benefits of nature, create an environment where students address each other by name, listen to each other ideas, value each other, and feel appreciated. Rick is between 21-29 years old with senior enrollment status. He is a non-traditional student returning to school after a hiatus. Rick writes the following in

his final reflection:

> I used to imagine college life as being something far away and traumatic and that I wouldn't be able to cope. As I discovered I was ready for the experience, welcomed, and encouraged by my peers and professors. – Rick

Cultivating connections with classmates changes the dynamics of the classroom. Peer interactions also change the learning process from an individual experience to one that encourages multiple perspectives so students can learn and grow from each other. Sociocultural learning can happen on a face-to-face classroom platform, or during the online experience. Emily shared her experience with connecting with her classmates. She writes:

> My favorite thing about this learning opportunity was the discussion boards each week since it allowed me to connect with my classmates and feel that my struggles were real, as well as seeing people whom I had similarities with and how we learned to relax through nature once again. – Emily

Based on the findings, relationships, a sense of community, and prosocial behaviors create a positive learning environment conducive to learning from peers. Mindfulness and nature as components of sociocultural learning created an environment where students expressed their thoughts and opinions with their peers. The contributions to conversations were welcomed; students felt that their ideas and thoughts were accepted and understood by their peers.

Learning from peers requires social interactions, which are the cornerstone of the sociocultural learning theory. The social aspect of learning supports students' understanding of new content and the sociocultural norms within a group. The qualitative data produced several examples of students learning. Emily and another student discuss a mindful approach to nature journaling. The other student asked Emily to share how

mindfulness impacts her connection with nature, as the student struggled to connect during sit spot one. Emily replies, “I am questioning more things and staring more intently. I think being opened to this new set of knowledge brings forth many new questions.”

Students gained perspective from each other and acknowledged similarities and differences in how they viewed nature and mindfulness. Oakley reflects on her most significant takeaway from the course and how she sees similar parallels with her peers’ reflections. Oakley writes:

> My biggest learning takeaway from the course was how much of a difference nature can make in a person’s life. I witnessed firsthand how calm and centered being outdoors can make me. I also read via the class discussion posts how nature also positively affected other peers' mental health and levels of focus. – Oakley

In this study, some social interactions were associated with learning how to use the mindfulness strategies; others with understanding course content. The interactions connected students to nature. The more extensive connection to nature supported the understanding of course content. Social interactions were also connected participants with their peers and themselves (their feelings and emotions).

> I enjoyed being outside and discussing with my peers something as simple as a tree. It was a great mental break and was relaxing. I also feel like it helped me connect with my group, which was nice because it was the first day of class. I definitely have not been that relaxed in school in a while. – Grant

Fay notes her connection with nature, content, and peers during one sit spot in SCN 301. Fay’s story is displayed in the “Other Curriculum Benefits” section, but for convenience, I will also post it here as well.

> I enjoyed the breathing exercises and being able to interact with peers comfortably with plant life. During, I felt relaxed, having enough energy to communicate effectively. What I enjoyed most was being able to look at all the

> parts of the saguaro, being able to touch it, and talk to my peers. I'm not really sure I would change anything. I thought today went well. - Fay

Similarly, Claire experienced a connection with her classmates. She noted that collaborating in an outdoor environment increased her connection with her peers. Claire's statement is also evidence that removing a student from the "typical" classroom environment supports learning. Based on ART, leaving the classroom is the first level of mental fatigue restoration. Additionally, there is a level of restoration where reducing mind clutter occurs. A peaceful mind may encourage connections to others. Thus, further discussion may be needed to identify if restorative environments increase sociocultural learning by providing a more enhanced connection to peers.

> I enjoyed taking a break from the classroom and being able to learn in a new environment. Spending time with classmates in an alternative environment also seems to strengthen these connections and create a stronger bond with my classmates. - Claire

Learning is a social process. Students shared what they learned during this project with others outside class. This expanded the learning process. When students are able to teach what they are learning, they truly understand the content involved. Lydia wrote about how she took the opportunity expand her learning and offered what she had learned and experienced with her coworkers.

> Now, I have been doing the 54321, journaling, and box breathing during class and in other situations at school and work. I have even recommended to my coworkers and interns to complete the mindfulness practices as they have really helped me. – Lydia

The findings also suggested that connecting with nature took on a social component. Some participants found they connected more to nature when among their peers. "I appreciated the mindfulness activities, and I felt more connected to nature when

I was collaborating with classmates outside in the nice weather" - Sylvie. Karly confirms Sylvie's thoughts, writing:

> I noticed I am more calm when I am outside than when I am inside. I also noticed that having friends around the area is something I enjoy, we are social creatures, so it makes me happy and relieves some of my stress. - Karly

Overall, in reference to sociocultural learning theory, findings document that nature and mindfulness supported relationships and fostered learning. Allie's reflection on her experiences notes the relationship to the findings from this study in association with the Sociocultural Learning Theory. Allie writes:

> I do think that being in nature and practicing mindfulness can have a big impact on how you feel. We are constantly being influenced by the people and environments around us, as well as how we respond to these influences. I think that being in nature and practicing mindfulness can help us take control of how we react to what's around us and give us a greater sense of peace. - Allie

Through peers, participants shared ideas, perspectives, and content knowledge. The socio-cultural aspect of this study allowed for relationships to flourish, community and culture to be established, and learning to take place.

Attention Restoration Theory

The Attention Restoration Theory (ART) is discussed in detail in Chapter 2. The theory developed in the 1980s by Kaplan and Kaplan suggests that nature is a basic human need. ART proposes that nature is enjoyable and can improve our focus and concentration. The theory also recognizes that humans have limited direct attention. Direct attention requires us to focus and concentrate intensely. Once direct attention is depleted, mental fatigue occurs, causing human error and irritability. To rejuvenate and restore mental fatigue, we must use involuntary attention. Involuntary attention does not require us to strain to concentrate and focus. When we come across something

interesting, exciting, or fascinating, it captures our attention without causing us to strain to focus; we are using involuntary attention. Nature can grab someone's attention and engage us without tapping into our directed attention, allowing restoration to occur, and our mental fatigue is restored. Our directed attention is then able to be replenished, enhancing well-being.

Enhancing Well-being

Throughout this study, participants evaluated their mental restoration. Using the following Likert scale where 0 represents "not restored," 1 is "somewhat restored," 2 means "fairly restored," and 3 is "extremely restored," participants assessed their level of mental fatigue or restoration upon completion of each sit spot. When analyzing the overall mean for each sit spot, the results indicate that participants received some level of mental restoration but not "extreme" restoration. The mean for each sit spot indicates that participants ranged from somewhat restored to fairly restored. Please see Table 14 below for the mean scores of all thirty-two participants.

Table 14

Activity Survey Sit Spot Results for Mental Restoration

Sit Spot	Question	M	SD
1	How would you rate mental fatigue (mental health) based on this activity?	1.62	.75
2	How would you rate mental fatigue (mental health) based on this activity?	1.94	.80
3	How would you rate mental fatigue (mental health) based on this activity?	1.97	.78
4	How would you rate mental fatigue (mental health) based on this activity?	2.00	.92

According to ART, participants must activate involuntary attention to achieve restoration. To do so, participants would have to be introduced to or find a restorative environment. As mentioned in Chapter 2, there are four properties of a restorative environment. These four elements consist of: 1) Being away. Participants would have to remove themselves from the location of everyday, ordinary daily activities. This occurred in both courses: SCN 301 was taken outdoors for two sit spots but stayed inside for two sit spots, and in SCN 309, participants selected their location for all sit spots. During indoor sit spots for SCN 301, students were exposed to nature in a different capacity: they were exploring something new to them, such as the cross-section of a saguaro or prickly pear cactus. Nature was also introduced visually and auditorily through technology. 2) "Extent" refers to engagement or how immersed the participant is in the environment. 3) The third component is "soft fascination." Soft fascination is the capacity in which the environment effortlessly captures our attention. 4) The last component is "compatibility," which refers to the participant's willingness to be in a particular environment.

Once the ideal restorative environment is located, different levels of restoration may occur. ART suggests these levels of restoration consist of 1) clearing one's head, 2) mental fatigue recovery, 3) soft fascination, and 4) reflection and restoration. Throughout this study, varying levels of restoration did occur. Participants often commented on the release of stress as their thoughts shifted and the natural process of allowing concerns and worries to disappear naturally transpired. Some participants achieved the first level of restoration, "clearing one's head," recording comments like "the mindfulness experience calmed me down and took my stresses away," "I felt more calm," and "I feel being in nature can help relieve stress and worry." Kevin also writes:

> After this experience, I felt at ease and like the tasks that I was previously worried about were a lot more accomplishable. – Kevin

The second level of restoration is "mental fatigue" recovery. Mental fatigue recovery is the beginning level of restoration where directed attention can be restored. While Kaplan and Kaplan state this happens in level two, participants in the study measured some levels of restoration in both level one and level two. Refer back to Table 13 for mean scores of various levels of mental restoration: Table 13 documents that the participants reported that their mental restoration was somewhat restored.

The third level of restoration is "soft fascination." Soft fascination is explained as quieting the internal noise in one's mind and clearing the clutter so that new stimulation can produce new thoughts and reflection. Throughout the study, students documented several occasions where mindfulness and nature cleared their minds or reduced their inner monologue. Data indicated that several students reached level three. The following are written accounts of students' experiences:

> It helps the student leave a confined area such as a classroom to clear their mind and then return which allows them to maximize their learning. – Max

> Personally, being outside with fresh air and warm sun clears my mind. I feel so much happier, motivated, and excited about life. – Sylvie

> I enjoyed the breathing exercises we do to really clear our minds, and I found it to be helpful when engaging all of our senses in nature. – Lydia

Clearing the mind was associated with several mindfulness practices and connecting to the outdoors. The process allowed students to focus and sometimes reflect on what they were experiencing more extensively. Regardless of whether mindfulness or nature was the strategy being discussed, participants valued the benefits of reduced clutter in their minds.

> My biggest learning takeaway from this course is it's a lot easier to allow yourself to relax than you think. Even if it's only 10 minutes and sitting outside, it'll help clear your head and potentially help with anxiety. - Kevin

> Nature and mindfulness impact my courses because after I am relaxed from my sit spot experiences, I have a clearer mind which allows me to perform better and for longer. - Kevin

With decreased mind distractions, students increased academic performance. Additionally, participants were able to perform for more extended periods. Other benefits included stress relief, connecting to nature, and gaining a new perspective on situations already in students' lives.

> I agree with you that drawing is a great way to destress since I'll draw a quick flower just to clear my mind really quick. - Emily

> Lastly, I also enjoy the clear state of mind that the sit spot experience allows when I'm reconnecting with nature. – Emily

> I also have a waterfall in front of my house, and at first, I thought of it as annoying since it runs pretty loud and always interrupted my tv audio, but the activity allowed me to just focus on it, and I found it pretty relaxing. When you single out the busyness of your house you can appreciate the natural water flow more, allowing for stress relief and a clear mind. – Emily

Participants, such as Oakley, connected with nature and found that nature increased their capacity to be clear-minded. ART suggests these students have allowed their rumination and anxiety to depart from their thought processes effortlessly. Reaching this stage of mental restoration means that students found a restorative environment during their sit spot. Oakley documents her connection to nature and how it supported her mental restoration.

> This activity was stress-relieving, for sure. I find myself feeling more clear-minded when I'm in touch with nature. – Oakley

> I agree, too, about how the nature aspect of this drawing sit spot exercise really helps ground you. I felt the same level-headedness after doing the assignment – Oakley

Trina and Karly share that their experiences in mindfulness and nature helped them focus and clear their minds. When you read Karly's experience, notice how clearing her mind opened her mind up to new information. Look at her process.

> The mindfulness exercise is always something I like doing and appreciate as it helps me focus and be clear in my mind. - Trina

> Because I had no stress before the activity, there was no change in my stress, but it allowed my mind to open and clear. My mind felt as if it was clean because there was room for information from my next lecture. I was able to collect the information from the lecture better than when I just sat inside a building on my phone waiting for a class. I think I am definitely going to take some time after class to just sit at my spot before a class. – Karly

Karly changed her routine from staying inside between classes and interacting with her phone to going outside and engaging with nature. Incorporating new practices and changing habits empowered Karly to improve her learning process.

According to ART, when students reach the final level of restorativeness, they have reached restoration. During this level of restoration, students will relax, restore their attention, and reflect on their life. Knowing that each participant came into the study with preconceived ideas based on their life experiences (sociocultural learning theory), each student's level of restoration was based on their personal experience. Thus, the data were analyzed further and isolated by courses to determine if there were differentiating outcomes. Table 15 identifies how many students from each class experienced "extreme restoration" during each sit spot. The green areas note the sit spots that were conducted outside.

