The Seven-S Model for Developing Environmental Leaders: Harmonizing Indigenous and Integral Approaches in Environmental and Sustainability Education

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Abstract: The Teaching and Researching Environmental Education (TREE) Semester is a residential 16-week program that empowers undergraduate liberal arts students to develop their critical environmental consciousness through place-based community living and learning while teaching K-12 environmental and sustainability education (ESE). The TREE Semester seeks to develop pedagogical skills and critical ESE awareness by exploring educational and sustainable thinking through divergent and historically silenced epistemologies. These transformational learning experiences prepare TREE's undergraduates for future roles as critical, holistic, and ethical environmental education leaders. In this paper, we share our curricular decisions and their related praxis to describe how we modified our Integral-motivated Seven-S curriculum model (Science, Systems, Spirit, Society, Stewardship, Service, Sustainability) to affirm Indigenous epistemologies. Western Integral approaches, however multidisciplinary, are insufficient for cultivating critical consciousness and spiritual connection. We suggest that purposefully incorporating systems thinking and decolonial *threshold concepts* in our curriculum contributes to epistemological transformation in our undergraduates. We offer recommendations for educators to ethically harmonize Western and Indigenous approaches in curricula and to collaborate across communities of Indigenous and non-Indigenous educators for place-connected transformative environmental education.

Keywords: Environmental and Sustainability Education, undergraduate education, Indigenous Ways of Knowing, Integral Theory, epistemological stretching, critical consciousness

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Introduction

"The choices we make about how we educate new generations and continue to learn and grow as Peoples stem from how we as cultures understand reality and ourselves."

Cajete (*Indigenous Community* 268)

This special issue of *Contingencies* calls for alternative approaches to unsettle environmental studies by challenging the established ways of teaching in the Western Academy through "new models of curriculum, pedagogy, and interdisciplinary learning." In this paper, we report how TREE attempts to expand beyond standard undergraduate ESE teacher training and leadership programming by interweaving Indigenous and Integral epistemologies, pushing our students to grapple with threshold concepts through purposeful epistemic integration (Barrett et al. 131). Following Minthorn's call for moving beyond decolonization into the Indigenizing of academic spaces, we commit to this epistemic task by modifying our TREE curricula from its roots (Minthorn 8). We describe our reflexive, in-progress endeavor of centering Indigenous epistemologies in a Seven-S curriculum model (Science, Systems, Spirit, Society, Service, Stewardship, Sustainability[1]) while acknowledging the boundaries and positionalities of instructors and students.

The TREE Semester

The Teaching and Researching Environmental Education (TREE) Semester is an intensive semester-long residential environmental and sustainability education (ESE) leadership program taught at the Catamount Mountain Campus in the montane life zone in the Front Range of Colorado. There, we seek to inspire an ethic of ecological stewardship in our undergraduate

[1] All seven S words are capitalized throughout the paper when referring to an epistemological position.

students—whom we refer to as Stewards (see Stewardship section below)—and the K-12 students they teach weekly over the 16-week semester. The program has fostered effective learning communities over ten years through an iterative and adaptive developmental evaluation framework (Drossman 807). We model the program's learning community as a complex adaptive system characterized by five rules: integrating staff and student learning, focusing on experiences over activities, minimizing hierarchical structures, emphasizing ongoing academic support, and taking the time to "smell the primroses" (Drossman 819).

This paper provides case study examples of curricular decisions for undergraduate learning of diverse epistemological perspectives across TREE's four courses (ESE Practicum, Critical Foundations of EE, Developing ESE Curriculum, and Nature Epistemologies). Our exploration builds upon prior studies on epistemological bridging (Tovar-Galvez 760), epistemological pluralism (Miller et al. 177), epistemological stretching (Harmin et al. 1489), and multiple ways of knowing (Barrett et al. 131). Though the value of such approaches is sometimes contested (e.g., Siegel 3), Loring and Barrett et al. independently identified epistemological diversity as a *threshold concept* for learning about sustainability— that is, an irreversible and transformative idea creating profound structural shifts in understanding (Meyer & Land 1). By interweaving the validity and value of divergent perspectives, we uncover how different worldviews open new ways of thinking.

In What Land Do We Live and Learn?[2]

[2]As shared directly by Anderson et al., "Saskatchewan Cree and Dene Elders believe the common expression 'on Mother Earth' continues the subtle colonization they experience from Anglophones. The expression 'in Mother Earth' is closer to their Indigenous meaning." Following this awareness, we attempt to reconsider our Sense of Place, in this paper and subsequently, from one "on the land" to "in the land."

The colonized land in which our Stewards learn daily looks out upon the north slope of Pikes Peak, a name commemorating settler colonization of "America's Mountain" from the Northern Ute People. We call the mountain (and name our dorms) by the mountain's Ute name, Tava (Sun Mountain). The Uncompahgre Ute band (formerly known as the Tabeguache Ute, "People of Sun Mountain") lived here for at least 1,000 years before colonization and forceful relocation to the Uintah-Ouray Reservation in Utah in 1880 (Pikes Peak Historical Society).

Since our undergraduate Stewards live, learn, teach, and recreate in the shadow of Tava for 16 weeks, their introduction to Indigenous history and culture requires much more than even the most thoughtful land acknowledgment—though, indeed, one of our professional development seminars asks Stewards to create and revise land acknowledgments for their hometowns and Catamount Center (Brooks et al. 121). Thus, in our early weeks of TREE, we invite Elders from—and historians of—different Indigenous communities to share stories, relate the history of colonization, present the cultural history of various nations, and lead optional rituals to better understand the multiplicity of historical and contemporary Indigenous peoples. Through this participation, we hope to learn and share how diverse epistemologies, including Ute, Lakota, and other Indigenous perspectives, can be better integrated into our ESE programming.

What Do We Learn?

