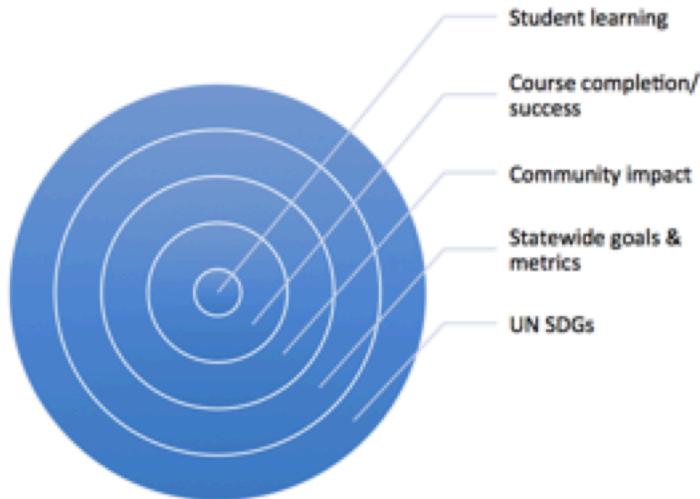


Measure What Matters (And Everything Matters): Assessing Sustainability Initiatives

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Assessing sustainability initiatives is a matter of focus. As the above “target” graphic illustrates, zooming in on one aspect often puts others at the periphery. What’s at the center for you? Some colleges keep great data on community impact, but don’t assess student learning about sustainability. On the other hand, assessing student learning addresses different questions and issues than assessing community impact. As the adage goes: “Measure what Matters.” However, in the case of sustainability, everything matters!

What resources and methodologies are available for your assessment? What matters to you, your students, your campus leadership, your community and state, and your accreditation agencies? This chapter provides ideas for designing a streamlined multi-pronged assessment model, based on Kapi’olani Community College’s *Engagement, Learning and Achievement* framework (KELA). The chapter lists available tools for monitoring the multiple impacts of campus sustainability initiatives, including the Community College Survey of Student Engagement (CCSSE), participant-observer research, pre- and post-testing, Student Assessment of their Learning Gains (SALG), the Sustainability Literacy Test (Sulitest), a reflection essay evaluation protocol, and the Carnegie Foundation.

STUDENT ENGAGEMENT, LEARNING AND ACHIEVEMENT

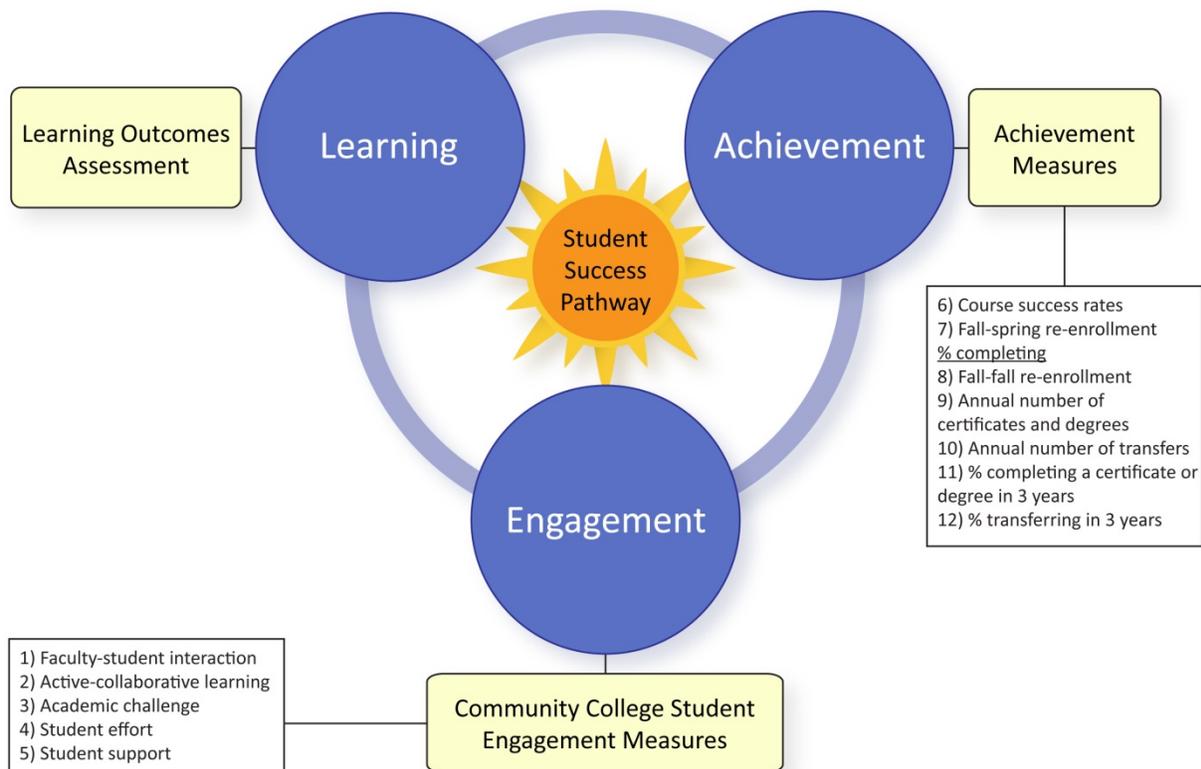
Community colleges in the U.S. are intently focused on student achievement: retention and completion numbers, liberal arts transfer, career and technical education degrees, job placement and even starting salary. But, as uniquely American institutions, from their inception

more than 110 years ago, community colleges are also preparing their students for the work of democracy and informed participation as citizens engaging in democratic systems locally and nationally, as well as collaborators in a rapidly developing global system.