Table 15

Reported Results of "Extreme Restoration"

	Sit Spot 1	Sit Spot 2	Sit Spot 3	Sit Spot 4
All Participants	4	9	8	11
SCN 301	3	2	6	2
SCN 309	1	7	2	9

The overall data showed that the highest number of participants experienced extreme levels of restoration during sit spots two and four. Further analysis documents that the majority of those students were enrolled in SCN 309, Nature Journaling. In Nature Journaling, sit spots two and four were conducted outdoors. In these two sit spots, more than half of the sixteen Nature Journaling participants found the restorative qualities of nature, reporting that they reached "extreme restoration." Kevin was one of the participants to achieve restoration. He started sit spot two at a "fairly stressed" level and ended it with "no stress." Kevin chose to go to his local park for his sit spot. He writes about his experience before, during, and after in his Activity Survey:

> Before, I had some external things stressing me out, more prominent than the last sit spot. I was actually looking forward to this because I knew beforehand I would feel a lot better. During it, I was a little overwhelmed at first, seeing so many people and so much going on. I felt that maybe I would get distracted or it was too loud even for me to have a quality sit spot. However, after, I felt genuinely happy and enjoyed my time there at the park. I felt satisfied. Even though I had felt stressed, I did my sit spot, knowing it would help, and by the time it was over, I was thoroughly enjoying myself and happy I had gone to do it at that time despite how busy it was. I felt fully immersed in nature. I felt that I could physically feel the warmth on me from the sun, I could feel the grass underneath me, and I could reach out and feel the sand. The dogs and birds were louder and more frequent. I could locate more brush, trees, cactus, and weeds, etc., than previously, so having that element, even though usually I take all those components for granted on most days. - Kevin.

Kevin noticed the benefits of sit spots and valued how they would influence his life. Using his senses, Kevin was able to establish a connection with nature. By reaching extreme restoration, his environment met the components of a restorative environment. Kevin was rejuvenated, happy, and relaxed.

Kelsey started sit spot two, "very stressed." After her sit spot, her stress was reduced to "a little stressed." Kelsey explored a neighborhood park during her sit spot.

> Before I did this activity, I took an exam for my other class. Therefore, my body was a little jittery, and my mind a bit scatterbrained. However, during the activity, I could feel myself becoming more and more relaxed the further into the activity I got. Once I was done, I felt that I should do this after every exam because it really helped me to reset quicker than I usually would after that much stress. Because I was stressed beforehand, I felt that my connection to nature during this activity was stronger than usual. When I concentrate on things like exams, I tend to be ignorant to lots of things around me and block out all of the noise. Yet, this activity brought me back into the real world, and I felt like I was able to reset thanks to just being in nature. – Kelsey

Kelsey found that her restorative environment reduced stress and replenished her after an exam. Her discovery of the benefits of mindfulness and nature encouraged her to find restorative environments in the future to manage her stress related to exams. Kelsey found her connection to nature more vital when her stress levels were higher. These quick, strong connections demonstrate the capability of nature to capture our attention and replenish our souls.

Karly was not stressed and stayed stress-free throughout the sit spot. She was able to connect with her surrounding environment by using her senses. Her initial comments suggest that she is aware of the impact of the environment on her mental restoration. She speaks of finding a location without interruptions below.

> The mindfulness experience was a great and calming experience. Before I started the activity, I wasn't really stressed, but I was still looking forward to the sit spot

> activity. During the activity, it was hard trying to find a good spot where I wouldn't be interrupted and where I would be surrounded by nature. I was walking to my next class, that doesn't start until an hour, so I sat at a nearby bench. I didn't really like the first bench I sat in, so I decided to move spots, and I liked it so much better. After the activity, I was able to wrap my thoughts up in my nature journal and began to walk to my next class. Because I wasn't stressed before the activity, I had no change in stress. The activity might not have been effective towards my stress, but I was able to clear my mind, and the lecture of my class was processed better in my brain. My connection to nature consisted of admiring how green the grass was and how tall the trees were. There were different types of trees, and I was able to count 7 different types of trees; some looked similar. I also connected with nature while I was listening to the birds chirping. I was able to distinguish three different songs from different birds. They all sounded different and unique. I liked appreciating the vibrant colors in my environment, and it was so beautiful. This is something I don't usually think about while on my way to class because I usually sit inside, but sitting on that bench might help me with clearing my mind and note-taking. - Karly

Karly's first choice of locations was not restorative based on her needs. Therefore, she changed location. Her awareness of her needs and environment allowed her to relocate and find a place that would help her achieve mental restoration. With no initial stress, there was no stress reduction; however, she was able to clear her mind and gain restoration.

Kevin also achieved restoration during his final sit spot. He ventured to Tempe Town Lake. Water is notably one of the features of nature that easily captures our attention, achieving soft fascination. Furthermore, Kevin visited his location during sunset, a feature that can easily capture one's attention. Kevin writes the following observations and reflections:

> I did my fourth sit spot experience at Tempe town lake at sunset. The first thing I noticed was the amount of people doing various activities such as riding bikes, scooters, etc. People were running, walking, and walking their pets. The second thing was the large body of water surrounded by a few bridges and a good amount of buildings in the background. The sun was still out, so although it was not super hot or super cold, it was a good temperature hovering around 75 degrees. The sunset gave the sky a light orange color that mixed in with the clouds rolling in,

> which then gave the sky some gray contour. The combination of the light sand by the lake, the dark brown color from the mountain hiding behind the building, and some green from trees further off in the distance also made for a good site to see, adding some more color. Since there was water, you could see the reflection of the bridge and the buildings.
>
> I listed open-minded and curious to my emotions. I felt open-minded because I had a lot of elements close to me (sand, water, warm/sun, etc.) all playing a part. It really brings me to a place I feel comfortable in, and usually, good conversation stems from that. There's little to look at except what is right in front of you, and it, for me, opens up my mind to possibilities and scenarios. It opens up my curiosity in the same sense I see all these people living their own lives and wonder to myself what they might be thinking about or what is going on in their life. It's interesting because we are all collectively in the same place more or less, but our actions, thoughts, and behavior are very different. I'd like to share that the course was right about experiencing a sit spot during sunset. I felt like it gave everything a natural glow, and there are a lot more colors at play. I also feel like a sunset can bring out emotions, and that has an effect on mood and what someone may notice or how they feel connected to one thing or another.

This restorative environment rejuvenated Kevin and provoked critical thinking and curiosity. Kevin explored his surroundings via all of his senses, prompting him to evaluate his role in the larger, more extensive environment he is a part of.

Kevin reflected more on his experience and documented his thoughts in his Activity Survey below.

> I felt mindfulness from the beginning and maintained that same level through the entirety of the activity and during it. As this was the fourth sit spot, I was almost yearning for it and the calmness it would bring me, so I was eager to do this experience, and that mentality followed through to the end. I felt very connected to nature during this activity. More so than my previous experiences. I had the sand underneath me, the water not far off - only a few yards; the sun was on full display and still brought warmth. I had trees in the distance, a mountain, and various types of birds and dogs present. I felt content and alive. Something about sunsets really brings out perspective and reflection in me and perhaps others. I enjoyed the sunset, the water, and hearing the activity of humans and the other natural environment around me but not immediately upon me. The lapping of water itself is soothing, and the reflection of the water/glass-like look adds a cool element. I don't think I would change anything about this experience. – Kevin

Kevin's reflection displays all the natural components he could connect with. The 54321

was integrated so that students had a convenient mindfulness practice to utilize to stay present. The findings indicate that participants used their senses to connect with nature. This practice assisted in engaging with nature on a restorative level.

At the end of Chapter 2, Figure 3 shared the variations in implementation necessary to meet the needs of class structure or curriculum circumstances. In this diagram, outdoor sit spots were part of the differentiation. In SCN 301, sit spot locations were predetermined, while in SCN 309, participants located their destinations for sit spots. ART suggests that to reach restoration, individuals must be in a restorative environment. These characteristics include: 1) Being away; 2) Extent; 3) Soft fascination; 4) Compatibility. In each of the scenarios mentioned above, the participant removed themselves from their "norm" (being away), found that they were immersed in the environment (extent), connected to flora or fauna in the natural environment (soft fascination), and were willing to be in that location (compatibility). Karly even evaluated and changed her location to meet her specific needs.

Eleven participants in the Ecology and History of the Sonoran Desert also recorded that they experienced the "extremely restored" level of restoration (See Table 14 for each sit spot). However, the qualitative data collected pertains primarily to reducing stress levels or calming effects of nature. For example, Rick reported being "extremely restored" in sit spot two. Sit spot two is an outdoor sit spot where students collected data on the Desert Willow or Mesquite tree. Rick's Activity Survey reflection states:

> The mindfulness experience can be very calming. I was relaxed during the whole activity. There was a lot of nature around, and many of them were the plant life we learned in class. Overall, I felt pretty connected. – Rick

Taking SCN 301 students outside as a class achieves level one of restoration, being away.

Rick reflects on the relaxed, calming feelings he experienced; he also mentions the availability to connect with nature via class content. These features may contribute to Rick's immersion, connection, and willingness to be in the environment, meeting the four restoration elements; however, it is not precisely referenced in his documented experience. Cindy's reflection evaluates a bit more, citing her emotions.

> I really enjoy this activity and appreciate that our professors care enough and consider students' well-being/mental health. Before this activity, I was pretty lethargic and not in tune with my emotions. During, I felt more awake, in the moment, and joyful. Walking away from this activity, I definitely feel more in tune with my emotions and felt more alive. I enjoyed this time more than with the last tree, Palo Verde, because the Desert Willow was more texturally satisfying to touch. I loved feeling the trunk bark at the bottom and working my way up, feeling where the bark peeled/broke off. Then feeling the youthful and smooth top of the tree. Physically touching the Desert Willow made me feel more connected to it and appreciate its special details. – Cindy

Using her senses, Cindy was able to immerse herself in nature and connect on a restorative level. Her willingness to be present and feel the Desert Willow (compatibility) allowed her to reach the final level of restoration. While nature was incorporated indoors and outdoors, the participants preferred an outdoor environment. This connection to nature is discussed below.

Cultivating Connections

With Nature. The participants' connection to nature increased throughout this innovative project (refer to Table 9). It is essential to recognize that this connection is dependent on each individual. Cultural perspective and mindset at any moment may impact one's relationship with nature. Participants noted the significance of cultural perspective. Claire's reflection documents how perspectives impacted this project and how they influence life in general.

> There really is no set answer for which environment helped to improve my mental restoration. Some days, I came to class feeling extremely tired of classrooms and screens and really enjoyed being outside. Other days, I was emotionally tired and found it draining to have to leave the classroom and socialize. I also believe there was a level of understanding shown that really helped in this experience. On days when it was too hot or cold, we were permitted to be outside for short periods of time, which I really appreciated. Overall, I enjoyed being outside, even if for short periods of time. – Claire

Claire's perspective reports the challenges of finding solutions in domains with diverse populations. The benefits of engaging with nature were identified in both indoor and outdoor sit spots. Lydia and Kara found that the indoors was the best environment to support their mental health. Their comments can be found below:

> Like last week, I really enjoyed when nature was brought indoors. I like being outside; however, since it is the middle of campus and there is a lot of activity, this tends to create more stress and anxiety for me. It is also very uncomfortable to be out in the cold, and this causes me to speed up my work. - Lydia

> The environment that had the most beneficial effect on my mental fatigue was being indoors, with nature sounds playing in the background. The tranquility of the room allowed me to better concentrate on the tasks assigned without being bothered with certain externalities. Performing tasks outside, for me, had mixed results. On days where the weather was sunny and warm, it was actually enjoyable to walk around and speak to peers; however, many days were rather cloudy, cold, and windy due to the abnormally long winter. Rendering them intolerable and agitating for me. – Kara

The diverse perspectives associated with sociocultural learning impacted ART. This study used a broad definition of nature. The vast possibilities challenged participants to understand what was considered nature. For example, here is a statement submitted by Oakley.

> As I was in my room, I was isolated from nature but this little pot plant brought a little bit to me and I automatically felt connected and calm because of it. – Oakley

Oakley's statement is a bit contradictory and demonstrates the challenge of defining nature. While she suggests she is "isolated" from nature, she acknowledges her automatic

connection with nature.

Oakley, Lydia, and Kara's statements above are supporting evidence that the environment matters and can differ among a group of individuals. These three participants found benefits to connecting to nature indoors; however, most participants appreciated and connected more with the outdoor environment. Below are the supporting data based on participants' experiences:

> I would much rather do this activity outdoors, and I think I have just the spot for that. - Andy
>
> From my own personal experience, mindfulness practices often have a more positive and rewarding outcome when done in a natural environment. – Claire
>
> I think it's nice to be in a college course that really seems to value mindfulness. I wasn't particularly a fan of breathing exercises, but to be out in nature definitely acted as a stress reliever for me. – Claire
> The main takeaway is nothing new; I enjoy nature very much and feel very connected to it as who I am and who I want to be. I notice that every time I do an activity that requires me to be more present with nature, I earn to be outside doing something. – Kevin
>
> I felt a little nervous before the activity. During and after the activity, I was calmer but not as calm, maybe because we didn't go outside this time. – Max

The above experiences document a small portion of the statements noting outdoor preference. The findings support Kaplan and Kaplan's ART: nature is a basic human need. Nature provides a restorative environment that supports the replenishment of students' mental health. The natural outdoor setting is preferred; ho butt meet the criteria mentioned in Kaplan and Kaplan's theory. Sylvie documents her preference for the outdoors but the need for the appropriate conditions, aligning with the attention restoration theory requirements to meet specific criteria to be restorative.