Historically, the curricular underpinnings of the TREE Semester have aligned closely with Ken Wilber's Integral Theory (Wilber *Integral Psychology*; Wilber *Integral Spirituality*) and its comprehensive application in *Integral Ecology* (Esbjörn-Hargens and Zimmerman). Wilber's Integral Theory posits an epistemological and ontological representation that can be parsed as objective or subjective and individual or collective. Our goal across the semester is to encourage TREE Stewards to apply the epistemic expansiveness of Wilber's four-quadrants model (Table

1) toward their K-12 ESE curricula and their critical thinking. The four-quadrants model posits that all human knowledge can be viewed through four epistemological lenses: individual-objective (Science), collective-objective (Systems), individual-subjective (Spirit), and collective-subjective (Society). We start one of the earliest days of TREE by reading a summary paper on the applications of Integral Theory to ecological issues in tandem with a paper on the art and science of lake restoration (Esbjörn-Hargens 1; Moss 15). By comparing these papers while in literal view of the two Catamount Lakes that our Stewards will teach from, play in, and accompany daily, we begin TREE by connecting foundational but abstract Integral concepts to a purposeful sense of place and community.

Also in the first week of class, we ask the TREE Stewards to define three additional "S" words: Service, Stewardship, and Sustainability. In groups, the Stewards represent the relations among the seven terms in either a more linear (square) model (Figure 1), a relational circular model (Figure 2), or an alternative model of their choosing. The purpose of this class activity is not to converge on a correct answer but to envisage parallel truths from the different models.

The linear model is straightforward to explain; the four "square" components of ecological stewardship seen in Figure 1 represent the four Integral ways of knowing (when looking inward towards the meaning of stewardship) or ontological ways of being (when looking outward at one's views towards stewardship), further elaborated in Table 1. We hope developing this Integral understanding of Stewardship will inspire our Stewards to Service towards Sustainability. Although direct, this model does not fully address nor convey how the concepts interact. Thus, this square Seven-S model opens many issues, perspectives, and potential critiques that might be addressed through intentional intertwining.

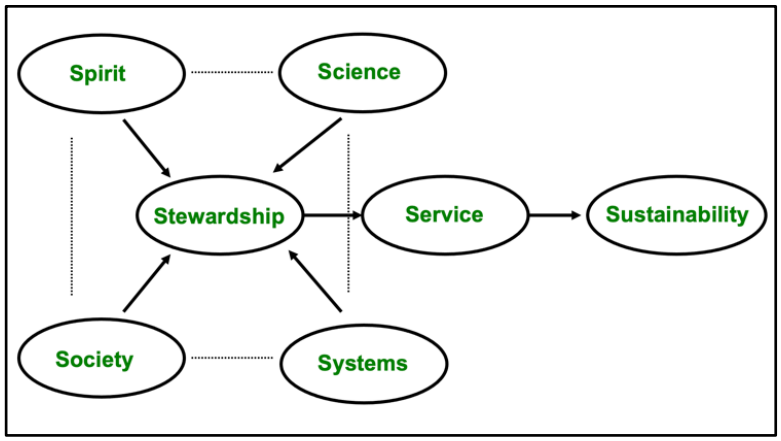

Figure 1. A linear or "square" version of the Seven-S Integral Model for Sustainability.

In our ongoing work to make TREE programming more critical and relational, we sought new ways to convey the relationships between people, worldviews, power, and the environmental/sustainability curricula our Stewards would eventually create. Our first major reworking of the Seven-S curricular model thus moved from linear and square relations to more intertwined circular relations, which we developed to convey the interdisciplinary aspects of critical Sustainability in our program (Figure 2). The overlapping circles directly convey the intertwining, rather than separate, relationships between these diverse lenses. Indeed, our campus Elder, Debbie Howell, reminds us that Indigenous models favor circular thinking over linear, that acknowledging seven interconnected directions (e.g., North, East, South, West, Above, Below, Center) is a widely shared indigenous worldview, and that siloing disciplines is itself a Western way of thinking (Good Feather, 16). Do these relational circles provide a better curricular model? Perhaps. We explore the curricular merits and limitations of our newly proposed model below.

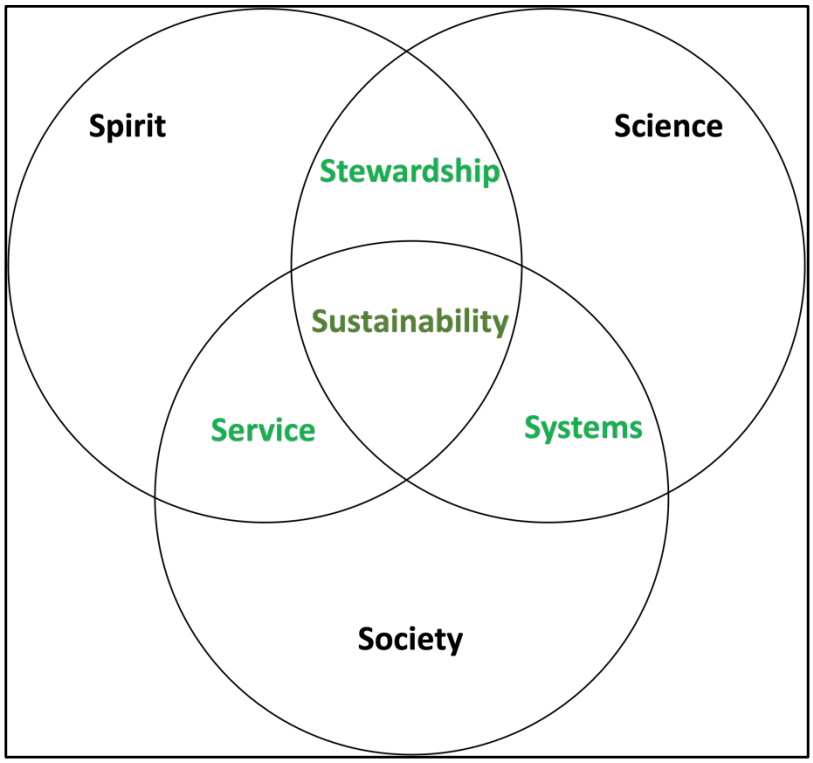

Fig. 2 Our initial circular reworking of the Seven-S Integral Model for Sustainability.

