Paradigm Shifts, Threshold Concepts, and Sustainability at Santa Clara University

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This essay uses a first-year two-course critical thinking and writing sequence focused on sustainability as a case study to advance our understanding of the challenges and opportunities offered by required first-year writing courses. After summarizing research from multiple disciplines that have shaped my thinking, I have organized my reflections on ways my writing sequence can foster transformative learning about sustainability into two categories shaped by my reading:

- Relevance of threshold concepts to changes in ontology and epistemology
- Relevance of prior knowledge and structures of knowledge to learning

The essay explores ways the organization of knowledge related to threshold concepts can help students rise to the challenges of a paradigm shift necessary to achieve the transition to a sustainable world. Particularly significant are ways a Cartesian basis for ontology and epistemology undermine both teaching and learning related to sustainability.

A student who excelled in one of these sequences will be present to provide her perspectives and insights.

How can we teach writing so that we stop destroying ourselves?
Robert P. Yagelski

In 2004, David W. Orr wrote "No institutions in modern society are better equipped to catalyze the necessary transition to a sustainable world than colleges and universities." But he warned that the education must be less concerned with achieving “efficient corporate units” and aim instead to educate curious and open-minded adults. For many years Santa Clara University has encouraged curiosity and open-mindedness related to sustainability, “meeting the needs of

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the present generation without compromising the ability of future generations to do the same.”

In 2013, a collection of essays about strategies and stories related to Sustainability in Higher Education included “Weaving a Culture of Sustainability: Santa Clara University’s Evolving Story.” The story told there began in the mid-1990s, when student activists teamed up with administrators to launch an environmental resource assessment, and culminated with sustainability becoming part of the University’s strategic planning. Since 2011, Santa Clara’s vision has been to “educate citizens and leaders of competence, conscience, and compassion and cultivate knowledge and faith to build a more humane, just, and sustainable world,” and one of five priorities has been to advance “knowledge and understanding of the ways in which social justice and sustainability intersect” through teaching, research, and community engagement. For this conversation on Liberal Arts for a Fragile Planet, I will update Santa Clara’s story using a first-year two-course critical thinking and writing sequence focused on sustainability as a case study to advance our understanding of the challenges and opportunities offered by required first-year writing courses.

**Interdisciplinary Integration and the Complexity of the Whole Picture**

Contributing to my update are ideas from a variety of disciplines and perspectives. Publications about higher education increasingly emphasize sustainability. For example, Anthony Cortese, cofounder of Second Nature, a nonprofit organization helping “build a sustainable and positive global future through leadership networks in higher education”

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2 The Brundtland Commission defined “sustainable development” in *Our Common Future* (1987); I follow David Orr, *The Last Refuge*, 82, and others who draw on that definition to define sustainability.


4 [https://www.scu.edu/santaclara2020/priorities/](https://www.scu.edu/santaclara2020/priorities/). The Center for Sustainability website provides more information about the university commitment to sustainability: [https://www.scu.edu/sustainability/commitment/policy/](https://www.scu.edu/sustainability/commitment/policy/).
lists five action steps necessary to achieve transformative change in university systems. The first and most relevant to my particular courses is that “the content of learning will reflect interdisciplinary [emphasis added] systems thinking, dynamics, and analysis for all majors and disciplines with the same lateral rigor across, as the vertical rigor within, the disciplines.” In their 2015 book *Designing the New American University*, Michael M. Crow and William B. Dabars, citing Cortese’s recommendations, go even farther, arguing for a change in university structure *away from disciplinary specialization* [emphasis added] to support a “need to consciously search for ways to transcend our sociobiological impetus toward competition.” They note,

Science uses disciplinary organization to recognize and focus on questions that can be answered. Disciplines, in turn, are separated by methodology, terminology, sociology, and disparate bodies of fact that resist synthesis. Although disciplinary specialization has been the key to scientific success, such specialization simultaneously takes us away from any knowledge of the whole. Our science remains culturally biased and isolated. Western science is derivative of a philosophical model of domination and the manipulation of nature, as opposed to the acceptance of natural systems and dynamics.