> I felt that being outside with nature when the weather was nice restored my mental health, but the outdoors when it was cold and raining did not help. I would

> say that the outdoor environments worked for me because I was able to connect better with nature, but the outdoors with cold weather or being inside did not work for me because I did not feel comfortable or connected with nature. – Sylvie

Other individuals support Sylvie's thoughts. The requirements for the ideal restorative environment will be dependent on each student. This complicates finding a universal location that would provide students with restoration. Future iterations of this research will need to consider how pre-established location impact their study. Even though there is no universal location to meet each student's diverse and cultural needs, the findings indicate that even predetermined locations result in positive student benefits. The experiences below document the influence of nature on participants in this study.

> We are constantly being influenced by the people and environments around us, so more people and busier/louder environments leads to more stress and a mind more prone to getting distracted from important tasks/responsibilities. The environment should be able to enhance my focus, not take away from it. - Allie

> During my meditation, my connection to nature kept getting interrupted by outside noises/things, so it took a minute to even get in the right zone. - Seth

> This is a positive activity and experience. I felt relaxed and happy after the activity, and I enjoyed simply turning myself off and watching the outdoors for a bit of time. I enjoyed the drawing aspect this time, as observing my surrounding was harder this time as I'm not familiar with this location. - Kara

Kara found beneficial qualities and enjoyed the outside; however, her unfamiliarity with the location may have impacted her connection with nature. The restorative environments must be compatible, meaning the student must enjoy being in the space. ART suggests that this is accomplished through motivation and personal preference to be in the space. Likewise, Allie and Seth above also experienced challenges with their connection to nature, demonstrating that the environment matters.

Even though students found challenges, other participants in the study found

specific characteristics in nature that they connected to. Certain locations were more successful and restorative than other locations. Grant and Josie remarked on some of their favorite spaces on the Tempe campus.

> Based on doing the DIFAs this semester, I would have to say that I really enjoy working on projects in nature. More specifically, in the cactus garden areas, while not as colorful as, say, the secret garden. My allergies preferred the cacti. Most of the days that we had labs this semester have been cold and rainy though, so not ideal and also not normal for Arizona. – Grant

> I enjoyed my time in green spaces like the secret garden. Or in areas of shade, like the breezeway lined with agaves. I had never used iNaturalist or Merlin before, so getting to add these resources to my toolbox was helpful in facilitating my lifelong learning post-graduation. The environment impacted my health because I was able to get fresh air, walk around, get some sun, and the drawing was meditative. – Josie

Even though Grant found a restorative environment that he connected to, the weather influenced his experience. The cold and rain made the environment uncomfortable; thus, compatibility was not established to achieve extreme mental restoration. Mental restoration was a difficult task to accomplish. Sarah struggled with finding mental restoration but connected with the outdoors and found it relaxing.

> Overall, I struggled to fully restore any mental fatigue I have going on, at least on a larger scale. Because it is my last semester and I'm working 30 hours a week on top of classes, I definitely still have a lot of stress and am just generally very burnt out. However, there were times throughout this class that I was able to restore my mental state at least a small amount. Being in more natural environments like at a park or going camping were very good for my brain. Even just the sight of a beautiful sunset or tree, or bird was often enough to bring me back into the real world and allow me a moment of relaxation. – Sarah

Despite the fact that students struggled to achieve mental restoration, the project still produced positive feedback and multiple benefits for students' health and well-being.

Overall, participants found that mindfulness and nature are intertwined. The more present we are in nature, the more we focus and pay attention to detail. Josie, a graduate

student, speaks about her struggle to achieve a positive mental health journey but finds peace and calm in nature.

> My mental health journey has been sort of a struggle during my time at university. Being outside, with greenery around, and listening to the birds helps calm me down. Focusing on using all my senses to take in the scenery, weather, and emotions has helped center my attention. I have really enjoyed the chilly days where I have experienced colder days with wind and rain. I have been thinking a lot about how to build toward inner sustainability since this is the first step to building a personal sustainable lifestyle and sharing related topics with others. Being present and practicing mindfulness in nature influences the way I feel. This semester I have made it a point to be more conscious in my classes, go outside and develop my awareness, and be cognizant of my emotions when I am working on assignments or work tasks. I have felt much better when I am focused on the task at hand. I have noticed that being in nature, drawing, and practicing mindfulness techniques slow down my heart rate and calm down my stress and anxiety. Drawing for the DIFA has been a relaxing activity for me during the week. Plus, being close and personal with different species intrigues me and makes me excited to learn more about the natural history and the ecology of the area. – Josie

Summary of Findings

Overall, nature and mindfulness had a positive impact on participants, according to my study. Incorporating nature and mindfulness into the course curriculum allows students to integrate self-care into their academic rituals. Participants found they were more relaxed, focused, and able to concentrate on the finer details around them. Students also found the environment conducive to building relationships with their peers and professors. The classroom culture encouraged thought processes, critical thinking, and peer collaboration. Participants could connect with nature indoors and outdoors, although they preferred being outdoors. Regardless of where the sit spot occurred, participants were not hindered by the process but spoke of the calming properties and relaxing outcomes of focus and clear-mindedness.

I write this summary as I conclude a mountain meditation in my calm app (see Appendix I). This study argues that mindfulness and nature are interconnected and offer mental health benefits. The mountain meditation provides further insight into this, asking you to visualize yourself as a grand mountain: your head being the peak and your feet being where the mountain meets the earth. Be this mountain. The wind and seasons change the mountainside, but the interior remains calm. The meditation compares this to the rhythmic breath that moves us, but like the mountain, we are capable of an "unwavering stillness" and a "grounded and unmovable presence" (Kabat-Zinn, J., 1994).

The findings in this study acknowledge that students at the university level are self-reportedly feeling stressed and anxious. There is a need to support students on their mental health and well-being journey to find stillness and calm in the face of change. Kabat-Zinn (1994) writes:

> Like the mountain, you will experience the changing nature of your mind and body and of the world around you. You will have periods varying in intensity – of darkness and light, of activity and inactivity, and moments that fill your life with color.
>
> Through it all, be the mountain, and call on its patient strength and stability within you. Let it empower you to encounter each moment with mindful composure and compassionate clarity.

If students are still looking for the mountain, we can provide opportunities to lead them there.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

Chapter 5 will provide an explanation of the significance and relevance of this study. This chapter will explain the outcomes, discuss lessons learned, and implications for practice and further research. The chapter will conclude with closing recommendations.

Discussion

The purpose of this study was to (a) embed nature and mindfulness into university course curriculum to determine the influence they have on students' health and well-being, (b) examine students' perspectives of mindfulness in the natural environment, and (c) to determine what students identify as the impacts of integrating nature and mindfulness into the university curriculum. This study was unique from previous studies as it incorporated nature and mindfulness into the curriculum. Additionally, several mindfulness practices were introduced so that participants could explore and evaluate what worked for them and what did not. The research was conducted in two Environmental Education Certificate courses at Arizona State University: The Ecology and History of the Sonoran Desert (SCN 301) and Nature Journaling (SCN 309). Two research questions guided this study.

RQ 1: What is the perception of mindfulness practices experienced in a natural environment by students enrolled in Environmental Education (EE) Certificate courses?

RQ 2: What do student participants identify as the effects of incorporating nature and mindfulness into their EE curriculum? (How do nature and mindfulness impact university students and the university curriculum/courses?)

In this chapter, I will discuss the research implications of this study. While Chapter 4 has a detailed account of the data collected and the analysis process results, this chapter will discuss what those results suggest and how they can be applied to my context, other contexts, and future iterations of this research. Like in Chapter 4, where applicable, the findings will be organized by three themes: 1) *Cultivating connection.* 2) *Enhancing well-being*. 3) *Links to Learning*.

Complementarity of the Quantitative and Qualitative Data

This study embedded a mixed-method research (MMR) approach to the innovative project. Quantitative and qualitative data were collected. The data sources collected are complementary. The term "complementarity" in MMR is defined as 'seeking elaboration, enhancement, illustration, and clarification of the results of one method (e.g., quantitative) from the results of the other method (e.g., qualitative)" (Ramlo, 2022, p. 226). In this study, the qualitative data elaborates on what is identified in the quantitative data; it provides clarification and understanding. Additionally, on some occasions, the two data sources provide contradictory information. Each circumstance will be discussed in this section.

The quantitative data in this research consisted of several surveys (NR, PSS, and AS). Each survey had a Likert scale component used to accumulate numeric data. The qualitative data was collected via my researcher observation notes, reflections, discussions, and open-ended questions documenting participants' experience during each sit spot. For example, the AS administered during each sit spot included three open-ended questions to elaborate on the Likert-scale questions in the survey. This additional data permitted a more extensive review of participants' experiences and perceptions of

mindfulness and nature. The comprehensive perspective allotted by collecting both data sources demonstrated students' perceptions of mindfulness techniques as well as their overall experience in relation to this study.

Perception of Mindfulness Practices

There are a number of areas in this study where quantitative and qualitative data are complementary. First, the quantitative data show that the mindfulness techniques were fairly helpful. Based on the results of the quantitative data, the participants rated the techniques most effective in the following order: box breathing, MBAT, 54321, and reflection. The qualitative data confirms that participants found these techniques effective to varying degrees. As documented in Chapter 4 in the form of participant quotes, the qualitative data give specific details on how the mindfulness strategies and nature supported students. The data demonstrated three significant themes: 1) *Enhancing well-being*: the impacts of mindfulness and nature on well-being. 2) *Cultivating connection*: Mindfulness and nature cultivate a more mindful way of connecting with oneself, with individuals, and with nature. 3) *Links to Learning*: academic benefits.

While the numeric data provided results, the qualitative data showed that students found breathing and drawing relaxing and calming. Each of these components was identified as having grounding effects, focusing qualities, and supporting the participants' connection with the environment. Participants found that the 54321 and drawing helped them connect to nature and become more aware of their environment. This information would not have been recorded without the qualitative data sources. The qualitative data sources add depth to the conversation on the perception of mindfulness in a natural setting.

Enhancing Well-being

Complementary data sources were identified when evaluating the effects of incorporating nature and mindfulness into the course curriculum. The quantitative data determined that the participants reduced their stress levels during the study, and fourteen participants increased their connection with nature. The participants confirmed this data when they documented their experiences. Students found they were more relaxed and ready to engage in the course content when mindfulness and nature were integrated into the course curriculum. Furthermore, participants found that they connected with nature on a deeper level; they were more focused and observant. The qualitative data helped identify why and how the participants were more connected with nature. Most students identified mindfulness strategies as key components of immersing themselves in nature and connecting more to their environment.

Finally, the quantitative data showed that students found the mindfulness activities “fairly” calming. The qualitative data elaborated on this to increase our understanding. While “calming” may be attributed to relaxing the body, when analyzing participants’ experiences, the calming effects of the activities were also associated with calming the clutter in the participants' minds. This is valuable information when assessing mental health and well-being. Clearing one’s mind is the beginning stage of mental restoration. According to ART (discussed in Chapter 4), students are at level one of mental restoration if the mind is naturally clearing without forcing or pushing thoughts away. Involuntary attention is activated, and mental fatigue (and directed attention) is at the beginning level of being replenished.

Cultivating Connections

The cultivating connections themes were used to describe several connections: the connection to self, the connection to individuals, and the connection to nature. The meditations in this project were selected to expose students to a strategy that would connect their minds with their bodies. The complementary data showed that the quantitative data determined that the box breathing meditation benefited students. The qualitative data expanded on this, noting that students found box breathing relaxing, calming, and increased student focus. Additionally, the qualitative data elaborated on the physical and mental contributions that breathing had, such as a relaxed mind, clear of clutter, and tension releasing from their shoulders.

The data also contributed to understanding the connection to other individuals and with nature. Participants state that this project permitted them to become grounded, aware, able to communicate with others and connect with others and their peers. This additional understanding would not have been possible without using a mixed-method approach that collected complementary data.

Links to Learning

There were several "links to learning" discovered in this study. Most of the discoveries were produced from qualitative data. However, there is one piece of data that is complementary. The AS documented both quantitative and qualitative data. One question asks, "How would you rate the mindfulness activities?" The numeric data showed that students rated all sit spots as "fairly calming." The qualitative data gave us a more extensive perspective. The relaxed, calming atmosphere associated with this project is conducive to learning. Students were excited about learning, engaged in the process,

and experienced positive educational benefits. Participants were able to clear their minds, allowing them to focus and be more observant. Students' open mindsets welcomed curiosity, awareness, and increased appreciation. All of these characteristics assist students in understanding that they are part of a much larger system; they are intertwined in something much bigger than who they are. So, they start to appreciate the most minor details surrounding them.