The three primary lenses of the new circular model in Figure 2 (Science, Spirit, and Society) roughly map to the Western canonical epistemes: Truth, Beauty, and Goodness (Esbjörn-Hargens and Zimmerman 251-253). Each can be viewed from an insider's or an outsider's perspective, and each has its methods for seeking and validating truthfulness (Table 1). In the following sections, we present each individual episteme of our circular Seven-S model and its importance for undergraduate ESE. We then examine how understanding their interrelatedness can lead to pedagogically useful conceptions of Systems, Stewardship, and Service. Lastly, we critique this still-Western model and propose how harmonization with Indigenous thinking can cultivate more transformative Sustainability education by proposing a new, harmonized Seven-S model.

	Subjective	Objective
Individual	**Spirit** (**phenomenology**; **structuralism**)	**Science** (**empiricism**; **autopoiesis**)
Collective	**Society** (**hermeneutics**; **ethnomethodology**)	**Systems** (**systems analysis**; **social autopoiesis**)

Table 1. Organization of Integral epistemological positions (green); and inquiry paradigms, from an internal view (blue) and external view (red). Adapted from Wilber, *Integral Spirituality*.

The Seven-S Curricular Model

Science

Science provides the methodology to inquire about the objective world through individual-objective (empirical) and collective-objective (systems-thinking) perspectives. This objective inquiry can be made through an external (observer as subject) or internal (observer as subject and object) view; although internal views of objective systems are much less frequently studied, methods for the internal study of individuals (autopoiesis) and collectives (social autopoiesis) exist and can provide important insights into environmental issues[3] (Esbjörn-Hargens and Zimmerman 251-253). Though these internal perspectives on inquiry help study environmental

[3] For example, Maturana and Varela's classic work, *The Tree of Knowledge,* offers an autopoietic approach to understanding human cognition, and Niklas Luhmann's social autopoietic study, *Differentiation of Society*, discusses the communication barriers among disciplines as one root cause of environmental problems.

issues, we focus on the more common aspects of Science and Systems viewed from an external perspective.

The dominant (hegemonic) epistemology of science intentionally objectifies nature and natural systems. Objectification, meant to reduce bias, requires removing oneself (the subject) from the focus of the study, most frequently viewed as an object in nature. The hegemonic colonizing power of science is not embedded in this objectification process *per se*, however, but in its claims to epistemic power that Druker-Ibañez et al. reviews as epistemic violence, epistemicide, epistemic supremacy, and cognitive injustice, among others (1211). The Integral principle of methodological pluralism focuses on non-exclusion, the idea that "truth claims [only] pass validity tests for their own paradigms in their respective fields"; more simply, "everyone is partially right!" (Esbjörn-Hargens and Zimmerman 42). Thus, we present Science to our Stewards as a valid and essential method for seeking truth, though we accompany it with social-critical critiques of prioritizing Western science at the expense of other scientific lenses.

The epistemological differentiation of objective science in the absence of Spirit (subjectivity) illuminates a source of cognitive injustice by clarifying which worldviews we honor and which we ignore. We address this at TREE when Elders introduce Indigenous epistemologies. As this paper affirms, there are many types of Indigenous knowledge (Tuck 439-446); traditional ecological knowledge (TEK) is seen by some (e.g., Carter 18; van Eijk & Roth 926) as an appropriative (and thus colonizing) term that attempts to include different types of ecologically related knowledge from many nations and peoples into one academic term. Though Kimmerer agrees, she uses TEK as an "accepted international academic and policy convention" (Kimmerer 50). When we use Science broadly to mean "a way of understanding and finding our way in the world" (Wooltorton et al. 931), TEK is on similar footing with SEK. Kimmerer's elegant

metaphor of the relation of TEK and SEK as a garden of corn, beans, and squash (the Three Sisters) enlightens the relative roles of TEK and SEK. In her view, the corn represents TEK, which provides structure through its longstanding history, while SEK, represented as beans, provides depth through its attempts at universalizing. As Kimmerer explains, "the squash represents the educational climate of mutual respect, intellectual pluralism and critical thinking in which both knowledges, TEK and SEK, can grow" (Kimmerer 69).

Spirit

Although no uniform Indigenous culture exists, almost all Indigenous traditions conceptualize Spirit as unifying, omnipresent, and holistic (Deloria 77-96; Good Feather 13). Elder Celinda Kaelin shares that underlying Lakota cosmology is the teaching of a universal manifestation/energy of the Creator: "an energy that is everywhere, present, and within all things" (3). In Lakota teachings, this Creator-energy is known as *Ton* (Lame Deer and Erdoes 271); the related Ute concept is *Puwa* (Denison 19). This permeating conception of Spirit consequently connects with other Indigenous understandings, most notably Sense of Place, Relations, and Reciprocity (similarly: "kinship, community, and natural world", Cajete, *Indigenous Community* 268; Deloria 77-96; Good Feather, 142). For a visual representation of how these Indigenous conceptions may relate to each other, see Figure 3. Note that in this visual representation, we also incorporate the relevant and valuable work of Anderson, Comay, and Chiarotto as a way of affirming their K-12 Indigenous Environmental Inquiry Resource Guide[4]

[4] Given that Anderson et al.'s Four Branches of Indigenous K-12 environmental inquiry also begin with Spirituality and work toward Sustainability, we saw immediate parallels with our own model development. We offer this visualization of their Branches (Figure 3) to organize and potentially connect with our Seven-S model for undergraduate ESE. While a thorough exploration of their Guide is out of the scope of this paper, we are affirmed by the conceptual similarities and encourage K-12 environmental and sustainability educators to explore it as a valuable resource.

and its mindful centering of Four Branches for environmental inquiry that relate to these Indigenous concepts (*Natural Curiosity, 2nd Ed., 2*).