Both Cortese and Crow and Dabars call for significant changes in higher education. Cortese writes, “our current higher education system is reinforcing the unhealthy, inequitable, and unsustainable paths that society is pursuing” and cites David Orr’s comment: “‘It is not a problem in education; it is a problem of education’” (20). Both books call for a change in

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mindset, specifying that campuses must “model economically and environmentally sustainable practices in . . . [their] operations, planning, facility design, purchasing, and investments,” and relate these efforts to the formal curriculum.7

Publications focused on learning and assessment of learning are also relevant to an understanding of sustainability as a subject matter and a mindset in higher education. For example, George D. Kuh and colleagues associated with the National Institution for Learning Outcomes Assessment (NILOA) directly address the economic sustainability of higher education in the concluding chapter of Using Evidence of Student Learning to Improve Higher Education: “For more than a decade, most of American higher education has been struggling with the painful realization that the economic model that sustained the academic enterprise in the past—and that allowed it to flourish—is severely strained and may no longer be sustainable.” 8 Less obvious, perhaps, is the relevance to paradigm-shifting, transformational learning of their recommendations about ways assessment can and should be used to enhance student learning. The seven strategies for “smart teaching” explored in How Learning Works,9 which builds on the recommendations with which the NILOA volume ends, are deeply relevant to the complexity of teaching and learning essential to the transformative learning necessary to achieve sustainability in and beyond higher education. More on that later in this paper.

Robert P. Yagelski, approaching sustainability from a Writing Studies perspective, which is interdisciplinary in its own right, suggests that we need to shift from Orr’s concern about the educational goal of achieving “efficient corporate units” to an ontological concern:

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7 Cortese, “Promises Made and Promises Lost,” 22; Crow and Dabars, The New American University, 234-35.
9 Susan A. Ambrose et al., How Learning Works: Seven Research-Based Principles for Smart Teaching (San Francisco: Jossey Bass, 2010).
as long as schooling, so potent a cultural institution, continues to foster a Cartesian sense of self, it remains an obstacle to realizing alternative ways of being that might enable us to confront the crisis of sustainability. And as long as writing instruction, a central component of schooling, continues to be based on a Cartesian view of writing, it will remain implicated in this [sustainability] crisis.”

Yagelski goes on at length to explore possible alternatives to the duality and hierarchy of the Cartesian worldview and, more specifically, to ways writing theory and instruction have encouraged thinking about writing as “an endless contest of meaning-making. And within the Cartesian worldview... that contest is exclusively intellectual, located within the realm of the Cartesian self that is conceived as fundamentally separate for the world around us.” He begins by exploring the crisis of sustainability as a social problem that has inadvertently been worsened by the Cartesian worldviews’ emphases on duality and hierarchy. He then proceeds to explore ways the powers of writing can be harnessed to inspire transformative thinking and action to create a more sustainable future.

Yagelski’s proposed alternative ontology aligns with Cortese’s, Crow’s, and Dabars’ call for a new mindset and can be understood as part of a paradigm shift in understanding of humans’ place in the cosmos with urgent relevance to ontology and epistemology. It also invites comparison to ideas proposed from the perspectives of quantum physics. For example, Parker J. Palmer (education) and Arthur Zajone (physics) argue in The Heart of Higher Education, A Call to Renewal: Transforming the Academy through Collegial Conversations,

11 Yagelski, Writing as a Way of Being, 74.
the new sciences of the 20th century are fundamentally different from those of the classical period, and any re-envisioning of higher education should take seriously what we have learned from them. It is imperative that we look at the higher education for the twenty-first century not through the lenses of Newton and Descartes but of Einstein and Bohr, whose science is not of matter and mechanism but of relationships and dynamic processes.12

Similarly, *The New Universe and the Human Future: How a Shared Cosmology Could Transform the World* by Nancy Ellen Abrams (history of science) and Joel R. Primack (physicist) invites reflection on ways new understanding of humans’ place in the cosmos, in light of quantum physics, can transform our behavior and ways of being.13 Although we might object to Abrams’ and Primack’s contentions about the specialness of earth and humans, their argument that a shared cosmology based on what quantum physics teaches us about relationships and dynamic processes can contribute to our understanding of the challenges related to sustainability. They argue that the “ultimate challenge for all people is to seek to understand nature *in order to harmonize our behavior with* nature, not just to exploit nature technologically while generating heaps of garbage and unhappiness.” They believe new understanding of the cosmos derived from quantum physics can move humanity beyond Newtonian assumptions that have contributed to unsustainable practices.14 All of these writers help me understand better some of the challenges my students and I encountered in my writing sequence.

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For example, I now realize the Cartesian view of writing explored by Yagelski may have been an obstacle to realizing alternative ways of being necessary for my writing sequence to achieve the course goals for my students’ thinking and writing. Although advances in understanding of writing and writing instruction informed my pedagogy and assignments, I may have been modeling the Newtonian and Cartesian lenses as ways of knowing and being when my goal would be better served by emphasizing relationships and dynamic processes.