Contradictions

The quantitative and qualitative data also revealed contradictory information, making the findings unclear. For example, in the case of the participants who showed negative stress results on the AS, their stress scores increased. In these cases, the qualitative data showed that students felt relaxed and calm while participating in the sit spot and experienced less anxiety. Two of these increases occurred in the first sit spot on the Tempe campus on their first day of school. The qualitative data attributes these increases to “first-day jitters.” Further discussion is needed to determine if these results are due to typical first-day jitters or are attributed to participating in the sit spot. The qualitative data, in this case, provided further understanding. Still, it is not definitive: numerically, the data showed the participants had a negative experience, and the qualitative data showed that students found the sit spots relaxing.

Used in conjunction, quantitative and qualitative data can supplement each other. The qualitative data can provide greater depth and understanding of the numeric data as it did in this research.

Outcomes Related to Theories and Literature

This study has been conducted through the lens of two theories: sociocultural learning theory and attention restoration theory. Combining these two theories and incorporating mindfulness and nature into the university curriculum is unique. This section will discuss the findings in relation to those theories. Then, the section will focus on a discussion of the findings with regard to the literature presented in Chapter 2 of this study. The three themes will be addressed when appropriate: 1) *Enhancing well-being*. 2) *Cultivating connection*. 3) *Links to Learning*.

Theories

As students enter the classroom, they bring with them various life experiences and circumstances, as well as academic knowledge; a one-size-fits-all approach is not compatible when dealing with people or education. Understanding human development and the theoretical perspectives that guide the learning process is essential to increase the probability of impacting the majority of students I serve or anyone else does. It is also important to understand and support the positive mental health of our students. In the case of this study, students' mental health is supported by integrating mindfulness and nature into the course curriculum. Based on this knowledge, my research has suggested that two theoretical perspectives help support the needs of the student population I serve - sociocultural learning theory and attention restoration theory.

Sociocultural Theory

Participants came into this study with cultural experiences impacting their learning and their engagement with nature and mindfulness. These experiences are based on the social interactions throughout their lives, which allow the students to construct

knowledge and form perceptions, values, beliefs, stereotypes, and misconceptions. All of these occasions guide the students in their development and decision-making. The more students are introduced and exposed to differing perspectives, the more frames of reference they have to guide their development and decision-making processes. Interactions empower individuals to reflect, ask questions, and change these preconceived frames of reference. As an educator, understanding the impact of social interaction on learning increases the likelihood of a successful project.

Links to Learning

Cultural components influence learning. Through communication, students may have positive or negative interactions (Englund et al., 2018). To increase positive interactions, the learning environment needed to be conducive to understanding, accepting, and appreciating others (Lantolf, 2000). This study has shown that incorporating mindfulness and nature reduces stress, calms students, and creates a learning environment that builds relationships and community. When students feel valued and safe, they can engage positively with others and the course content (as evidence suggested in this study). Additionally, the calming qualities of nature and mindfulness assisted students with communicating effectively with their peers (Englund, Olofsson, & Price, 2018). This collaborates with Englund et al. (2018) suggestion that communication does indeed influence interactions and learning.

Along with social interactions inside the classroom, cultural differences outside the classroom must be considered. Cultural practices at home may have had implications on this study and future iterations of the study. In order to increase the likelihood of developing new frameworks, the environment must be conducive to accepting the

perspectives of all involved. We do not have to agree with all perspectives; however, respecting the opinions of others was a crucial component of the study. If I am asking students to transform their thinking to encompass mindfulness, then respecting all the views, values, and beliefs of others is essential. This study indicates that incorporating mindfulness and nature into the course curriculum creates an environment that encourages productive conversation and critical thinking. In this environment, students can discuss views, promote thinking, question, and possibly make a positive change in their surrounding environment. The mindfulness practices associated with this project are valuable for encouraging this type of learning environment.

Enhancing Well-being

Peers are a vital strategy in coping with life stressors (Roming & Howard, 2019). The social setting combined with mindfulness supports a non-judgmental environment that permits students to experience the present moment without ruminating about the past or being anxious about the future. If students are able to focus on the present without judgment, they are more likely to listen and learn actively. This study showed that incorporating mindfulness and nature into the curriculum resulted in students focusing, seeing more detail, appreciating the environment, and becoming more aware. These characteristics, combined with an open, non-judgmental awareness, allow students to become more aware and appreciative of the world around them and make decisions about their actions accordingly. This awareness and appreciation include not only the environment but also the people we interact with.

Cultivating Connections

With Individuals. Sociocultural learning theory plays an active role in this study as it takes place in a university setting. Peers play an essential role in the university environment. Constant interactions with peers, professors, and outside sources impact classroom dynamics. Encouragement of mindfulness practices and an open mindset creates opportunities for students to gain new knowledge from others' experiences, forming a greater understanding of their local environment and a global perspective.

With Nature. Culture also impacts our connection with nature. Some students may have been exposed to nature at a very early age thanks to their parents taking them camping, to parks, or other green spaces. Other students may not have had access to nature due to sociocultural circumstances. Each of these scenarios influenced students' perspectives as they entered this study, aligning with research stating that through others, we become ourselves (Vygotsky & Cole, 1978). It is important to note that "culture" is not just an aspect of our upbringing; culture is also created among groups, such as classmates or peers attending a university. The qualitative data in this study found that students' exposure to nature has drastically decreased. Students spend much of their time on laptops and other forms of technology due to academic demands instead of exposing themselves to nature. When students are outdoors, they are often found with their eyes buried in their phones or chatting with friends instead of exploring or engaging with the nature surrounding them. Participants in this study even commented that they need to put their "phone down and pay attention to what is around them" after experiencing their connection when being present in nature. Students' connection with nature is further discussed when examining the study in relation to attention restoration theory.

Attention Restoration Theory

Universities spend money to create an environment that is naturally appealing to students. Green spaces and sitting areas are elements typically incorporated into the university setting. However, often these spaces are underused and undervalued. These landscaped areas are ideal for outdoor learning. Kaplan and Kaplan (1995) suggest that in order to engage involuntary attention and restore mental fatigue, a restorative environment must be established. Students need to get away from their normal environment, which causes stress, and find somewhere new ("Being away"). This does not need to be outdoors. However, exposure to nature meets all of the other required characteristics of a restorative environment. These other characteristics include being engaged or immersed in the environment ("Extent"), something has to capture the students' attention in a non-taxing way ("Soft-fascination"), and students have to be willing and want to be in the environment ("Compatibility"). Environments that meet these characteristics welcome restoration.

Cultivating Connections

With Nature. As mentioned throughout the study, universities design their campuses with an aesthetically pleasing landscape in mind. However, the number of green spaces and their restorative properties vary (Felsten, 2009). This study found that the environment played an important role in participant satisfaction and connection with the environment. The location, environment, and weather contributed to the participants' experiences. This was particularly true for students enrolled in in-person courses on the Tempe campus (SCN 301). The SCN 301 students were assigned locations for their sit spots. Oftentimes, students commented on the distraction of passing students, the

hardscape, or difficulty connecting with nature because they were on campus (the challenge of defining nature).

The participants also noted their connection and preference for nature in areas like the Secret Garden. The Secret Garden is located on the Tempe campus but in a more isolated location. The foot traffic there is less than in other places on campus. The surrounding buildings isolate the greenery of the grass and the vibrant colors of perimeter plants. The building also contributes to a quieter atmosphere. Students visiting the Secret Garden are calm and peaceful, matching the natural environment. As in the Felsten (2009) study, lush green spaces were the participants' preference in this study. The difference between this study and Felsten is that Felsten viewed green space through a window view, while SCN 301 physically explored the space. According to ART, the Secret Garden aligns more with Kaplan and Kaplan's restorative environment characteristics, which is why participants preferred this location.

Based on ART, location preference should be dependent on the participant and their preference. Nature Journaling (SCN 309) was structured more to meet the diverse needs of student preference in relation to ART's restorative environment characteristics. Participants were allowed to pick their location, and qualitative data indicates that they adjusted their location to meet their needs. This freedom to choose and modify their location assisted participants in achieving "extreme restoration." Referring back to Table 14 in Chapter 4, you will see that more SCN 309 students (nineteen students) reached a higher level of mental restoration than students in SCN 301 (thirteen students). While it is not necessary to go outside to achieve restoration, the vast majority (sixteen students) of

SCN 309 students found the highest level of restoration during outdoor sit spots, aligning with Kaplan and Kaplan's (1995) theory that nature is a restorative environment.

While exposure to nature outdoors was the participants' ideal location, students did find exposure to nature indoors was also beneficial. Felsten (2009) explored "simulated nature," associated with images of nature in photographs, paintings, slides videos, computer displays, etcetera. Like this study, Felsten (2009) found that indoor spaces displaying simulated nature had some restorative qualities. For the SCN 301 participants, the indoor connection to nature was affiliated with a house plant, hawk feathers, and being engaged and curious about cacti specimens. The in-person Tempe SCN 301 class also experienced nature through revolving nature screensavers and nature music. The online SCN 309 participants viewed nature through their windows and shared the experience of opening the window to fully engage in what nature had to offer.

Literature

Students participating in this study reported that they experienced feelings of stress and anxiety. During week one of this study, the average PSS score (M=20) rated the participants as moderately stressed. This means students' average scores ranged between fourteen and twenty-six on the PSS. Participants also often noted times of anxiety throughout this study, aligning with Saleh et al. (2017) study that indicated college students often experience stress, anxiety, and depression. Understanding students' mental health and well-being permits educators an opportunity to support the students they serve.

Enhancing Well-being

Feelings of stress and anxiety are associated with mental fatigue. Previous chapters note that cognitive demands and stressors at the university level deplete one's capacity to manage emotions. As noted throughout this study, mental fatigue causes students to have a lapse in attention, challenges with self-regulation, cooperation, work performance, and problem-solving and increases irritability (Kaplan & Kaplan, 1995; Yusli et al., 2021). This research also noted that green spaces and exposure to natural environments can decrease stress and mental fatigue, as Berto (2014) and Ewert and Chang (2018) reported. Participants in this study found both nature and mindfulness helpful in supporting their ability to self-regulate feelings and emotions, noting that nature and mindfulness elicited a sense of calm and decreased negative moods and thoughts. The student's ability to self-regulate reduced their stress. Beyond stress reduction, positive feelings were associated with positive emotions, such as happiness, peacefulness, and calm (Grinde & Patil, 2009; Kaplan & Kaplan, 1995; Louv, 2005).

Links to Learning

Academically, the combination of nature and mindfulness supported a sense of wonder, student engagement, and increased cognitive performance, aligning with Berto (2014). This sense of wonder and engagement increased opportunities for students to see nature from a different perspective. Participants documented their experiences as they viewed nature through a detail-oriented, focused lens that found new meaning in their everyday environments. Students evaluated and appreciated nature at a deeper level and questioned the history behind living things instead of ignoring their relevance.

Participants also connected to creativity, noting drawing as a creative outlet that connected them to nature, aligning with research by Van Gordon et al. (2018).

Cultivating Connections

With Nature. With Self. With Individuals. Van Gordon et al. (2018) share that connecting with nature is associated with greater life satisfaction, improved vitality, decreased anxiety, meaningfulness, happiness, creativity, and pro-social and pro-nature behaviors. Integrating nature and mindfulness into this study also found that exposure to nature increased pro-social and pro-nature. Participants connected to their peers. The calm learning environment and the non-judgmental mindfulness practices encouraged students to share ideas, thoughts, and conversations. Participants were more appreciative and aware of the environment. The newfound appreciation and awareness permitted students to examine nature as a part of a more extensive, looking for patterns, functions, and impacts on the more extensive system rather than looking at nature through a singular perspective or view. The woven threads between mindfulness and nature strengthen this open-minded point of view.

It is difficult to determine if nature enhanced mindfulness or mindfulness created deeper connections with nature. Nature and mindfulness are so intertwined that it is challenging to differentiate between the two; they are as connected as our co-existing ecosystems. E.O. Wilson (1984) comments that nature connects us with our senses, causing us to pause and be in the moment. This pause allows us to take a deep breath and be more present and mindful. In return, as shown in this study, being present heightens our focus and observation skills, allowing us to notice nature's rhythms and patterns. The combined benefits of nature and mindfulness support participants' connection to

themselves, others, nature, and the world around them. These connections increase our capacity to support one another and the environment we share.

Lessons Learned

Action research in education serves as an instrument to address problems and improve situations that may be challenging academically. The implementation of the innovative project design plan in this study is a result of identifying the needs of the students I serve. The educational setting and the more extensive education system are a challenge. University education is as dynamic and diverse as the students who attend. Therefore, many lessons were learned about the implementation of this project. The lessons are discussed below.

Lessons Learned Through Implementation

This study expands on previous research by incorporating the combination of mindfulness and nature into the university curriculum. Some interesting features of this study include: 1) examining participants' exposure to nature in two domains: inside and outside the classroom; 2) integrating both nature and mindfulness into the curriculum; and 3) incorporating four mindfulness components as strategies for students to explore and determine the effectiveness. Incorporating multiple components into this study contributed to several lessons learned. The lessons are organized by subtitles below.