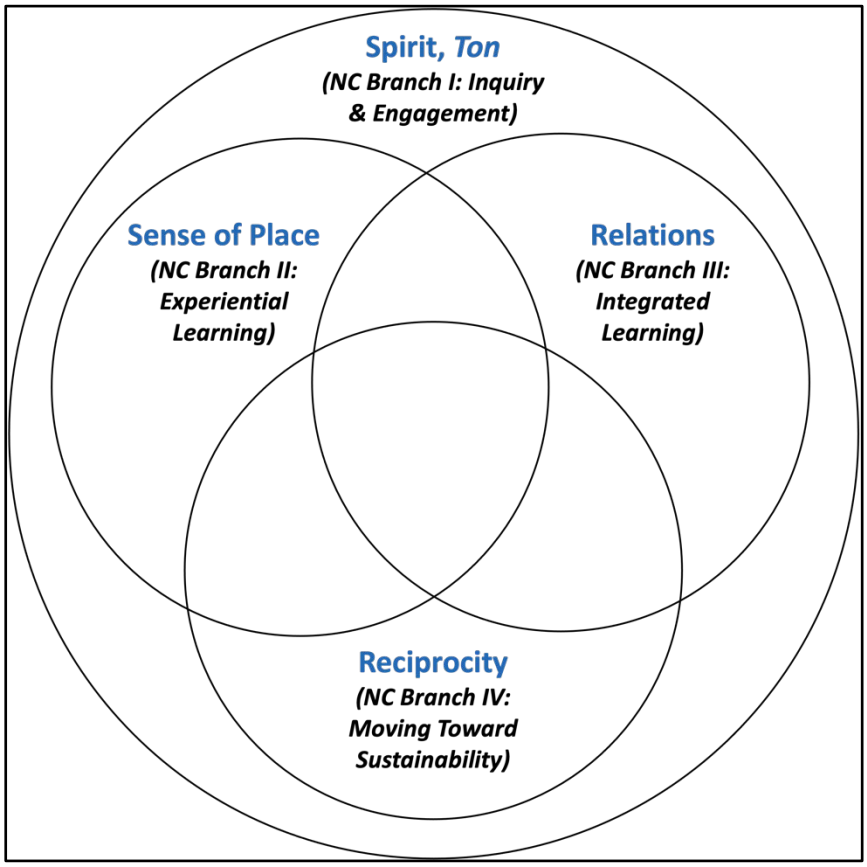

Fig. 3 A circular model of interrelated Indigenous concepts and values. One possible representation of Indigenous conceptions of permeating Spirit in relation to Sense of Place, Relations, and Reciprocity (in blue). As a curricular connection, we include descriptions of the Four Branches of Indigenous-informed K-12 environmental inquiry (in black; adapted from Anderson et al., 7).

Following Wilber (*Integral Spirituality*), we posit that Spirit may have at least three different manifestations in Integral conceptions (in addition to a common Western religious understanding of Spirit as an individual "soul"). One conception is Spirit as a "line of development," or an area of knowledge along which one can progress, as suggested by James Fowler's research on the development of stages (*Stages of Faith*) and types (*Faith Development*) of faith. Parallel

developmental lines might include logical, musical, or emotional lines; Stein and Heikkinen discuss how lines are analogous but not the same as Howard Gardner's multiple intelligences (109-110). Another conception is that Spirit may instead represent an individual's will, actions, and experiences *per se* as they quest toward the highest level along any developmental line.[5]

A third Western definition of Spirit is the notion of extending concern beyond one's egocentric self, or rather, diminishing the importance of ego altogether. We see this incrementally expanding awareness as core to motivating authentic Sustainability; in other words, whether for a K-12 curriculum or beyond, awareness and action must be embodied at the levels that learners can feel and conceptualize (Monroe et al. 791). A goal of Sustainability education, therefore, lies in widening these levels for learners. We revisit this with our Stewards again when they develop lesson plans to incorporate Spirit into Sustainable action.

While Western viewpoints employ individualistic framings of the Self and what it observes and values (both objective or subjective), Indigenous worldviews do not emphasize such compartmentalized views of Self or Spirit. They prioritize instead the primacy of unity/Oneness, as exemplified in the Lakota truth of *Mitákuye Oyás'iŋ*: "We are all related" (Kaelin 1; Cajete *Indigenous Community,* 268). Similarly, whereas an uninformed Western perspective may view rituals as isolated practices or performances, Indigenous thought recognizes ritual and ceremony as integrated representations of appropriate thought and action within systems of accountability and wider meaning (Deloria 203; Callicott 293). At TREE, we invite our Elders to participate in and lead optional Spiritual rituals for our Stewards (such as a Lakota pipe ceremony), but not as isolated, "low-context" snapshots of Indigenous culture (Cajete *Indigenous Community* 288).

[5] For example, high proficiency performance in mathematics or music may similarly engage Spirit to achieve something like Mihaly Csikszentmihalyi's Flow state; the state of Flow alone is not the manifestation of Spirit, but rather the meaning, effort, and Flow experience of that individual in combination.

Rather, we see these opportunities as epistemologically important invitations to reconnect with the value of Ritual itself and to integrate personal rituals—however, they may appropriately look—into their own lives. The impact of ritual was apparent to one recent Steward:

> Once Celinda began the ritual with the pipe, I felt calm and relaxed…Thoughts were flowing by me, and for the first time in my life, I felt as if I could acknowledge my thoughts and let them go without holding onto them. My mind was flowing seamlessly, like a river fueled by snowmelt from the highest peaks. Pure, clean water, flowing in unison, and excited to finally be free from the winter freeze.

Importantly, given the contentious history of cultural and intellectual appropriation of Indigeneity by Western Settlers, ESE educators included (Tuck 439), we must engage with any Indigenous thought—and ritual specifically—with humility, care, and commitment to Indigenous futures, recognizing that we are guests in such experiences. At TREE we are working to honor this commitment by increasing our relationships with—and the leadership of—Indigenous Elders, students, and community members; there is no appropriate engagement with Indigenous thought without the leadership of Indigenous people, and we hope to continue strengthening this leadership into the future.

Society

Following our introduction to the Indigenous and Western lenses of Science and Spirit, our curricular framework turns to the forces behind why these perspectives are often in conflict. We do so by interrogating why Western, linear worldviews have superseded other perspectives despite the growing evidence that such worldviews are incomplete and often counterproductive to sustainable, multigenerational thriving (Tannock; Tuck 439-446). We turn to the historical and present realities of settler colonialism, racism, and inequality (in our United States context) and to their consequences on environmentalism, environmental justice, and education writ large and on ESE in particular (Freire; Haluza-Delay 394-402; Stapleton 155-170).

Our focus on society as part of the Seven-S model comprises three threshold concepts, which we define as such for their troublesome and transformative nature (Barrett et al. 131). The first threshold concept is that imbalances of power in Society—and the legacy of white settler-colonialism specifically—have significant and accumulating consequences for individuals, cultures, and the world (Gilio-Whitaker; Tuck & Yang 1-40). We consider this awareness of historical and Societal influences as essential—not supplementary—to our undergraduate environmental educators' preparation (Arias and Drossman 24).