Writing About Sustainability: A Two-Course Sequence for First-Year Students

Now, more about my courses. Writing About Sustainability, was approved to satisfy Santa Clara’s Core first-year writing requirement in 2008. I developed the readings and writing assignments in collaboration with another faculty member after we participated in a workshop that was part of the initiative to weave a culture of sustainability at SCU, and we both taught courses in the sequences in 2008 and 2009. Since then a number of other faculty have offered sequences with the same topic. Our course sequences share learning objectives (provided as an appendix) with all first-year writing sequences approved for Core credit, but we are invited to address those learning objectives through a topic we care deeply about.

During the 2015-16 academic year, after a five-year stint in administration, I taught two Writing About Sustainability sequences, one during fall and winter terms, the other during winter and spring terms. I updated my reading and writing assignments (understanding of sustainability had changed considerably), went paperless by using Santa Clara’s course-management system to communicate course information and requiring electronic submission of all student work, and added ePortfolios as a tool for student learning and reflection. However, the course goals in the earlier and more recent versions of the sequence were nearly identical. My syllabus for the first course specifies,
This course begins a two-course sequence that provides an introduction to academic reading, thinking, and writing through exploration of the topic of sustainability, which Santa Clara University defines in the context of decision making:

A sustainable decision balances impacts on the environment, social well-being, and economic systems. Sustainability is about taking the long-term approach and considering systemic effects when making decisions. Sustainability involves three components for improving the quality of life for all: environmental protection, economic development, and social development. The formal definition is "meeting the needs of present without compromising the ability of future generations to meet their own needs."\(^1\)

A second main topic for the course will be evidence: how to find it, how to evaluate it, and how to present it effectively in light of rhetorical knowledge. Each essay assignment for the course will require students to think about how other writers present their evidence and how evidence can be presented most effectively in various kinds of essays.

In connection with both these topics, we will consider the power of scientific and other methods of developing and testing hypotheses as they are represented in published essays and as students use them to develop their own essays. Activities and assignments for the course are designed to increase students’ knowledge about sustainability and to provide practice related to the learning objectives for all Critical Thinking & Writing classes at Santa Clara University.

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\(^1\) This statement is from a website that changed significantly between 2008, when I developed the course, fall 2015, and the present. The Office of Sustainability is now a Center for Sustainability. The website no longer defines sustainability, but it provides a history of sustainability at Santa Clara: [https://www.scu.edu/sustainability/about/history/](https://www.scu.edu/sustainability/about/history/).
Nothing in these goals is explicitly Cartesian. However, as I think about my writing assignments and my responses to the texts my students produced, I am increasingly aware of a tension between my unexamined Cartesian assumptions and the goals of my course. I am especially aware of the focus on the writing—the texts to be evaluated and determine a grade for student work—perhaps to the detriment of a focus on the writers writing and ways their writing could be transformative.

**Cartesian Obstacles to Transformative Learning?**

As I read my students’ ePortfolios at the end of each course, I was very proud of ways the texts my students presented for evaluation were evidence of growth in understanding of the complex issues related to sustainability and my students’ ability to articulate complex ideas in rhetorically sophisticated ways. The research, analysis, and evaluation in essays written in the second quarter of the sequence, about root causes of problems related to sustainability, were especially gratifying. Nearly every student had struggled in their research on solutions to problems related to sustainability with the challenge of distinguishing between intermediate causes and root causes. Yet most of the students provided evidence in the ePortfolios that they understood root cause analysis and its relevance to their topic. For example, some students evaluated a range of attempts to solve problems related to large-scale agriculture, especially meat production, and concluded that a primary impediment to progress has been lack of attention to socio-economic root causes, especially marketing of inexpensive meats through the fast-food industries. Several students explored the influence of federal economic policy on unsustainable consumer habits/practices. Others grappled with the conundrum that unintended consequences of automation and artificial intelligence may put human culture at great risk. Although the quality of thinking and writing was not even across all of my students, I was convinced each had made
significant progress toward achieving their potential as writers and thinkers at that point in their undergraduate studies. I also believe each understood to some extent the importance—even urgency—of action related to our topic. Now I wonder, however, to what extent the teaching contributed to transformation of the academy and the learning was transformative for the students, my larger goals.