Flexibility and Creativity

The first lesson learned pertains to implementing the project itself. Many positive results emerged from integrating mindfulness and nature into the two courses monitored for this study. However, all classes are not created equally: learning outcomes and course goals vary from course to course. This was the situation presented in this study. A four-

credit science course differs drastically from a one-credit elective course. Thus, flexibility was needed to implement this project. Creative thinking was an important part of differentiating instruction to meet the needs of the students. By thinking outside the box, SCN 301 students were able to receive a unique opportunity to observe and feel what the inside of various cacti looks and feel like. Additionally, the study found that simply displaying a natural setting on the class monitor and playing nature sounds or relaxing music decreased participants' stress while creating a calming learning environment. Van den Bogerd, Dijkstra, Tanja-Dijkstra, de Boer, Seidell, Koole, and Maas (2020) focused their research on university classrooms where students spent short periods, such as lecture halls. Nature in the form of plants, nature pictures, and scents associated with nature were introduced to the lecture halls. The researchers reported that students attending classes where they were exposed to nature acknowledged an improved indoor climate and academic performance, had a favorable opinion of the course and the instructor, and had increased retention of course content. As in the case of van den Bogerd et al. (2020), this study also found that students reported decreased stress levels, fatigue, and negative feelings. Participants also documented connections to course content, peers, and professors. *Lesson Learned*: Be flexible and get creative because small changes in the classroom may have a significant influence on students.

Mindfulness Matters

The two courses for this study were chosen partly because they already had an outdoor component written in their curriculum. Past observation of the Ecology of the Sonoran Desert class noted that students appeared calm and relaxed when attending the outdoor lab component of the class. Students were able to observe nature and connect

content in a very meaningful way. Instructors also had conversations with students that indicated they enjoyed the class and the opportunity to get out of the traditional classroom. While I had visual and verbal observation and had read the documented research of others, I had no data to support the benefits of integrating nature into the coursework with my students. This study extended beyond exploring nature via course labs; it also incorporated mindfulness strategies as well. What I learned was that mindfulness is an essential addition to engaging with nature. Adding mindfulness presented lessons across all three themes – cultivating connections, links to learning, and enhancing well-being. These three areas are discussed in detail below.

Cultivating Connections

With Nature. Adding mindfulness to the curriculum permits students to focus and increase their ability to see the details in the flora and fauna they were observing. The more observant they became; the more aware and appreciative students were concerning their environment. Participants in this study started embracing the history of the flora and fauna and questioning how they, as humans, fit into the larger scope of the ecological system. *Lesson Learned:* Including mindfulness in the outdoor curriculum cultivated a connection with nature that builds relationships that expand beyond the university curriculum. The relationship parallels that of our ancestors who respected and appreciated nature, taking from it only what was needed and embracing the benefits of coexisting together.

Additionally, this study complements Kaplan and Kaplan's theory, identifying that participants preferred the outdoors. This study demonstrates that if students are allowed to be exposed to nature, they are calmer and more relaxed. Research and results

of this study indicate that if going outside is not favorable to the curriculum and course content, nature can be brought indoors in several ways. Integrating natural sounds or smells, pictures or videos, plants, or even taking advantage of a classroom window with views of nature could positively impact students' health and well-being. *Lesson learned*: Exposing students to nature, whether indoors or outdoors, would be beneficial in alleviating student stress and anxiety at some level.

With Individuals. This study recognized that nature and mindfulness cultivated connections with other individuals. Participants connected with peers and their professors. These relationships contributed to open communication and fostered a community within the university campus. Participants commented that their thoughts and ideas were valued during class conversations. Students felt calm, supported, and welcomed in the classroom, encouraging conversation, curiosity, and collaboration. These components changed the dynamics of the classroom.

One of the biggest lessons learned in this study was that by incorporating mindfulness into the curriculum, students felt like the instructor was invested in their well-being. In each class we discussed, students were asked how they were doing, how they felt, what techniques worked for them, and what was not. This study identified that students consider classrooms stressful environments, making these conversations important. *Lesson learned*: Incorporating mindfulness into the curriculum changes classroom relationships to one in which students feel appreciated and valued. Students also feel that their instructor is invested in them and their well-being.

With Self. Students continue to experience life stressors that impact them throughout various elements of their lives, showing a need for coping strategies.

Integrating nature and mindfulness into the course curriculum provided students with opportunities and strategies to reduce stress and anxiety. Being present and aware of the relationship between mind and body permits students to assess how one is influencing the others and provides an opportunity for students to regulate each component. *Lesson learned*: Mindfulness and nature are beneficial strategies to support students' self-regulation, emotional development, and overall well-being. This lesson could impact education on a much grander scale, even reaching a life scale.

Links to Learning

Participants in this study highlighted their increased focus throughout the innovative project. Mindfulness and nature allowed students to self-regulate and even refocus when needed. Participants acknowledge that after engaging in this project, they were able to focus on their academics, retain information, and connect with course content. Assignments demonstrated increased detailed observations as the innovative project progressed. *Lesson learned*: Practicing mindfulness contributes to learning, connects students to course content, and supports skill development.

This study acknowledged that university students identify classroom environments as stressful and challenging. Instead, the results produced by integrating mindfulness and nature into a classroom environment indicate that a change in students' perspective is possible. Imagine a classroom space where students are comfortable, calm, and free of stress. An environment where students enjoy attending class, feel engaged in their learning, and are welcomed by a community of peers who accept their thoughts, ideas, and perspectives without judgment. A positive, calming classroom environment was one of the outcomes of this project, which has the potential to impact university

classrooms in Arizona, across the nation, and on a global platform. Along with calming learning spaces, the outcomes of this study suggest that small changes can produce more significant impacts.

Students in SCN 301 and SCN 309 expressed positive reactions to incorporating nature and mindfulness into their courses. These strategies allowed students to self-regulate, destress, clear their minds, and focus on academic responsibilities. Self-regulating one's emotions extends beyond the university setting. Equipping students with these routine-altering strategies teaches them life skills that extend beyond the classroom walls and the time they spend at the university. *Lessons learned*: Mindfulness and nature generate positive learning spaces that students consider peaceful. Integrating mindfulness supports effective communication and active listening, contributing to understanding perspectives. The learning spaces are conducive to fostering relationships built on respectful interactions.

Enhancing Well-being

This study demonstrated that mindfulness and nature in the course curriculum enhanced student well-being. Participants documented that they had decreasing negative feelings and increasing feelings of happiness. The mindfulness techniques and connecting to nature allowed students to release negative feelings instead of ruminating on the past. Furthermore, mindfulness and nature supported reduced stress and anxiety, increased attention, and restored mental fatigue.

Participants discovered that using sit spots when they noticed mental fatigue restored their ability to perform in class. This acknowledgment and application of restoration will grant students the ability to incorporate their newly obtained skills into

life routines. This technique will be applicable to future academics, workplaces, or home life.

The benefits of nature and mindfulness were found on campus and expanded beyond the university campus. Students found that applying these strategies during stressful situations, such as during traffic or prior to exams, reduced their reactive tendencies and replaced them with feelings of contentment and calmness. This is a life skill that students can apply to their lives that will extend into their futures.

Finally, students recognized that their lives are highly influenced by screen time. Academic demands require students to be on their laptops and mobile devices for much of their day. Participants noted that with this reliance on technology comes a fear of leaving their phones for even fifteen minutes to participate in this project. While there was initial tension surrounding time spent away from technology, participants found that once they embraced the process of connecting to nature, the time away was welcomed. At times, students even extended their time outdoors. It is interesting to note that during the course reflection at the end of this project, participants acknowledged that they needed the time away from their screens and found that connecting with nature instead of their screens was more beneficial to their mental health and well-being than they realized.

Lessons learned: Incorporating mindfulness and nature into the university curriculum enhances students' well-being, providing the foundation for life application. These life applications expand beyond the classroom doors and have the potential to make large-scale impacts on students.

Limitations of the Study

Every research study has limitations: weaknesses or constraints that impact the research and the outcomes. This could be research design challenges, time constraints, lack of resources, or sample size. This study is no different. The limitations of the study are discussed below.

Constraints

The data collected in this study, with the exception of my research observations and notes, were contributed by students on a self-report basis. Self-reporting has advantages and limitations. The advantages are that participants could document and describe their personal experiences; this prevents assumptions by an observer. The documentation instead gives the researcher a glimpse of what each of the students had the opportunity to express about their reality during the project.

The limitation of self-reporting in relation to this study also revolves around participants documenting their experiences. Students who self-report may tend to respond in accordance with their peers to be in social compliance with the group. Additionally, because this project was integrated into the course curriculum, students may have answered survey questions, reflections, and discussions in a manner they view as appropriate to their professor or assignment expectations. Self-report allows for exaggeration or deletion of facts based on what the individual sees fit. If students are not assessing and documenting their experience truthfully, the data will be inaccurate, impacting the outcomes of this study.

Another limitation of this study is time constraints. Nature Journaling is a Session A and Session B course. Session A and B courses are completed within 8 weeks. Ecology

and History of the Sonoran Desert is a fifteen-week course. The logistics of the Nature Journaling course restricted the length of time I could implement the innovative project into the Ecology and History of the Sonoran Desert course and still have consistency across the two platforms. Due to time limitations, participants were only able to complete four sit spots. Four weeks of practicing and engaging in mindfulness practices and connecting with nature may not be enough time for participants to accurately access the outcomes of incorporating such practices into their lifestyle routines. Thus, time constraints should be considered for this study and future studies.

The sample size and demographic characteristics should also be considered when discussing limitations. The four classes in this study had seventy-seven (forty-one in SCN 301; thirty-six in SCN 309) students enrolled in these courses. The study considered the viewpoints of thirty-two of these students due to time constraints and data collection restraints. Thirty-two students are a fraction of the 68,789 students enrolled at ASU in the Fall of 2022, which is the semester that preceded this study (Arizona State University, n.d.). It is difficult to determine if this sample size accurately reflects the perspectives of the entire student population.

Finally, the demographics of the sample size reflect the views of a predominately white female population with a white female researcher leading the research. While there was diversity in terms of gender, age, education level, and race/ethnicity, the participant pool still favors the white female perspective. Therefore, the sample size may not accurately depict the view of the population within the diverse population of ASU, the United States, or a global view.

Assessment Tools

The NR and the PSS have been determined as valid and reliable assessment tools. However, it is important to remember that in this study, these assessment tools document a brief moment in time. The outcomes will reflect where each participant is during the particular moment when they reflect and take their assessment. This may not specifically reflect the students' genuine connection to nature or perceived stress; it could simply demonstrate what the student reactively documented at the moment.

Furthermore, as mentioned above, this study had time constraints. The NR and PSS assessment tools were given during the semester's first and sixth weeks. Participants engaged in four sit spots over four weeks, during this six-week period. The four-week time frame may not be enough time to create a new routine and mindset in which the assessment tools would actively reflect.

Implications for Practice

Mindfulness and nature are two potential strategies instructors can incorporate into their curriculum to improve student health and well-being. This study demonstrated positive outcomes that will be discussed in the following section.

Environmental Education Certificate Program

One implication is that a positive learning environment will motivate students to attend class, increase their cognitive skills, and support their environmental awareness. Additionally, there is evidence that mindfulness and nature are beneficial from a learning standpoint and from an emotional and social development standpoint. As an educator, I want to provide positive learning environments for my students. The combination of incorporating mindfulness and nature into course curriculum creates a classroom climate

or culture that is conducive for student learning. The new addition to the course curriculum will reduce stress, elicit feelings of calm, and increase student focus and observation. These results align with previous studies (Grinde & Patil, 2009; Kaplan & Kaplan, 1995; Louv, 2005). The study also found that students were able to self-regulate their emotions; they were in touch with how they were feeling and what they were thinking. This new awareness allowed students to contemplate their thoughts and clearly communicate them. The non-judgmental approach of mindfulness allows students to share their perspectives without other students judging their ideas, permitting greater cognitive growth (Amutio, et al., 2022).

Another implication is that incorporating mindfulness and nature into multiple environmental education certificate program courses creates a potential for large-scale change. The environmental education certificate program values nature connectedness. Students who are closely connected to the environment are likely to contemplate how their actions and decisions impact the environment. Based on this study, there is evidence that there is also extreme value in incorporating mindfulness techniques into courses as well. The mindfulness techniques used during this innovative project all worked to some extent. Even though participants had four techniques to explore, they desired more variety, suggesting that in the future, more techniques would be available. As a lifelong learner, I recognize the importance of continuous improvement. I also recognize that I am in a novice role when it comes to mindfulness. Thus, I have already begun the process of seeking additional education opportunities via conferences to improve my practice so that I can support students throughout the entire environmental education program, which will support their continuous improvement.

Implications for Research

Aligning with previous research, this study found that students benefitted from nature and mindfulness. The calm and relaxed conditions permitted students to clear their minds, generating more focus, appreciation, and attention to detail. Incorporating these practices into the university curriculum gives students a sense of belonging. A sense of belonging establishes a community, which is essential when students are trying to navigate university life, work life, and social lives. Often times, university students are away from home for the first time, finding life on their own stressful as they are in charge of their lives, finances, and decisions (Saleh et al., 2017). Feeling valued, included, and part of a community would help students process and manage their stressors.