Our second threshold concept is that *knowledge itself* is mediated by Society and, as such, is shaped by the same imbalances of power and inequality (Bang & Medin 1008; Cajete *Native Science*). We explicitly discuss the valuing and silencing of divergent epistemologies, hoping that this explicit focus can help students lean into—rather than ignore—their positional subjectivity when practicing Scientific approaches, teaching students, or reflecting on their own actions (Harmin et al. 1489-1500).

Further, we encourage our Stewards to incorporate critical elements in their K-12 curricula, attending to their lessons' developmental and positional appropriateness. As part of this preparation, we continue to explore local and online resources for incorporating decolonial and Indigenous perspectives (e.g., Anderson et al. 7; Ziehr 811). Importantly, we clarify that incorporating these perspectives cannot be as superficial details to otherwise unchanged curricular plans. Drawing from Banks (247-266), Taylor (3), and others, we affirm the limitations of segmented and additive approaches to multicultural education. Rather, as described by Banks in his Transformational Approach, the curricula themselves must be fully transformed to uplift multicultural perspectives (Banks 260).

Our third threshold concept around Society is that, just as issues of power, epistemic validity, and environmental degradation have been reproduced by Society, such issues will only be fully addressed by intentionally considering Society. This perspective is seen in our emphasis that many of the questions and actionable steps for contemporary sustainability are not, in fact, scientific questions but rather political, economic, and educational questions—in other words, questions about Societies, how they act for or against sustainable thriving, and what can be done to reconcile these actions (Madden 284; Orr 237; Stevenson 139). Given this social and place-based approach to environmental questions, we emphasize local examples when discussing race, class, and other factors of lived experiences. Similarly, we emphasize issues relevant to the Northern Ute and nearby Indigenous communities when interrogating topics such as sovereignty, rematriation, and wellness. To frame these interactions between local places and people, we use Gruenewald's foundational pieces as well as more recent explorations of place-based Indigenous learnings (Gruenewald 3; Wooltorton et al. 931).

Interrelated Connections—Meeting of Circles

Science + Society = Systems, Relational Understanding

Our integral notion of Systems represents the study of collective-objective perspectives; from this Integral viewpoint, Systems would merit a fundamental quadrant (or circle) along with Science, Society, and Spirit (Table 1). However, there is logic to employing a metaphor of Systems as the intersection of Science and Society (Figure 2) since systems studies attempt to bridge social and natural science knowledge. Much has been written about how reductionist scientific approaches that objectify the natural world have led to a narrow understanding of environmental problems (e.g., Capra and Luisi) and even as a form of epistemic violence (e.g. Shiva; Vermeylen). However, these methods for understanding Systems broaden the conception

of Science from a reductionist approach to a more holistic—but not necessarily more spiritual or ethical—ecological approach.

Systems without Spirit

Esbjörn-Hargens and Zimmerman argue that though Systems epistemologies are more holistic than Science epistemologies, their objective roots do not overlap with the subjective Spirit (148-150). Modeling a system does not necessarily imply caring for it. This disconnection supports one of the long-held premises of environmental education – that knowledge of an environmental issue does not directly lead to action (Hungerford and Volk 258).

Objectivity is crucial for systems scientists like ecologists and economists. Fritof Capra notes that the principles of ecology include "interdependence, diversity, partnership, energy flow, flexibility, cycles, coevolution, and sustainability" (1). He further suggests that these ecological principles can also be called community principles that can be applied as education principles. He notes that the most important system skill is to perceive connectedness. But is perceiving a system the same as feeling part of a system? James Lovelock's Gaia hypothesis indicates the whole planet is a living system that comes closer to Spirit, but perceiving even an all-connected planet is not the same as an all-connected Spirit (Lovelock 278). Relatedly, contemporary Indigenous scholars assert that Systems Thinking is not equivalent to Holistic Indigenous Thinking (Hernandez 115-123). Simply because an approach takes on multiple disciplines or complex models to answer questions does not make it one rooted in care and relationships. When we encourage our Stewards to explore their situated lives and actions through the lenses of Western social and ecological systems, we emphasize that these purported connections are not inherently ethical or positive simply because they are multi-disciplinary or systemic.

To this point, we further recognized that matching our Integral conception of Systems with an Indigenous conception of Relations, while superficially tidy, would be an incomplete comparison without the recognition that Spiritual and ethical interdependencies are also implied within Relations, not just systemic relationships. These limitations of Systems as "Science and Society" (without Spirit) and the recognition that Indigenous conceptions of Spirit are not "individual-subjective" (as would be suggested by our first Seven-S model: Figure 2), thus compelled us to change our model to better convey these understandings. By moving Spirit to instead holistically contain the interrelationships between *Self*, Society, and Science (see Figure 4), we not only better connect to authentic Indigenous conceptions of spirituality, but also more clearly represent the value of both individual-subjective (Self) and holistic-encompassing (Spirit) ideas when relating to the world and others.