Numerical evaluations at the end of each term initiated my questioning. Although the numbers aligned with my assessment of improvement in my students’ writing and thinking (for example, spring quarter 94.5% of students agreed or agreed strongly that my feedback on writing and availability outside class were helpful), I was not happy with the overall student evaluations. In particular, 44.5% of the students in my spring section of Critical Thinking & Writing 2 reported that my instruction did not help them grasp key concepts in the course, and 47% reported that I did not use class time in a manner that enhanced their learning. Numerical responses for other sections were similar. Therefore, I am using this Gaede conversation as an opportunity to reflect with you on the opportunities and challenges for transformative learning offered by courses like mine, especially when teachers draw on new understanding of how people learn and of ways the Cartesian worldview has contributed to teaching and learning in the United States.¹⁶ I have organized my reflections into two categories shaped by my reading:

- Relevance of threshold concepts to changes in ontology and epistemology
- Relevance of prior knowledge and structures of knowledge to learning

I will focus on ways the organization of knowledge related to threshold concepts can help students rise to the challenges of the paradigm shift necessary to achieve the transition to a

¹⁶ Kuh et al., *How People Learn* and Ambrose et al., *How Learning Works* are important resources related to learning. The Introduction and chapters one and two in Robert P. Yagelski’s *Writing as a Way of Being* articulate the negative effects of the Cartesian worldview on teaching and learning.
sustainable world. Particularly significant are ways a Cartesian basis for ontology and epistemology undermine both teaching and learning related to sustainability.

**Threshold Concepts, Ontology, Epistemology**

Extensive reading and thinking about threshold concepts related to writing studies and sustainability have helped me better understand the challenges for pedagogies aimed at transformative thinking and learning. In 2006, J. H. F. Meyer & R. Land described threshold concepts “as akin to a portal, opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress.”\(^{17}\) Learning related to threshold concepts usually is *transformative; integrative; irreversible;* and frequently *troublesome.*\(^{18}\) While threshold concepts were originally conceived as relevant to particular disciplines, more recently scholars researching writing studies and sustainability—both interdisciplinary endeavors—have identified threshold concepts for learning related to writing and sustainability.

Researchers at the University of Saskatchewan identify six threshold concepts they believe “can be used as curricular guideposts to disrupt the socially constituted separation, and hierarchy, between humans and the more-than-human.” In their view, transformative sustainability learning “recognizes that the capacity to work with multiple ways of knowing is

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\(^{18}\) The website “Threshold Concepts: Undergraduate Teaching, Postgraduate Training, Professional Development and School Education: A Short Introduction and a Bibliography” includes four additional threshold concepts and provides access to extensive resources (http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html).
required to effectively engage in the process of sustainability knowledge creation.” They list six threshold concepts for sustainability:

- there are different ways of knowing;
- we can communicate with non-human nature and non-human nature can communicate with us;
- knowing is relational;
- transrational intuition and embodied knowing are valuable and valid ways of knowing;
- worldview is the lens through which we view reality;
- the power of dominant beliefs (represented in discourse) supports and/or undermines particular ways of knowing and being as in/valid.19

Even if we do not accept their contention that non-human nature can communicate or that “transrational intuition and embodied knowing are valuable and valid ways of knowing,” the other concepts clearly are fundamental to sustainability—and to ways of being.

In 2015 Linda Adler-Kassner and Elizabeth Wardle edited Naming What We Know: Threshold Concepts of Writing Studies, in which 31 scholars join them in naming 37 threshold concepts for writing studies, clustering them into five overarching concepts, and exploring their relevance to writing studies.20 The main concepts are

1. Writing is a Social and Rhetorical Activity
2. Writing Speaks to Situations through Recognizable Forms
3. Writing Enacts and Creates Identities and Ideologies
4. All Writers Have More to Learn

5. Writing Is (Also Always) a Cognitive Activity

The threshold concepts identified by these two groups of scholars invite me to think about ways Cartesian ontology impedes the transformative learning higher education values. For both sustainability and academic writing, Cartesian emphasis on duality and traditional hierarchies can impede the conceptual transformations and shifts in subjectivity characteristic of threshold concepts. Yagelski identifies three components of a Cartesian worldview that undermine writing pedagogy:

- an understanding of language as a relatively unproblematic conduit for thought;
- an essentially positivistic conception of knowledge as separate from the knower;
- a sense of the self as an autonomous, thinking being.21

Yagelski urges writing instructors to interrogate understanding of writing as “an expression of Cartesian ontology” which views writing as “a physical artifact of the Cartesian self declaring itself to be and defining itself as metaphysical entity.” The belief in writing as “a visual, tangible record of the abstract, metaphysical being that we become as writers,” Yagelski argues, “is a concrete reminder of what Descartes believed: that thinking is what makes us who we are.”22

Although the authors of Naming What We Know don’t refer to a Cartesian worldview or ontology as relevant to the threshold concepts they identify and Yagelski does not name threshold concepts in his discussion of ontology, duality, and sustainability, ideas in the two books helped me understand both better.