This project produced positive results. This brings to question the benefits of applying similar projects or practices to various university courses. Mindfulness and nature could potentially be most beneficial in classes considered highly stressful by students. Students in this study suggested that adding mindfulness and nature to courses like math and statistics (considered high-stress courses by students in the study) would be a valuable addition to the university curriculum. Students would be more relaxed, their minds would be clear of clutter, and they would be able to focus on the task at hand. This study also demonstrated the possibility of students gaining perspective, seeing the bigger picture, and applying critical thinking skills. These characteristics are all valuable in any university classroom.

Recommendations

Some factors to consider during future iterations of this research are being flexible and creative when differentiation integration into course curriculum and assessing gender in relation to the constructs of this study.

Differentiating Integration

There is no "one-size-fits-all" prescription when it comes to education. The available courses are as diverse as the students who enroll in them. Thus, integrating nature and/or mindfulness into the university curriculum will take some creativity. The courses monitored in this study were opportune for incorporating mindfulness and nature. They each had an outside component that required students to explore nature. Other university classes that do not have an outdoor component will require some thought process to take advantage of the positive impacts of nature and mindfulness. Creative measures could be as simple as incorporating a nature screensaver and/or including calming music in the classroom, adding plants to the classroom, or even hanging up nature pictures. Better than bringing nature inside would be to do an assignment outside. This could be a short walk in the middle of class to regain focus or creatively delivering a lecture outdoors. Creatively finding ways to include nature and/or mindfulness in the classroom will potentially create a peaceful environment where students can identify their feelings, self-regulate, effectively communicate, focus, observe details, think critically, and work with their peers. Students will create a community where peers actively listen and learn from each other.

Students in this study identified the university classroom as a place of stress and dissociation. University students acknowledge that their connection to peers and

instructors is limited in the confines of a classroom's four walls. This study found that by incorporating mindfulness and nature into the class curriculum, students feel valued and connected to not only their peers but their professors. Students find learning fun again, making engaging with course content simple and collaborating with peers easier. Creating these types of learning environments will support students' mental health and well-being so they can perform better academically. Furthermore, a non-threatening, stress-free learning environment encourages students to attend class and actively participate in coursework. These added components to the course curriculum will improve retention at the university level. If students are engaged in the curriculum and having fun while doing so, they are more likely to stay in school and graduate.

Gender

This study identified that females had higher stress scores than males at the beginning of every sit spot. Females also had a higher connection with nature and a higher PSS. When the post-tests were initiated, females decreased their stress by higher point differences than males. Females also decreased their PSS and increased their connection with nature. Males, however, decreased their connection with nature but surprisingly decreased their post-PSS by a higher point difference than females. In future iterations of this study, researchers may consider focusing on gender differences in relation to stress levels. If females tend to have increased stress levels, they will highly benefit from nature and mindfulness practices. These practices would assist in regulating their emotions, which would increase their academic performance.

Additionally, if the males in this study decreased their connection to nature yet their PSS showed higher signs of decreased stress levels, it would be interesting to

determine if they did have an increased connection to nature and how that would impact male stress levels. If strategies focused on increasing connection to nature were successful, then seemingly stress levels may decrease at an even greater point difference.

Conclusion

The findings in this study align with previous studies. Mindfulness and nature were helpful strategies to assist students in managing their stress. In addition to stress reduction, students found that a safe, welcoming learning environment was established, creating spaces where students can actively engage in conversations that promote critical thinking and allow students to see various perspectives to further their understanding of course content and how it applies to the world around them. Applying procedures that consider student mental health will contribute to their success in the classroom. Additionally, the more courses that apply strategies that support student mental health and well-being, the more universities will observe retention numbers increase. This study shows that students appreciate the investment of professors by implementing nature and mindfulness, a practice that will continue in the EE certificate program.

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APPENDIX A

COLLEAGUE INTERVIEW QUESTION

Briefing Statement

Thank you for agreeing to participate in this interview. I am interested in examining change at CEI and its effects on you. Please respond with your own thinking about the questions. In your responses do not mention your name or the names of other individuals. May I record the interview?

1. What makes the Polytechnic campus unique? What advantages, if any, do students gain by attending classes on this campus?

2. From your perspective, what challenges do our students face during their university education? Describe some challenges and the changes you have seen in those challenges over your career.

3. What are some of the challenges you face in the same university education environment?

4. How/what do students in your classrooms do to decrease stress? How do you support this?

5. What resources do we have in the College and on this campus to support our students through these challenges?

6. Have you worked on other campuses or for any other colleges? If so, compare the support provided to students in the various settings.

7. From your perspective, what additional support should be provided for our students on the Polytechnic campus?

8. How has the pandemic impacted you and your students this past year?

9. What else would you like to add?

10. What questions do you have of me?

Debriefing Statement

Thank you for your responses and your time today. I appreciate it very much. I will be using your responses to inform my work this semester and in future efforts on this matter.

STUDENT INTERVIEW QUESTIONS

Briefing Statement

Thank you for agreeing to participate in this interview. I am interested in examining change at CEI and its effects on you. Please respond with your own thinking about the questions. In your responses do not mention your name or the names of other individuals. May I record the interview?

1. What makes the Polytechnic campus unique? What are the benefits you gained by attending classes on this campus?

2. From your perspective, what is the most challenging transition to university education?

3. What are the biggest factors that contribute to increased stress for you? How does that affect your education?

4. Describe a specific challenging moment during the school year that was stressful and how you got through it?

5. What are some things you currently do to manage or decrease your stress?

6. What support, activities or environment does the Mary Lou Fulton Teachers College provide that helps you decrease your stress levels? Describe what these are and how they help.

7. What would help you manage your stress levels and make you more successful? Provide some suggestions on services the Mary Lou Fulton Teachers College could provide to help you.

8. How has the pandemic impacted your life this past year?

9. What else would you like to add?

10. What questions do you have of me?

Debriefing Statement

Thank you for your responses and your time today. I appreciate it very much. I will be using your responses to inform my work this semester and in future efforts on this matter.

APPENDIX B

PERCEIVED STRESS SCALE

Regardless of whether you choose to participate in this study or not, please complete the survey so you can gain a personal awareness of your perceived stress levels.

Confidentiality

To protect your confidentiality, please create a unique identifier known only to you. To create this unique code, please record the first three letters of your mother's first name and the last four digits of your phone number. Thus, for example, if your mother's name was Sarah and your phone number was (602) 543-6789, your code would be Sar 6789. The unique identifier will allow us to match your post-intervention survey responses and your retrospective, pre-intervention responses when we analyze the data.

My unique identifier is: _____ _____ (e.g., Sar 6789, see paragraph above)

Demographics: (Highlight your responses)

Age

Which category below includes your age? (Circle One)

17 or younger	18-20	21-29	30-39
40-49	50-59	60 or older	

Ethnicity

- ☐ White
- ☐ Black or African-American
- ☐ American Indian or Alaskan Native
- ☐ Asian
- ☐ Native Hawaiian or other Pacific islanders
- ☐ From multiple races
- ☐ Some other race (please specify) _____

Gender

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Other (specify) _____
- ☐ Choose not to answer.

Education

What is your current level of school?

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Graduate school

How many credit hours are you currently taking?

- ☐ 1-5 credits
- ☐ 6-10 credits
- ☐ 11-15 credits
- ☐ 16-20 credits
- ☐ Other (explain):_____

Employment

How many hours a week do you work?

- ☐ I do not work
- ☐ 1-5 hours
- ☐ 6-10 hours
- ☐ 11-15 hours
- ☐ 6-20 hours
- ☐ Other (explain):_____

Living Conditions

I am…….

- ☐ Single
- ☐ Married
- ☐ Married with Children
- ☐ Single with Children
- ☐ Divorced
- ☐ Other (explain):_____

I currently…….

- ☐ Live at home with parental financial support
- ☐ Live at home and pay rent
- ☐ Live on my own with parental financial support
- ☐ Live on my own and am responsible for myself financially
- ☐ Live with roommates with parental financial support
- ☐ Live with roommates and am responsible for myself financially
- ☐ Other (explain):_____

Perceived Stress Scale

A more precise measure of personal stress can be determined by using a variety of instruments that have been designed to help measure individual stress levels. The first of these is called the Perceived Stress Scale.

The Perceived Stress Scale (PSS) is a classic stress assessment instrument. The tool, while originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. The questions in this scale ask about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:
0 - never 1 - almost never 2 - sometimes 3 - fairly often 4 - very often

_____ l. In the last month, how often have you been upset because of something that happened unexpectedly?

_____ 2. In the last month, how often have you felt that you were unable to control the important things in your life?

_____ 3. In the last month, how often have you felt nervous and stressed?

_____ 4. In the last month, how often have you felt confident about your ability to handle your personal problems?

_____ 5. In the last month, how often have you felt that things were going your way?

_____ 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

_____ 7. In the last month, how often have you been able to control irritations in your life?

_____ 8. In the last month, how often have you felt that you were on top of things?

_____ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?

_____ 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Figuring Your PSS Score

You can determine your PSS score by following these directions:

- First, reverse your scores for questions 4, 5, 7, and 8. On these 4 questions, change the scores like this: 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.

- Now add up your scores for each item to get a total. My total score is _____.
- Individual scores on the PSS can range from 0 to 40, with higher scores indicating higher perceived stress.

    ► Scores ranging from 0-13 would be considered low stress.
    ► Scores ranging from 14-26 would be considered moderate stress.
    ► Scores ranging from 27-40 would be considered high perceived stress.

The Perceived Stress Scale is interesting and important because your perception of what is happening in your life is most important. Consider the idea that two individuals could have the exact same events and experiences in their lives for the past month. Depending on their perception, the total score could put one of those individuals in the low-stress category, and the total score could put the second person in the high-stress category.

Disclaimer: The scores on the following self-assessment do not reflect any particular diagnosis or course of treatment. They are meant as a tool to help assess your level of stress. If you have any further concerns about your current well-being, you may contact EAP and talk confidentially to one of our specialists.

APPENDIX C

ACTIVITY SURVEY

To protect your confidentiality, please create a unique identifier known only to you. To create this unique code, please record the first three letters of your mother's first name and the last four digits of your phone number. Thus, for example, if your mother's name was Sarah and your phone number was (602) 543-6789, your code would be Sar 6789. The unique identifier will allow us to match your post-intervention survey responses and your retrospective, pre-intervention responses when we analyze the data.

My unique identifier is: _____ _____ (e.g., Sar 6789, see paragraph above)

For each question choose from the following alternatives:
0 - no stress 1 - a little stress 2 - fairly stressed 3 - very stressed

_____ l. What was your level of stress before the activity?

_____ 2. What was your level of stress after the activity?

For each question choose from the following alternatives:
0 - no help 1 - very little help 2- fairly helpful 3 - very helpful

_____ 3. How would you rate the mindfulness activity you participated in?

For each question choose from the following alternatives:
0 – not calming 1 – somewhat calming 2- fairly calming 3 - extremely calming

_____ 4. How would you rate the environment in which the mindfulness activity took place?

For each question choose from the following alternatives:
0 – not connected 1 – somewhat connected 2- fairly connected 3 – extremely connected

_____ 5. How would you rate your connectedness to nature based on this activity?

*****PLEASE ANSWER THE QUESTIONS ON THE BACKSIDE OF THIS SURVEY******

Please answer the following questions:

6. What was your opinion of the mindfulness experience? How often do you engage in mindfulness practices during a given week? What practices do you engage in?

7. What was your connection to nature during this activity?

8. What would you change about your experience?

APPENDIX D

NATURE RELATEDNESS SCALE (NR)

Nature Relatedness Scale

What This Tool Measures

The Nature Relatedness (NR) Scale measures a person's emotional, cognitive, and physical connection to nature (Nisbet, Zelenski, & Murphy, 2009). The NR scale measures the overall construct, but three subscales or dimensions can also be calculated: Self (emotional), Perspective (cognitive), and Experience (physical). NRSelf reflects an internal, personal identity and connection to nature. NR-Perspective measures an individual's external worldview about nature and how that relates to that person's behavior. NR-Experience describes an individual's familiarity with nature and that person's desire for and comfort with being outdoors.

Tool Format

The NR scale consists of 21 statements to which people respond on a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The scale includes reverse-scored items. Scores can be calculated to provide an overall score, as well as scores on each of the three dimensions. There is also a short-form (unidimensional) version of the scale, called the NR-6, which includes six statements (Nisbet & Zelenski, 2013).

How This Tool Has Been Used

The longer version of the tool was initially tested with undergraduate psychology students and used with adults in the community, the federal government, and the private sector (Nisbet et al., 2009; Nisbet & Zelenski, 2013). The NR scale has been used in a variety of countries and cultural contexts including Australia, Canada, Ecuador, Finland, Germany, the United Kingdom, and the United States, and has also been translated into Arabic, Chinese, Czech, French, Korean, Hungarian, Polish, and Turkish.