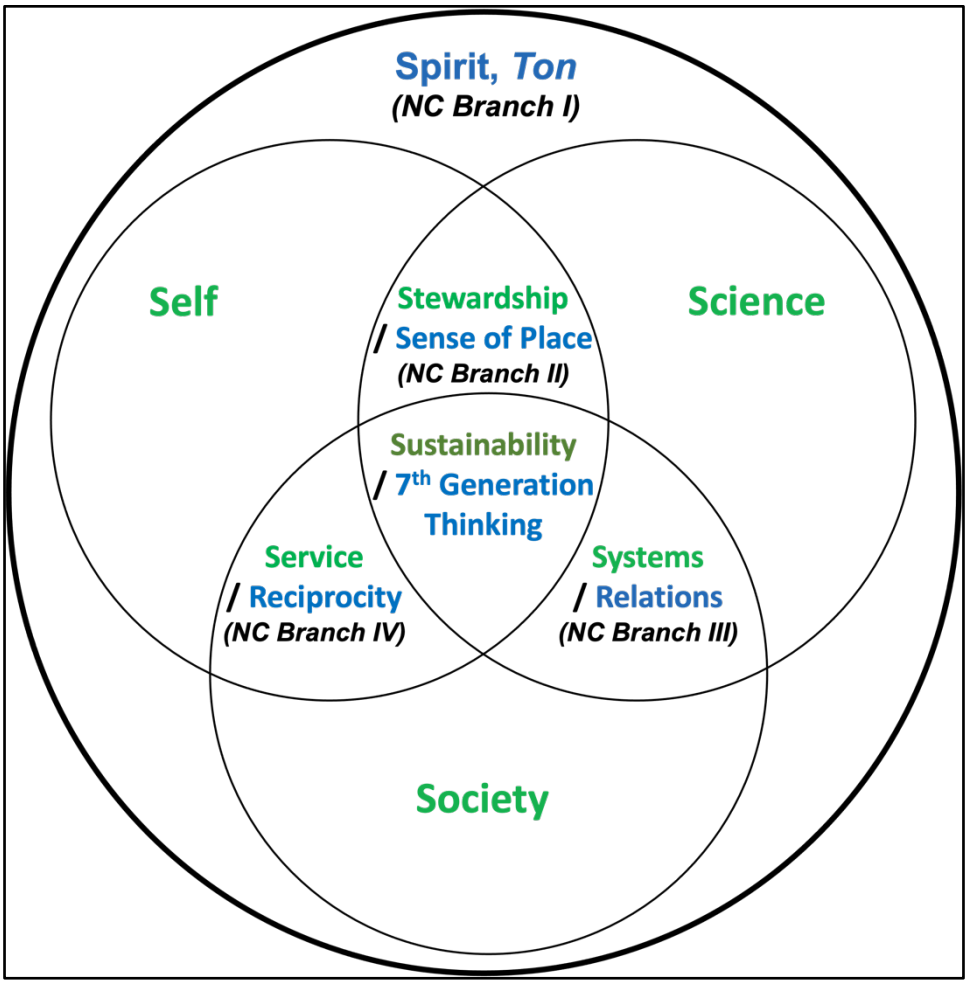

Fig. 4 Our finalized circular Seven-S Curricular Model for Sustainability, harmonizing Western Integral (green) and Indigenous (blue) epistemologies. Note the replacement of *Self* as the individual subjective that interrelates with other circles while *Spirit* takes a holistic-encompassing position. We also incorporate our visualization of *Natural Curiosity's (2nd Ed.)* Four Branches of Indigenous-informed K-12 environmental inquiry (in black; adapted from Anderson et al., 7).

Science + Spirit = Stewardship, Sense of Place

Whether conceptualized as Spirit or now more appropriately as "Self," an individual's embodied connections to their environment, homes, and land—their Sense of Place in and as part of the natural world—are fundamentally important in Sustainable living. These connections—and the environmental actions they may motivate—are what we name *Stewardship* in our Seven-S model. At TREE, Stewardship is understanding, participating in, and caring for Places and Relations—of which we are also part—whom have been entrusted to us for future generations

but whom we do not "own" (Anderson et al. 134; Welchman 303). Consequently, the nonprofit Catamount Center's mission is to "inspire ecological stewardship," and we label the TREE Semester undergraduates who take care of each other, the campus, and their students, as Stewards. This stewardship is manifested through, as many Elders teach, our "body, mind, emotions, and spirit" (Kaelin 3) or, similarly, through "care, knowledge, and agency" (Goodale et al. 2). Such qualities can all be fostered by connecting deeply with a place.

While stewardship implies a responsibility to care for a place, caring can arise from an obligation or duty (e.g., to God or others) rather than a relationship or kinship with the land (Lees and Bang 1). We believe the latter is a more generally motivating and authentic source of care, especially in our contemporary world; as such, we constantly seek ways to increase the amount and quality of time our Stewards connect with the more-than-human world. These experiences are embedded into our undergraduate curriculum as a personal nature journal, which may include prose, poetry, art, and whole-group projects. For one year's group project, for instance, each Steward undertook the slow, mindful process of felting a representation of themselves as a tree; they then combined the trees into an interlocking felted wool art piece that we still prominently display.

We continuously use our iterative developmental evaluation cycle to reorganize TREE based on Stewards' evaluation comments (Drossman 807). Historically, Stewards have admonished us for not creating enough space for such nature-connection activities, which sometimes become lost in their rush to complete their assignments and lesson-planning responsibilities. This year, we are addressing this shortcoming in our curricular attention to nature-connectedness by prioritizing more curricular time for forest bathing, outdoor tai chi, and guided meditation in addition to our ecopsychology teachings and Indigenous Elder-led hikes.

In addition to the personal Stewardship-cultivating exercises we create for our undergraduates, we also ask them to be the reciprocal cultivators of Stewardship for their K-12 students. For our undergraduate Stewards, translating their knowledge of and affinity for the land in which they live and teach into a 20-hour inquiry-based curriculum is perhaps their most direct Stewardship practice. Since our Stewards also follow the Seven-S curriculum model to conceive the lessons that they write and teach to their students over the semester, they dedicate time every teaching day to connect their fifth graders to the Land and Spirit through forest practice and guided meditation. Though most of their Stewardship as teachers happens outdoors, the Stewards also spend time in the K-12 classroom to lead their students in writing a scientific paper and preparing a group poster to present to each student in the school and to interested parents. As part of Stewardship is indeed the deep learning of Place through both Indigenous and Western Sciences (Kimmerer, "Searching for Synergy" 317), the scientific study of a place-based question allows our Stewards to integrate Science and Spirit to teach and learn Stewardship with their K-12 students.

Society + Spirit = Service, Reciprocity

If Spirit is conceived as an individual's development, lifeforce, and subjective connection with the world, and Society is the cultural and collective-subjective experiences of those around us and our predecessors, then the relationships between self and others are what comprise the overlap between Spirit (or Self) and Society. We acknowledge that these relationships may not always be positive and indeed—like the other overlapping circles—are multidirectional and complex. To align our own and our students' actions with our critical and Indigenous curricular values, we clarify why and how the relationship between Spirit and Society should aspire toward Service and Reciprocity if our ultimate goals are multigenerational Sustainability. We draw from

Gregory Cajete who shares, “The truth of relatedness is why Indigenous education is not only community-based but also communal…ensuring the well-being of both the community and its members” (Cajete 268, 287).