In his Preface to Naming What We Know, Ray Land describes an observation early in his work on threshold concepts:

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21 Yagelski, Writing as a Way of Being, 45.
22 Yagelski, Writing as a Way of Being, 45.
the conceptual transformations and shifts in subjectivity students experienced in various disciplines we investigated were invariably and inextricably accompanied by changes in their own use of discourse. More than that, we observed how an encounter with unfamiliar discourse, or different uses or forms of language, often was the trigger that provoked a state of liminality and subsequent transformation in their understanding of a particular phenomenon.23

Certainly reading Naming What We Know provoked in me “a state of liminality and subsequent transformation” that helps me understand better the numerical evaluations of my teaching. It might be the case that just over 50% of my students shared in that transformation—before I had a vocabulary to describe it—but others didn’t. Now I can see that Yagelski’s discussion of ways mainstream writing pedagogies depend on a Cartesian world view and undermine the goals of composition theory likely has relevance to the challenges of pedagogies related to sustainability and thus is especially valuable for my courses. It is my hope that my shift in understanding will help me better assist students with the troublesome knowledge of writing and sustainability.

**Relevance of prior knowledge and structures of knowledge**

Because transformational learning related to writing and sustainability is troublesome, advances in understanding about how learning works is especially important. Fortunately, in 2000 the National Research Council published an expanded edition of How People Learn: Brain, Mind, Experience, and School and in 2010 Jossey Bass published How Learning Works: Seven Research-Based Principles for Smart Teaching. Both books aim to help teachers apply the science of learning to classroom practices. Both books help me understand ways I can improve

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23 Ray Land, “Preface,” Naming What We Know, xi.
my classroom practices to meet the needs of students with great differences in experience and preparation for college-level critical thinking and writing. Both *How People Learn* and *How Learning Works* draw attention to the importance of “the relationship between the organization and representation of knowledge and the purpose of learning that knowledge.”^{24} Chapter two in *How Learning Works*, “How Does the Way Students Organize Knowledge Affect Their Learning?” provides research from multiple disciplines to demonstrate that ability to organize knowledge is a significant difference between novices and experts. That research suggests careful attention to structures of knowledge that allow experts to recall or find information and use it effectively can improve student learning by helping them “develop more connected, meaningful, and flexible ways of organizing their knowledge.”^{25}

Before reading these books, I had not thought much about my own structures of knowledge. However, with hindsight I recognize the complex networks of information I draw on in my teaching and research. I have been aware for a long time that interdisciplinarity enriches my research and writing on medieval and early modern writers. In addition, teaching a broad range of Core courses, especially first-year writing, has expanded my knowledge base. Serving as Director of Santa Clara’s Core Curriculum and Associate Provost for Undergraduate Studies resulted in my gaining considerable information about subject matter taught in Core courses and ways colleagues enhance learning of complex subject matter. One of the features of the Core launched in 2009 was increased interdisciplinarity. For example, a Science, Technology & Society requirement replaced a Technology requirement, acknowledging the reality that social issues always affect science and technology and there are no social issues these days not affected

^{24} *How People Learn* identifies “the relationship between the organization and representation of knowledge and the purpose of learning that knowledge” as an important area for new research on the science of learning, 281.

by science and/or technology. Also important, in my view, was Santa Clara’s goal of integrating knowledge related to sustainability into as wide a range of courses as possible rather than requiring a single course focused on sustainability. Every year staff in the Office of Sustainability track the number and range of courses that include at least a unit or component related to sustainability.