The Royal Society for the Protection of Birds adapted the shortened scale for use with 8- to 12-year-old children in the United Kingdom (Bragg et al., 2013). The shortened scale has also been used in Tokyo, Japan to assess whether a person's level of connection to nature can help explain the psychological and social wellbeing experienced by people who participate in urban gardening (Soga et al., 2017).

Variations and Modifications

Nisbet and Zelenski (2013) developed and tested a shorter version of the NR scale. The NR-6 contains six items that perform very similarly to the 21-item scale. The NR-6 is comprised of items representing two of the three factors from the original scale (Self and Experience), but is intended to assess the overall construct, rather than dimensions. The NR-6 scale is reliable, stable over time, and correlates with other environmental attitude scales and well-being indicators similarly to the full 21item scale. The short form is appropriate when time or space is limited, but the 21-item scale provides a more nuanced and robust assessment of the nature relatedness construct.

Tips for Using This Tool

This tool can be used to collect baseline data or a snapshot of a person's connection to nature at a particular point in time. Practitioners who are implementing longterm programs or multiple interventions may use it as a pretest/posttest to detect changes in NR. Because the NR is relatively stable over time (e.g., it measures traits rather than more temporary states), it would be difficult to detect change after a short or low-intensity program.

Nature Relatedness Scale

For each of the following statements, please rate the extent to which you agree with each statement, using the scale from 1 to 5 as shown below. Please respond as you really feel, rather than how you think you should feel, or how "most people" feel.

1	2	3	4	5
Strongly Disagree	Disagree a Little	Neither Agree nor Disagree	Agree a Little	Strongly Agree

____1. I enjoy being outdoors, even in unpleasant weather.
____2. Some species are just meant to die out or become extinct.
____3. Humans have the right to use natural resources any way we want.
____4. My ideal vacation spot would be a remote, wilderness area.*
____5. I always think about how my actions affect the environment.*
____6. I enjoy digging in the earth and getting dirt on my hands.
____7. My connection to nature and the environment is a part of my spirituality.*
____8. I am very aware of environmental issues.
____9. I take notice of wildlife wherever I am.*
____10. I don't often go out in nature.
____11. Nothing I do will change problems in other places on the planet.
____12. I am not separate from nature, but a part of nature.
____13. The thought of being deep in the woods, away from civilization, is frightening.
____14. My feelings about nature do not affect how I live my life.
____15. Animals, birds, and plants should have fewer rights than humans.
____16. Even in the middle of the city, I notice nature around me.
____17. My relationship to nature is an important part of who I am.*
____18. Conservation is unnecessary because nature is strong enough to recover from any human impact.
____19. The state of non-human species is an indicator of the future for humans.
____20. I think a lot about the suffering of animals.
____21. I feel very connected to all living things and the earth.*

* Notes to evaluator: The statements marked with asterisks make up the short-form version of the NR scale (NR-6). No items are reverse-scored in the short-form version. In the long version, statements 2, 3, 10, 11, 13, 14, 15, and 18 are reverse-scored. Nisbet, E. K., & Zelenski, J. M. (2013). The NR-6: A new brief measure of nature relatedness. Frontiers in Psychology: Personality Science and Social Psychology, 4, 1-11 Nisbet, E. K. L., Zelenski, J. M., & Murphy, S. A. (2009). The Nature Relatedness Scale: Linking individuals' connection with nature to environmental concern and behavior. Environment and Behavior, 41, 715-740. This tool was developed and validated in English.

Analyzing Your Data

These scoring instructions are for the 21-item scale.

Recording the Data

1) We recommend entering survey responses into a spreadsheet using a program such as Microsoft Excel. Create a spreadsheet with 21 columns for the 21 statements and a row for each participant. Assign each survey a record number, and enter each individual's responses (ranging from 1 to 5) across the corresponding row, noting that some statements are reverse-scored and need to be adjusted as explained in step 2. Enter a dot if the response was skipped.

2) Some of the statements in the NR scale are reverse scored: a high score means a lower connection to nature. To be able to calculate these scores with the other statements (where a high score reflects a greater connection to nature) you must reverse the score. For example, if a person answered 1 on a reverse-scored statement, you would assign them a 5 in your Excel spreadsheet, or if they answered 2 on the survey, you would assign a 4. A score of 3 stays the same. If they answer 4, you would assign a 2, and if they respond 5, you would assign a 1. Statements 2, 3, 10, 11, 13, 14, 15, and 18 are all reverse-scored and need to be adjusted in this manner.

3) After you enter your data, we recommend that you take time to clean it up. Cleaning data is necessary because participants do not always respond carefully to surveys. For example, some participants may leave responses blank and others may circle the same answer for every question. We recommend reviewing your data and excluding individuals' responses if approximately 25% or more of their responses are blank, or if their answers display a strong visual pattern, like a zigzag.

Calculating NR Scores

1) Create an average (mean) NR score for each individual by adding all of their responses and dividing by the number of questions answered. Do not include skipped questions for which you entered a dot. The average will be between 1 and 5. NR scores of 1–2 indicate a lower connection to nature, a score of 3 indicates neither a low nor a high connection, and scores of 4–5 indicate a higher level of connection to nature.

2) You can also average the scores from all individuals to obtain an overall group score (this number will also be between 1 and 5). You could then compare an individual's score to the group average.

Additional Analytic Options

To further analyze your data, you could compare the averages for different groups or subgroups using a t-test in Microsoft Excel. For example, you could compare the NR scores of males and females.

Reliability and Validity

The NR scale is said to be valid because it correlates with the other scales measuring environmental attitudes and predicts behaviors consistent with the constructs, such as time spent in nature. The scale also has high internal consistency (Cronbach's alpha = 0.87) and has been found to be stable over time (Nisbet et al., 2009).

APPENDIX E

DESERT INVESTIGATION FIELD ACTIVITY (DIFA)

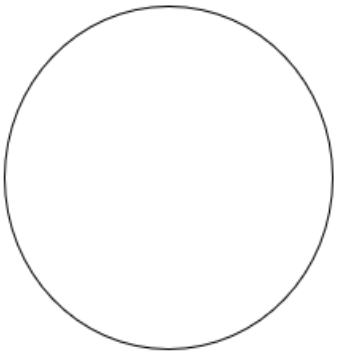
DIFA: Desert Investigation Field Activity

5, 4, 3, 2, 1

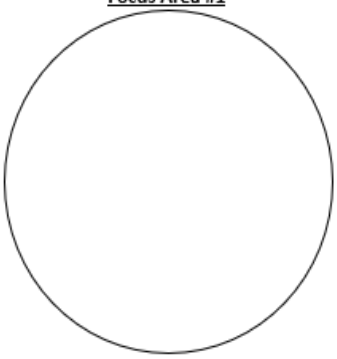
1. 5 things you specifically see?
2. 4 things you touched/felt?
3. 3 things you can hear?
4. 2 things you can smell?
5. 1 emotion you are feeling?

Common Name: _____ **Scientific Name:** _____

USING colored pencils and labels, complete the worksheet drawings. LABEL the drawing with observations.



Focus Area #1



Species (Big Picture). USE THE ENTIRE AREA for an enlarged drawing

Focus Area #2

QUANTITATIVE: USE COMPLETE SENTENCES to provide 3 quantitative **DETAILED** observations specific to the species you are observing. Use your science tool kit to make 3 accurate measurements and record the data. **Write out the measurements.**

EX for Species: The yucca plant is four feet tall and three feet wide, with a circumference of 26 inches. The plant contains 26 individual leaves.

EX for Focus Area: One agave leaf is 3 feet long and 1.5 inches wide. The leaf is tapered with a base 2 inches wide and narrow at the tip to a .25-inch measurement.

1. Species:

2. Focus Area #1:

3. Focus Area #2:

QUALITATIVE: **USE COMPLETE SENTENCES** to provide 3 qualitative **DETAILED** observations specific to the species you are observing. Connect these observations to three different senses (What does it feel like? What do you see? What does it smell like? Does it make any noises as you interact with it?)

EX for Species: The Texas sage bush is oval in shape, with green leaves that have a silver tint. The bush has several small purple flowers on it. When touched, the leaf is soft like velvet.

EX for Focus Area: The flowers on the fairy duster are deep red. Each flower is made of small, individual hair-like "petals" that together form a fan shape. The flower is soft to the touch.

1. Species:

2. Focus Area #1:

3. Focus Area #2:

RESEARCH: Research your species using the field guide or the internet. Provide 3 interesting facts about your species. Written in a complete sentence or two. **Cite your resources**.

1.

2.

3.

APPENDIX F

IRB DOCUMENTATION

APPROVAL: EXPEDITED REVIEW

Jill Koyama
Division of Educational Leadership and Innovation - Tempe
480/965-7652 Jill.Koyama@asu.edu

Dear Jill Koyama:

On 12/22/2022 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Examining Mindfulness and Nature Connectedness on the Mental Health and Wellbeing of University Students
Investigator:	Jill Koyama
IRB ID:	STUDY00017159
Category of review:	
Funding:	None
Grant Title:	None
Grant ID:	None

	group questions);
Documents Reviewed:	• AS, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Intervention Outline, Category: Other; • IRB, Category: IRB Protocol; • Mindfulness and Nature STUDY PRESENTATION, Category: Recruitment Materials; • Mindfulness and Nature_ INTERVENTION_SIT SPOT PRESENTATION, Category: Recruitment Materials; • Participant Consent, Category: Consent Form; • Point-by-point Revision Letter, Category: Other;• Pre and Post NR, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Pre and Post PSS, Category: Measures (Survey questions/Interview questions /interview guides/focus

The IRB approved the protocol effective 12/22/2022. Continuing Review is not required for this study.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Cynthia Schuster Cynthia Schuster

APPENDIX G

RECRUITMENT CONSENT LETTER

Dear Student/Colleague:

My name is Cyna Schuster and I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the direction of Dr. Ray Buss, a faculty member in MLFTC. We are conducting a research study on increasing student coping skills through mindfulness activities and decreasing student stress levels as a result of learning these skills. The purpose of this study is to understand better the current situation with respect to the challenges and stressors students face.

We are asking for your help, which will involve your participation in an interview concerning your knowledge, experiences, attitudes, and beliefs about the needs and abilities for students to manage stress and be mindful. We anticipate this interview to take 20 minutes total. I would like to audio record this interview. The interview will not be recorded without your permission. Please let me know if you do not want the interview to be recorded; you also can change your mind after the interview starts, just let me know.

Your participation in this study is voluntary. If you choose not to participate or withdraw from the study at any time, there will be no penalty whatsoever. You must be 18 years of age or older to participate.

The benefit to participation is the opportunity for you to reflect on and think more about the challenges our students face as well as possible strategies to reduce their stress. Interview responses will also inform future iterations of the study and possible solution for student retention at Mary Lou Fulton Teachers College. Thus, there is potential to enhance the experiences of our students. There are no foreseeable risks or discomforts to your participation.

Your responses will be confidential. Results from this study may be used in reports, presentations, or publications but your name will not be used. The interview recording will be labeled with a study ID rather than your name, transferred to a password-protected computer, and deleted from the original recording device.

If you have any questions concerning the research study, please contact the research team – Ray Buss at ray.buss@asu.edu or (602) 543-6343 or Cyna Schuster at cstehr@asu.edu or (480) 710-2654.

Thank you,
Cyna Schuster, Doctoral Student
Ray Buss, Professor

Please let me know if you wish to be part of the study and will allow me audio record your responses by verbally indicating your consent. Written consent is also accepted.
If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact Ray Buss at (602) 543-6343 or the Chair of Human

Subjects Institutional Review Board through the ASU Office of Research Integrity and Assurance at (480) 965-6788.

Dear Student:

My name is Cyna Schuster, and I am a doctoral student at the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the direction of Dr. Jill Koyama, the Vice Dean of Educational Leadership, and Mary Lou Fulton Teachers College Division of Ed Leadership & Innovation at Mary Lou Fulton Teachers College. We are conducting a research study on increasing student coping strategies through integrating mindfulness activities and exposure to nature into the course curriculum in an effort to decrease student stress levels as a result of learning these skills. The purpose of this study is to understand better the current situation with respect to the challenges and stressors students face based on student experiences.

We are asking for your help, which will involve your participation in a brief 7-week intervention. The study is embedded in the class coursework, so no additional work is needed to participate in the study. The study includes two pre-tests (approximately 5 minutes each), two post-tests (approximately 5 minutes each), four activity surveys (approximately 5-10 minutes each), and reflections/discussions (approximately 5-10 minutes each). As part of the course content, there is no penalty or repercussion for choosing not to participate. As a participant, you will be sharing your experiences, knowledge, attitudes, and beliefs about the influence of mindfulness practices and nature on students' abilities to effectively manage life stressors. If you choose not to participate or withdraw from the study at any time, there will be no penalty whatsoever. You must be 18 years of age or older to participate. Additionally, participants will not be revealed until after the intervention is over and grades have been submitted to Canvas.