Through deepening our understanding of the relatedness of all things and an acceptance of the responsibility that comes with this consciousness, we hope that the need for participation in and service toward communities is abundantly motivating. To scaffold this consideration, we make explicit for our Stewards that it is fitting that Banks’ fourth and final level for integrating multicultural content is one of *Social Action* (161). In this approach, curricula are not only infused with various worldviews and emphases on marginalized perspectives (Banks’ third level) but are further constructed so that students “make *decisions* and take *actions* related to the concept, issue, or problem studied in the unit” (161). In other words, once learners truly internalize the significance of people and perspectives in their reality (and see that many are silenced or mistreated), the responsibility to act with and for others becomes clear. Importantly, guided by the indigenizing orientations of our Seven-S model, we attempt to convey the threshold concept that Service is not just an isolated act done for others. Rather, Service is a manifestation of gratitude and an understanding of Reciprocity: that we all have influence, depend on, and have duties toward one another and the world.

Like our other core elements, the TREE Semester acknowledges that Service is most authentic if it is incorporated into multiple elements of our program. It could be argued that teaching K-12 students is already an act of Service; we would agree – the orientation toward teaching younger students about the world and the many ways to know it is indeed one of our pillars of Service. However, the TREE Semester additionally incorporates intentional service components in our curricula to elaborate that they are neither supplementary nor optional, but rather central to our

programmatic outcomes. Historically, we encourage our Stewards to prioritize a Service component in both their elementary and secondary curricula. At the elementary level, this may look like a classroom-wide presentation to the other grades in the school or a letter-writing campaign to school leaders. Similarly, at the secondary level, the ecology or agriculture and nutrition units that our Stewards lead often culminate with school-wide campaigns or projects (Harness and Drossman 147).

Systems + Stewardship + Service = Sustainability, Seventh Generation Thinking

In arriving at our interrelated curricular center, which we call Sustainability, we return to the ideas of threshold concepts in sustainability learning. Loring suggests five threshold concepts; those that apply to this paper include complexity (systems thinking) and ways of knowing (epistemological diversity 182). Sandri also suggests that thinking about systems is a threshold concept (810). Barrett et al. suggest six threshold concepts for sustainability learning specifically connected to epistemological stretching, including how "the power of dominant beliefs (represented in discourse) supports and undermines particular ways of knowing and being as in/valid" (136). Within the centrality of Spirit and Indigenous epistemologies in Barrett et al.'s work, we again find corroboration that the Indigenous concepts of Sense of Place (which we incorporate as Stewardship), Relations (Systems), and Reciprocity (Service) are essential clarifications to an epistemologically rich Seven-S ESE curriculum model. Moreover, like many contemporary scholars of Indigenous futurity, we find the Haudenosaunee principle of Seventh Generation Thinking[6] a fitting referent for ethical Sustainability (LaDuke; Druker-Ibanez and

[6] First documented as a central principle of Haudenosaunee (Six Nations) decision-making and governance (Lyons 13), the accountability of decisions for Seven Generations into the future is a widespread Indigenous sustainability ethic, especially in relation to human thought, action, and—increasingly—legal responsibility for the environment (LaDuke 198).

Caceres-Jensen). As an ethic of mindful decision-making—the centering of Seventh Generation Thinking in our model is particularly appropriate because, ultimately, ours is an *educational* model for transforming human thought and action. Seventh Generation thinking connects considerations of natural, social, and individual understandings within a context of relational responsibility: a responsibility for (human) action that we must collectively accept if we are to contribute to the balance of sustainable life. To conclude our review of the Seven concepts around which we structure our undergraduate ESE education, and to reaffirm their integration with each other—and across Western and Indigenous ways of knowing—we offer a visual synthesis of our model in Figure 4. Our hope is that this model can serve, not only as a visual representation of the possible harmony across Integral and Indigenous conceptions of Sustainability, but as an explicit plan for how and why to structure undergraduate ESE education when striving for transformational development.

Continuing Directions

Limitations

In presenting this harmonized model for Integral and Indigenous-informed undergraduate ESE, we are attentive to Indigenous scholars' concerns about the inappropriate or unsanctioned application of Indigenous knowledge (McGregor 340–353; Tuck 442). Our intention of harmonizing perspectives is not to appropriate or temporarily observe. Rather, in contextualizing this curriculum within a semester-long, place-based, critical teacher preparation program, our hope is indeed for our Stewards to generate these environmental ethics within themselves authentically. We seek to appropriately respond to the demonstrated call for Indigenous perspectives in contemporary environmental and sustainability education for Indigenous and

non-Indigenous audiences alike—for the benefit of all people (McGregor 340–353; UNESCO, 1-3).

Our argument—that epistemological stretching by harmonizing Integral theory with Indigenous thinking at the undergraduate level leads to better-developed environmental leaders—is certainly open to criticism. However, by harmonizing Integral theory with Indigenous thinking, we can tap into a wealth of knowledge and wisdom that can truly transform our approach to environmental leadership, inspiring a hopeful future through divergent and critical lenses.

Refining Our Ideas and Models (Always)

As demonstrated by analyzing the nature of overlapping circles, our relational circular metaphor of sustainability (Figure 4) presents several challenges, especially when relating two epistemic perspectives without a third. As Esbjörn-Hargens explains, all experiences arise from all perspectives simultaneously, and thus, no single perspective fully captures anyone's whole experience. Analogously, Wilber's integral methodological pluralism suggests that any single epistemological lens only provides a partial truth. An Indigenous worldview honors the importance of relations, reciprocity, and place to address these limitations. Combining these with the integral-motivated epistemologies allows for more holistic conceptions of Stewardship. We approach this in our harmonized model of Sustainability (Figure 4), but perhaps an even more appropriate Indigenous-informed model, as suggested by Celinda Kaelin, would be one that emphasizes concentric encapsulation of all concepts (Figure 5). We are inspired in this realm by the work of Tyson Yunkaporta, an Australian Indigenous scholar, who uses simple symbols to clarify his main point about Indigenous epistemology in each chapter of his book, *Sand Talk*. Through each symbol, he illustrates the truthfulness of an Indigenous story (and its related

ontology); no words are required when the story's point is straightforward because the picture tells more than 1,000 words.