These books on learning heighten my awareness of ways all of my years of teaching and learning contribute to the knowledge structures I draw on unconsciously. More important, they enhance my ongoing awareness of the very different prior knowledge students bring with them to college with new appreciation of the importance of differences in knowledge structures. Chapter two in *How Learning Works* focuses on the principle “How students organize knowledge influences how they learn and apply what they know.” Figure 2.1 provides a visualization:
The authors of *How Learning Works* suggest 11 strategies for instructors “to assess their own knowledge organizations relative to students’ and help students develop more connected, meaningful, and flexible ways of organizing their knowledge.” It helps me that the authors begin this section of the chapter by acknowledging “It can be difficult for experts to recognize how they organize their own knowledge, and thus difficult for them to communicate this organization to students.” It also helps me that they not only recommend that instructors share the organizational structure of the course and the organization of each unit or other component of the course with students; they also recommend strategies clarifying that there is no one correct knowledge structure. For example, one strategy calls for assignment design clarifying that different tasks draw on different knowledge organization. They specify, “it can be helpful to analyze the tasks assigned to determine what kind of knowledge organization would best facilitate learning and performance. Then you might consider providing your students with a skeletal outline or template for organizing their knowledge.” They also suggest using contrasting examples or situations that “share many features but differ in critical ways” to “help students develop more sophisticated and nuanced ways of organizing knowledge” and encouraging students to explore multiple organizing structures.

But the complexities of recognizing and communicating the knowledge structures I am drawing on, helping students recognize knowledge structures implicit in texts they are reading and become aware of the thinness or richness of their own knowledge structures, are only part of the challenge. Increasingly scholars of thinking and writing draw attention to disjunctions between beliefs in relativism, that there is no absolute truth unifying human knowing, and the

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goal of writing instruction to foster ethical reasoning, truthful discourse, and ways of being that contribute to a more just and sustainable society. My unexamined Cartesian assumptions and awareness of theory inviting thinkers to be wary of assertions of Truth may have worked against my goals for writing instruction and transformational learning related to sustainability.

Aware of these shortcomings, I recognize that my sequence at the very least made students more aware of central issues contributing to unsustainable practices and offered them opportunities to practice writing and rewriting in ways that allowed them to become more articulate about complex problems. Now I am more ambitious. I propose offering learning experiences that will make sense to more students by

- drawing and building on strategies presented in *How Learning Works* and other similar texts to heighten student awareness of their ways of knowing and being
- distinguishing more clearly between writing as a *document* to be evaluated as evidence of mastery of learning objectives and writing as an *activity* designed to foster thinking and transformative being
- using strategies to increase awareness of the complexity and importance of understandings of truth and value as they relate to ethical production of texts contributing to an ongoing conversation about sustainability.

To achieve this I will need to be more thoughtful and transparent about ways I use the course management platform and ePortfolios.

The course management platform provides structures that I found quite perplexing in my first year using it in my teaching. The navigation system lists multiple categories such as announcements, assignments, discussions, grades, people, pages, files, syllabus, modules, and
collaborations. I had trouble understanding the potential relationship among assignments, pages, files, and modules and ways those could relate to the syllabus. Perhaps more problematic, the software made it easy to revise—but not so easy to make sure revisions appeared in every appropriate category. I now realize that my structure needs to be clearer and it shouldn’t change during the term. My new structure and revised assignments will draw heavily on the strategies elaborated in *How Learning Works*.

To gain insights into prior knowledge about sustainability, I will use another recommendation in chapter one of *How Learning Works*: a concept map activity asking them to arrange and connect a list of categories (such as economy, equity, environment, carrying capacity, climate change, waste, pollution, ecosystems, agriculture, energy), labeling the links. That assignment can be followed by discussion of Jon Jensen’s claim, “teaching sustainability is not simply teaching about sustainability. Rather, the goal is to equip students with the skills and habits of mind necessary to move towards sustainability.”

28 This assignment can lead to teaching strategies and assignments suggested in chapter two of *How Learning Works* aimed at understanding and evaluating knowledge structures: “Explicitly Highlight Deep Features,” “Make Connections Among Concepts Explicit,” “Encourage Students to Work with Multiple Organizing Structures,” “Ask Students to Draw a Concept Map to Expose Their Knowledge Organizations.” The authors of *How Learning Works* review “research pointing to the fact that it is not just what you know but how you organize what you know that influences learning and

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performance. Knowledge organizations that include more interconnections and that are based on
deep and meaningful features tend to be effective in supporting learning and performance.”

I will also use the modules of the course management tool to clarify the knowledge
structures of my courses. This requires me to think beyond the sequence of assignments I have
always attended to as important to learning. Each assignment, whether formal or informal,
graded or not graded, is meant to be part of a logical sequence culminating in the presentation of
revised work in the ePortfolio. However, I now realize the knowledge structures of the course
require more elucidation. The first module, which in the past was called Knowing and
Questioning, will be more clearly related to ontology and epistemology, and the assignments will
all relate to sustainability (in the past I allowed the first paper to be on any personal experience
related to belief and skepticism). Readings will trace the history of the divergence and more
recent convergence of science and religion, erosion of confidence in science and religion as
sources of truth, and the history of skepticism about sustainability. I will clarify that the
assignments in the module are designed to increase understanding of sustainability and prepare
for research later in the course and sequence, when they will need to evaluate claims, evidence,
and reasoning in writings they draw on to support their analysis and argument. As I revise the
assignments, I will continue to draw on strategies suggested in How Learning Works to assist
students in developing mastery of writing conventions and a complex understanding of
sustainability.