The benefit to participation is the opportunity for you to reflect on and think more about the challenges our students face as well as possible strategies to reduce their stress. Survey responses and student reflections will also inform future iterations of the study and possible solutions for student retention at Mary Lou Fulton Teachers College. Thus, there is potential to enhance the experience of our students. There are no foreseeable risks or discomforts to your participation.

Your responses will be confidential. Results from this study may be used in reports, presentations, or publications but your name will not be used. The interview recording will be labeled with a study ID rather than your name, transferred to a password-protected computer, and deleted from the original recording device.

If you have any questions concerning the research study, please contact the research team – Jill Koyama at Jill.koyama@asu.edu or (480) 965-7652 or Cyna Schuster at cstehr@asu.edu or (480) 710-2654.

Thank you,

Cyna Schuster, Doctoral Student
Jill Koyama, Ph.D., Vice Dean, and Professor, Educational Leadership & Innovation

- Please check the box and sign below to participate. My signature below indicates that I agree to participate in the above-mentioned study. My coursework may be used for research.

- To protect your confidentiality, please create a unique identifier known only to you. To create this unique code, please record the first three letters of your mother's first name and the last four digits of your phone number. Thus, for example, if your mother's name was Sarah and your phone number was (602) 543-6789, your code would be Sar 6789. The unique identifier will allow us to match your post-intervention survey responses and your retrospective, pre-intervention responses when we analyze the data.

  My unique identifier is: _____ _____ (e.g., Sar 6789, see paragraph above)

  Signature:
  _____

If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact Ray Buss at (602) 543-6343 or the Chair of Human Subjects Institutional Review Board through the ASU Office of Research Integrity and Assurance at (480) 965-6788.

APPENDIX H

RESULTS OF ACTIVITY SURVEY

For each question, choose from the following alternatives:
0 - no help 1 - very little help 2- fairly helpful 3 - very helpful

3. How would you rate the mindfulness activity you participated in?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			**SS2 SCN 309 Outdoor/SCN 301 Outdoor**			**SS3 SCN 309 Indoor/SCN 301 Indoor**			**SS4 SCN 309 Outdoor/SCN 301 Indoor**		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Help	0	0	0	0	0	0	1	1	2	0	0	0
1 - Very Little Help	2	1	3	1	0	1	2	1	3	2	0	2
2 - Fairly Help	7	9	16	10	6	16	8	6	14	12	3	15
2.5	0	1	1	0	0	0	0	0	0	0	0	0
3 - Very Help	7	5	12	5	9	14	5	8	13	2	13	15
4	0	0	0	0	1	1	0	0	0	0	0	0
AVG	**2.31**	**2.28**	**2.3**	**2.25**	**2.69**	**2.5**	**2.06**	**2.5**	**2.19**	**2**	**2.81**	**2.41**

4. How would you rate box breathing on reducing stress?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Help	1	0	1	0	0	0	0	0	0	0	0	0
1 - Very Little Help	2	2	4	4	2	6	1	1	2	1	1	2
2 - Fairly Help	8	5	13	8	3	11	10	5	15	8	5	13
3 - Very Help	5	8	13	4	10	14	5	10	15	7	10	17
4	0	1	1	0	1	1	0	0	0	0	0	0
AVG	**2.06**	**2.5**	**2.28**	**2**	**2.63**	**2.3**	**2.25**	**2.56**	**2.41**	**2.38**	**2.56**	**2.47**

5. How would you rate the 54321 on reducing stress?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Help	2	0	2	1	0	1	1	1	2	1	0	1
1 - Very Little Help	3	4	7	1	1	2	4	1	5	7	0	7
2 - Fairly Help	7	6	13	11	7	18	9	3	12	7	8	15
2.5	0	0	0	0	0	0	0	0	0	0	1	1
2.75	0	0	0	0	1	1	0	1	1	0	0	0
3 - Very Help	4	6	10	3	7	10	2	10	12	1	7	8
AVG	**1.81**	**2.13**	**2**	**2**	**2.42**	**2.21**	**1.75**	**2.48**	**2.12**	**1.5**	**2.47**	**1.98**

6. How would you rate drawing/sketching on reducing stress?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Help	1	0	1	0	0	0	0	0	0	0		0
1 - Very Little Help	3	3	6	5	1	6	3	3	6	2		4
2 - Fairly Help	2	6	8	6	5	11	5	3	8	9		12
2.5	0	1	1	0	1	1	0	1	1	0		0
3 - Very Help	10	5	15	5	8	13	8	8	16	5	11	16
4	0	1	1	0	1	1	0	1	1	0	0	0
AVG	**2.31**	**2.28**	**2.3**	**2**	**2.59**	**2.3**	**2.31**	**2.47**	**2.39**	**2.19**	**2.56**	**2.38**

7. How would you rate reflecting on your experience in reducing stress?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Help	2	2	4	0	1	1	1	0	1	1	0	1
1 - Very Little Help	4	5	9	5	5	10	3	3	6	4	5	9
2 - Fairly Help	5	3	8	8	6	14	7	7	14	7	4	11
2.75	0	1	1	0	0	0	0	0	0	0	0	0
3 - Very Help	5	4	9	3	4	7	5	6	11	4	7	11
4	0	1	1	0	0	0	0	0	0	0	0	0
AVG	**1.81**	**1.86**	**1.84**	**1.88**	**1.81**	**1.84**	**2**	**2.19**	**2.09**	**1.88**	**2.13**	**2**

For each question, choose from the following alternatives:
0 – not calming 1 – somewhat calming 2- fairly calming 3 - extremely calming

8. How would you rate the environment in which the mindfulness activity took place?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			**SS2 SCN 309 Outdoor/SCN 301 Outdoor**			**SS3 SCN 309 Indoor/SCN 301 Indoor**			**SS4 SCN 309 Outdoor/SCN 301 Indoor**		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Calm	0	2	2	0	0	0	0	3	3	1	0	1
1 - Somewhat Calming	4	4	8	5	1	6	3	1	4	8	1	9
1.75	0	0	0	0	1	1	0	1	1	0	0	0
2- Fairly Calming	6	7	13	6	5	11	6	4	10	2	4	6
2.5	0	1	1	0	0	0	0	0	0	0	0	0
3- Extremely Calming	6	2	8	5	8	13	6	7	13	5	11	16
4	0	0	0	0	1	1	1	0	1	0	0	0
AVG	**2.13**	**1.66**	**1.89**	**2**	**2.55**	**2.3**	**2.31**	**1.98**	**2.15**	**1.68**	**2.63**	**2.5**

9. How would you rate the mindfulness activities?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Calm	0	0	0	0	0	0	0	0	0	0	0	0
1 - Somewhat Calming	3	1	4	2	1	3	1	1	2	3	1	4
2- Fairly Calming	6	9	15	11	9	20	9	7	16	13	3	16
3- Extremely Calm	7	6	13	3	6	9	6	8	14	0	12	12
AVG	**2.25**	**2.31**	**2.28**	**2.06**	**2.31**	**2.2**	**2.31**	**2.44**	**2.38**	**1.83**	**2.69**	**2.25**

10. How would you rate your exposure to nature?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			SS2 SCN 309 Outdoor/SCN 301 Outdoor			SS3 SCN 309 Indoor/SCN 301 Indoor			SS4 SCN 309 Outdoor/SCN 301 Indoor		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - No Calm	0	2	2	1	0	1	0	0	0	1	0	1
1 - Somewhat Calming	1	4	5	2	1	3	4	10	14	6	0	6
2- Fairly Calming	6	4	10	4	4	8	8	2	10	5	3	8
2.5	0	1	1	0	0	0	0	0	0	0	0	0
3- Extremely Calming	9	5	14	9	10	19	4	4	8	4	13	17
4	0	0	0	0	1	1	0	0	0	0	0	0
AVG	**2.47**	**1.84**	**2.15**	**2.31**	**2.69**	**2.5**	**2**	**1.63**	**1.81**	**1.75**	**2.81**	**2.28**

For each question, choose from the following alternatives:
0 – not connected 1 – somewhat connected 2- fairly connected 3 – extremely connected

11. How would you rate your connectedness to nature based on this activity?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			**SS2 SCN 309 Outdoor/SCN 301 Outdoor**			**SS3 SCN 309 Indoor/SCN 301 Indoor**			**SS4 SCN 309 Outdoor/SCN 301 Indoor**		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - Not Connected	1	2	3	1	0	1	2	3	5	0	0	0
1 - Somewhat Connected	3	5	8	2	2	4	2	5	7	8	1	9
2 - Fairly Connected	10	8	18	9	4	13	11	4	15	6	3	9
2.5	0	1	1	0	0	0	0	0	0	0	1	1
3 - Extremely Connected	2	0	2	4	9	13	1	4	5	2	11	13
4	0	0	0	0	1	1	0	0	0	0	0	0
AVG	**1.81**	**1.47**	**1.64**	**2**	**2.56**	**2.28**	**1.69**	**1.56**	**1.63**	**1.63**	**2.66**	**2.28**

For each question, choose from the following alternatives:
0 – not restored 1 – somewhat restored 2- fairly restored 3 – extremely restored

12. How would you rate mental fatigue (mental health) based on this activity?

	SS1 SCN 309 Indoor/SCN 301 Outdoor			**SS2 SCN 309 Outdoor/SCN 301 Outdoor**			**SS3 SCN 309 Indoor/SCN 301 Indoor**			**SS4 SCN 309 Outdoor/SCN 301 Indoor**		
	301	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**	**301**	**309**	**All**
0 - Not Restored	0	1	1	0	0	0	1	0	1	2	0	2
1 - Somewhat Restored	8	6	14	8	3	11	2	5	7	4	3	7
2 – Fairly Restored	5	8	13	6	6	12	7	9	16	8	4	12
3 - Extremely Restored	3	1	4	2	7	9	6	2	8	2	9	11
AVG	**1.68**	**1.56**	**1.63**	**1.63**	**2.25**	**1.94**	**2.13**	**1.81**	**1.97**	**1.63**	**2.37**	**2**

APPENDIX I

MOUNTAIN MEDITATION

Bring your awareness to the sensations of your breath and the gentle rhythm it is creating within you. “Letting it be, just as it is.” Each inhale and exhale, announcing the next.

Expand your awareness to the sensations of your body. Sitting upright and with dignity — bring your attention to the surface beneath you and the support it provides. Root your body into its strength and become aware of your connection to it — complete, whole, and in this moment, you are grounded by its unwavering resolve.

As you sit there, visualize a grand mountain, whose peaks pierce smoky clouds and continue upward where the air is clear and the view is endless. A mountain with slopes that are both jagged and gentle; supported by a vast foundation rooted deep in the bedrock of the earth. This mountain is a monument to all that is solid, grand, unmoving, and beautiful.

Are there trees? Does snow blanket it lofty heights? Perhaps waterfalls cascading as mist into an open sky?

However, it is — let it be as it is: a perfect creation.

Be this mountain, and share in its stillness.

Grounded in your posture, your head its skyward peak, supported by the rest of your form, granting you an awe-inspiring perspective of the landscape before you, behind you, and about you, which flows from your center into the distance horizon.

Be this mountain.

And take on its stability as your own. From the top of your crown, down your neck, and into the balance of your shoulders, like cliffs, descending into your arms and forearms, and coming to rest in the valley of your hands.

Be the mountain.

Your feet, legs, and hips its base — solid and rooted beneath you — a foundation, extending up your spine and abdomen: A core of stability.

The rhythm of your breath is all that moves you. A living mountain: alive and aware, “yet unwavering in inner stillness. Completely what you are, beyond words and thought: a centered, grounded, unmovable presence.”

A mountain which witnesses the sun travel across the sky, casting light and shadows and colors across its consistent composure. Moment by moment, in the mountain’s stillness, the surface teems with life and activity: Snows melt, streams run down its face, trees and flowers bloom and die and bloom again as the wildlife returns and departs with the

seasons.

Be the mountain, who will be called beautiful and inspiring, and dark and ominous, and knows that it is all of those things and less.

Be the mountain — which sits and sees how night follows day and back again. Which knows the sun by the warmth it brings on rising and the stars by the way they show in a darkened sky.

Through it all, the mountain sits. Aware of the changes that each moment brings, around it and to it. Yet it remains itself. Still, as the seasons flow one into the other, the air swirls from hot and cold, and the weather turns from tame to turbulent. Some so treacherous as to tear at its surface.

Still — none of this concerns the mountain, whose serenity is housed within and cannot be disturbed by the fleeting furor.

In the same way, as you sit in meditation, you can learn to experience the mountain as a means to embody the same centered, unwavering stillness and groundedness in the face of all that changes in your life — over seconds and hours, and years.

Like the mountain, you will experience the changing nature of your mind and body and of the world around you. You will have periods varying in intensity — of darkness and light, of activity and inactivity, and moments that fill your life with color.

Through it all, be the mountain, and call on its patient strength and stability within you. Let it empower you to encounter each moment with mindful composure and compassionate clarity.

References

Kabat-Zinn, J. (1994). Wherever you go, there you are: Mindfulness meditation in everyday life. New York: Hyperion.