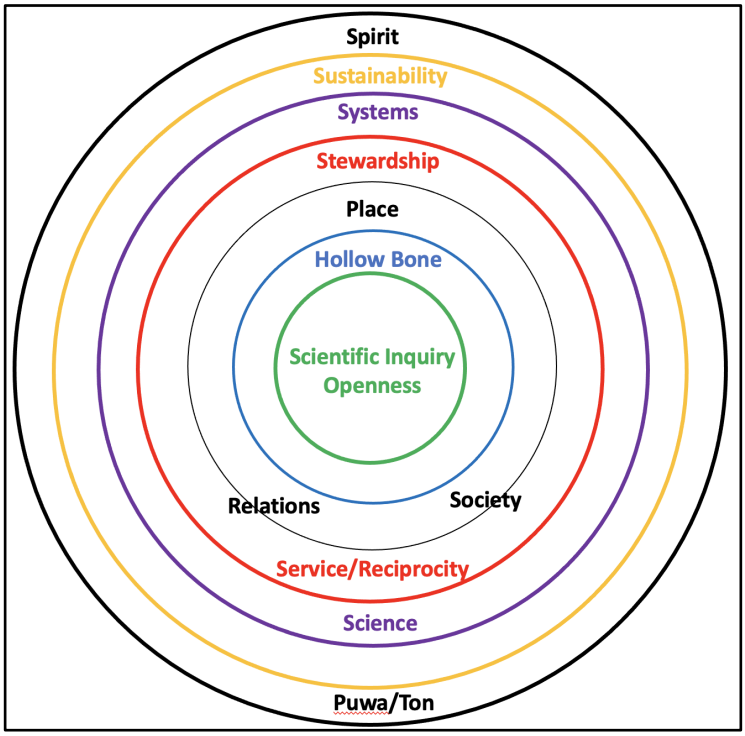

Fig. 5 The Seven-S Model as Concentric Circles. The concentric circles offer a possible metaphor for Indigenous Ways of Knowing, as suggested by Elder Celinda Kaelin. At its center, an invitation for openness to Scientific and Spiritual inquiry, embracing our role as the "hollow bone" through which Spirit can use us to heal others and the world.

Measuring Epistemological Development

Drawing from Harmin et al., our goals in the TREE Semester are to foster critical epistemological stretching for transformative development in our Stewards' conceptions of sustainability (1497). How, then, do we know if we are approaching these developmental goals? Gregory Bateson provides a more generalizable model of ecological learning and development. As Sterling (25) interprets Bateson's ecological model of learning, he posits that the lowest stage of learning is cognition (conforming); the next stage is metacognitive (reforming), but only the third stage (transforming) results in a change of worldview. Theo Dawson suggests that systems

thinking is a relatively high developmental level that typically starts toward the beginning of undergraduate work. Her research indicates that the average U.S. citizen never reaches this level. Our role as educators is to help future environmental leaders think at levels of complexity required to match the task of addressing wicked sustainability problems.

An Indigenous research approach suggests we may perceive success in this task intuitively, but a Western scientific approach often requires quantitative validity. Can we measure such development? A solely Science-based answer says, of course. A Society-based answer asks whether we should measure development. Moreover, to what ends? Is it a radical conception that we focus on our student's development when teaching about the environment and sustainability? Perhaps the best answer is what happens if we do not. The complexity of problems appears to be increasing along with our numbers and technologies. To address such issues, no human will likely understand the complexity required, but perhaps groups of people (perhaps assisted with emerging technologies) with enough epistemological humility can muster the capacity and collaboration to solve these problems.

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Biographies

Following, with gratitude, a model observed in Kennedy et al., we cite the authors and contributing Elders of this piece together in a convergent acknowledgment of Western academic and Indigenous Knowledge Systems (2-3). Howard Drossman and Juan Miguel Arias, the Professors guiding the TREE Program, collaborated to author the text of this paper. Elders Celinda Kaelin and Debbie Howell provided instrumental guidance in the framing of this work and offered appreciated suggestions and opportunities for critical reflection during its review. Their ongoing, years-long contributions to the TREE Semester have been essential in making it more epistemologically inclusive and transformative.

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Juan Miguel Arias is an Assistant Professor of Education at Colorado College. His research examines culturally sustaining and critical teaching practices in outdoor and environmental contexts. He received his PhD in Educational Psychology from Stanford University, as well as multiple awards in teaching and community service, including the Stanford Alumni Association Community Impact Award and the Kennedy-Diamond Award for Excellence in Community-Engaged Teaching and Research. Dr. Arias is a faculty mentor for the Colorado College Latine affinity group SOMOS, the Sustainable Reinvestment Coalition, and the Bridge Program for incoming students. To learn more, please visit his webpage at www.juanmiguelarias.com.

Contributing Elders

Celinda Reynolds Kaelin, *Unpan Oyate Win* (Elk People Woman), is a descendant of the Cherokee shaman, *Ugvwiyuhi Totsu'wha* (Red Bird), and an adopted member of the Oglala Band of the Lakota Nation. She is also an adopted member of the Tabeguache Band of the Ute Nation and worked as assistant to their spiritual leader for over 20 years. She follows Lakota Way as a Sun Dancer and carrier of the Sacred Pipe. Since 1998, Celinda has collaborated with the Catamount Center in reconnecting the Northern Ute Band to Tava, their sacred mountain. During this time, they have jointly hosted indigenous teachers/shamans from the World Council of Elders (150 First Nations). She has worked with the TREE Program since 2008, providing Ute and Lakota history and culture to inform their environmental studies. She is the author of six ethnographic books.

Debra (Debbie) Howell is a citizen of the Pawnee Nation of Oklahoma and a descendant of the Sisseton-Wahpeton Oyate of South Dakota. Ms. Howell was raised in her Native culture, traditions, and practices. She holds the position of Elder-in-Residence in collaboration with the Chaplain's Office at Colorado College, providing students with cultural, spiritual, and social support. She has extensive civic engagement experience with local and regional Indigenous and non-Indigenous populations on boards, advisory councils, and committees.

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