The new second module will pull together ideas from a variety of sources to engage
students with Yagelski’s idea that writing is “a way of being in the world” and “a practice of

29 Ambrose et al., How Learning Works, 65.
truth-seeking that is characterized by . . . reflection on our experience of ourselves in the world” and “can move us beyond the entrenched dualities of a Cartesian view of writing and toward a connected sense of self that can become the foundation for imagining and creating more just and sustainable communities.”30 The assignments I have used in the past are likely to be more successful in this context. I ask students to select an issue related to sustainability that is their topic for three assignments:

- a report on key issues in a topic related to sustainability;
- a group project facilitating class exploration of the complexity of the topic;
- a Rogerian argument about the topic designed to engage readers whose views likely differ from the author’s views and demonstrating their understanding of multiple perspectives on the topic.

The final assignment for the module and course requires students to investigate and report on ecological citizenship in the Santa Clara University community. A recent book by one of my colleagues clarifies ways virtue ethics can be a unifying element of the module. In Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting, Shannon Vallor coins the term “technomoral virtues” and provides a thoughtful discussion of virtue ethics as a means to shape what she calls a “technosocial future” worth living, in contrast to the “terrestrial resource depletion, . . . rising ecological instability,” “increasingly dis-ordered geopolitics and widening fractures in the public commons,” and “amplification of consumerism by converging innovations and ever-shorter product marketing cycles” while “the relationship between science, governance, and public trust is increasingly contentious and unsettled.”31

30 Yagelski, Writing as a Way of Being, 134.
A third module will relate to rhetoric and writing. While the two sustainability modules will be sequential, assignments in the rhetoric and writing module will make the categories of writing instruction in the course explicit. For example, rather than beginning the course with summary assignments to test comprehension of complex texts, I will begin with in-class brainstorming followed by informal written student assessment of their prior knowledge about academic writing (two suggestions in chapter one of *How Learning Works*). That will allow me to see a baseline of their writing ability in response to a far less demanding task than summary. It will also provide an introduction to many of the threshold concepts of writing studies, such as “Writing is Informed by Prior Experience” (one subcategory of concept three, “Writing Enacts and Creates Identities and Ideologies”) and concept four, “All Writers Have More to Learn.” I will need to pay attention to a likely tendency to see dualism in the design of the course (writing/sustainability) and emphasize the complex interconnections of the threshold concepts for both subjects and the learning I am encouraging.

In addition to using modules in the course management system to clarify the course structures and relationships among the assignments, I also need to recognize the differences between ePortfolios designed to foster thinking and learning and ePortfolios curated to demonstrate mastery of learning objectives. In a session of the Association of American Colleges and Universities (AAC&U) General Education and Assessment meeting February 23-25, 2017, focused on “Using Design and Folio Thinking Principles to Promote Innovation in General Education,” Helen Chen and Micah Lande distinguished between learning portfolios and showcase portfolios in ways that encourage me to create separate expectations for two ePortfolios to be developed by each student. The learning portfolios can be messy and demonstrate struggle with threshold concepts and new, complex information. The showcase
portfolios will allow students to present evidence of their success engaging with the learning objectives of the course. I have yet to decide how best to integrate the course management system with the ePortfolio platform, but recognizing the need for two separate uses of ePortfolios is a good first step.

Also important will be recognition that my responses to student work in the two portfolios should be significantly different. Yagelski suggests providing discursive written responses to writing to encourage writing as a way of being. That practice might lead to learning portfolios with an ongoing dialogue about writing between each student and me. The course management system provides a convenient tool for annotating student work with comments. That kind of feedback would aim to help students improve their writing as part of a recursive process of thinking, drafting, revising, expanding, cutting, editing, and proofreading for the showcase portfolio. One challenge will be helping students move beyond a Cartesian view of the two portfolios, seeing them as mechanisms helping them make sense of the big picture created by their work for the course.

In *High-Impact ePortfolio Practice: A Catalyst for Student, Faculty, and Institutional Learning* (published in association with the AAC&U), Bret Eynon and Laura M. Gambino provide additional insight into the power of ePortfolios and multiple examples of ways faculty at 24 campuses have implemented high-impact ePortfolio practices. Chapter 3, “Integrative ePortfolio Pedagogy,” focuses on the second “value proposition” named in the introduction: “ePortfolio practice done well makes student learning visible and supports reflection, integration, and deep learning.” The authors report on success at participating schools when they drew on a

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“four-part framework for reflection, the active process at the heart of integrative ePortfolio pedagogy” derived from a 2002 article by Carol Rodgers, “Defining Reflection: Another Look at John Dewey and Reflective Thinking.” Rodgers identifies four principles for meaningful reflection:

- Reflection as Connection
- Reflection as Systematic & Disciplined
- Reflection as Social Pedagogy
- Reflection as an Attitude Towards Change

These categories will be particularly relevant to advancing understanding of sustainability.

After describing assignments and results achieved by the participating faculty, Eynon and Gambino conclude that these experiences “confirmed that integrative social pedagogy that engages students in regular opportunities to reflect and connect their learning stands at the core of what it means to do ePortfolio well.” In particular, “reflective activities . . . help students sustain their focus on learning, make integrative connections, and find larger meaning in their educational experiences.” They also help students “build vital capacities for integration and purposeful self-authorship.” These capacities align well with other goals of my courses.

But the reflection assignments will have to be carefully designed. During the 2015-16 academic year my thinking about reflection changed considerably. I began by transferring an end-of-term reflection assignment I had used for many years in paper portfolios showcasing student work, simply asking students to reflect in writing on what they had learned and use that

as an introduction to their portfolio. However, reading and conversations with colleagues clarified for me that I should teach reflection as a mode of writing, not simply assign it. I now realize it will be useful to assign reflection at intervals throughout each quarter as part of the learning ePortfolio. Then students can decide to what extent they want to include reflection in their showcase portfolios. Kathleen Blake Yancey’s *Reflection in the Writing Classroom* will be a valuable resource.36

Randall Bass, who contributed a discussion of social pedagogy to *High-Impact ePortfolio Practices*, writes about ways “innovative ePortfolios practices can help solve problems and meet challenges that institutions did not have 30 years ago. This is where the true power of ePortfolio may lie—in its capacity to push toward new practices and a new paradigm, while at the same time operating under the design constraints of current structures.”37 He cites an earlier publication that described institutions that foster student engagement and persistence as cultivating “positive restlessness” in how faculty and staff “think about themselves and what they aspire to be.”38 I believe the impact Bass describes can be cultivated in first-year writing sequences focused on sustainability. Foregrounding the organization of knowledge related to threshold concepts can help students rise to the challenges of the paradigm shift necessary to achieve the transition to a sustainable world.

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Learning Goals for Critical Thinking and Writing 1 & 2

Critical Thinking: The ability to identify, reflect upon, evaluate, integrate, and apply different types of information and knowledge to form independent judgments

Complexity: An approach to understanding the world that appreciates ambiguity and nuance as well as clarity and precision

Communication: Interacting effectively with different audiences, especially through writing, speech, and a second language.

Learning Objectives for Critical Thinking and Writing 1

1.1 Read and write with a critical point of view that displays depth of thought and is mindful of the rhetorical situation. (Critical Thinking, Complexity, Communication)

1.2 Write essays that contain well-supported arguable theses and that demonstrate personal engagement and clear purpose. (Critical Thinking, Communication)

1.3 Reflect on and/or analyze the rhetorical differences, both constraints and possibilities, of different modes of presentation. (Critical Thinking, Complexity)

1.4 Reflect on the writing process as a mode of thinking and learning that can be generalized across a range of writing and thinking tasks. (Critical Thinking, Complexity)

Learning Objectives for Critical Thinking & Writing 2

2.1 Read and write with a critical point of view that demonstrates greater depth of thought and a more thorough understanding of the rhetorical situation than in CTW 1. (Critical Thinking, Complexity, Communication)

2.2 Write research-based essays that contain well-supported arguable theses and that demonstrate personal engagement and clear purpose. (Critical Thinking, Complexity, Communication)

2.3 Independently and deliberately locate, select, and appropriately use and cite evidence that is ample, credible, and smoothly integrated into an intellectually honest argument. (Complexity, Communication)

2.4 Analyze the rhetorical differences, both constraints and possibilities, of different modes of presentation. (Critical Thinking, Complexity)

2.5 Reflect more deeply than in CTW 1 upon the writing process as a mode of thinking and learning that can be generalized across range of writing and thinking tasks. (Critical Thinking, Complexity)