Kapi’olani Community College uses a multi-faceted institutional evaluation framework known as the KELA model: *Kapi’olani Engagement, Learning, and Achievement*. This framework focuses faculty and staff planning and program implementation on a few central variables. The achievement and engagement variables are quantitative: achievement variables are tracked each semester while engagement variables are tracked every two-years through the administration of the Community College Survey of Student Engagement (CCSSE). Course learning outcomes are assessed by individual faculty while general education outcomes are assessed through rubric-based analyses of student artifacts (usually writing assignments) conducted by faculty communities of practice.

Kapi’olani Engagement, Learning, and Achievement Model

Integrating Institutional Effectiveness Measures (IEM) with Student Learning



Engagement

To assess student engagement the college relies heavily on the results of its CCSSE, which it administers in spring semesters in even-numbered years. The CCSSE organizes its reporting under five major benchmarks:

1. Faculty-Student Interaction
2. Active-Collaborative Learning
3. Academic Challenge
4. Student Effort
5. Student Support

One could hypothesize that curricular and pedagogical practices considered best practices in sustainability learning; that is, Applied Learning (campus as a living laboratory), service-learning, place-based learning, learning communities, undergraduate research, and research and industry internships, should result in higher levels of student engagement across all five benchmarks. Sustainability pedagogies tend to be High Impact Practices, especially for students historically underrepresented in higher education (Kuh). Kapi 'olani uses AASHE STARS criteria to identify Sustainability Focused courses, which must identify a high-impact pedagogy as part of the course designation.

Assessing learning in these Sustainability Focused courses provides an opportunity to compare these students who complete them and those who do not. We should not pretend that all the controls required of pure experimental research can be developed and applied in the highly diverse student populations in the community colleges. We should instead strive for consistently and cyclically applied assessment and evaluation methods that meet the criteria of “quasi-experimental” research (see Hill et al). The results of these studies should spark and sustain administrative and faculty dialogue about improvement.

The community college environment itself provides unique challenges to assessment design. For example, identifying groups of “statistical twins” for pure experimental research is onerous, especially with community college students with diverse demographic and linguistic backgrounds. Added to this foundational diversity are differences in high school preparation, access to financial support (family and college-supported), full-time and part-time status, patterns of stopping out and returning, clarity about course-taking choices and pathways, clarity about employment aspirations, and understanding of the rights and responsibilities of citizenship. All this variability has a direct impact on whether students gain a **sense of belonging** at the campus, how long it takes them to gain this sense of belonging, and then whether they gain a **sense of becoming** that enables them to complete certificates and degrees, and attain gainful employment or successful transfer to a baccalaureate campus. This is how we define engagement.

Faculty must design effective interactions with students who are unsure they belong and have not identified what they will become. The best community college faculty see their course as a central part of this belonging-becoming continuum, strive to understand that each of their students are situated differently on this continuum, and try to build on this situated-ness. Most community college faculty are teaching five course sections per semester, often with multiple course preparations. Faculty themselves are on a continuum of caring and nurturing, and their workloads and class sizes are not always amenable to teaching differently by using research-based high impact practices which enable more individually customized learning opportunities for diverse students. To engage more faculty in high impact and empowering sustainability teaching practices requires strong staff support to maintain, assess, and improve community collaborations and partnerships. This is why we measure what matters.

Sustainability teaching and learning, curriculum and pedagogy, *done well*, provide a rich and relevant context for many general education, career and capstone courses on the belonging-becoming continuum. But what does *done well* mean for Learning, Achievement and Engagement through sustainability initiatives? To tackle the question of sustainability education *done well* we would also want to develop methods, both quantitative and qualitative, that inform us about student sustainability learning.

Achievement

The KELA model focuses on seven student achievement measures:

1. Course Success (percent of student completing a C or better)
2. Re-enrollment rates from fall to spring semester
3. Re-enrollment rates from fall to subsequent fall
4. Annual number of certificates of achievement and degrees completed
5. Annual number of transfer to baccalaureate campuses
6. Percent of students completing certificates of achievement and degrees in a three-year period
7. Percent of students transferring to a baccalaureate campus in three years

Let's envision how we might document the impact of Sustainability courses on these achievement measures. Measures 4-7 above are particularly important since achieving these measures often results in additional funding to campuses from state legislatures and systems.

In the current curricular environment at Kapi'olani, most Sustainability courses are actually course sections with specific course registration numbers and a SUST identifier. Not all sections

of a course are Sustainability designated. For example, only a few English 100 (first-year composition) courses have the sustainability designation; not all the Psychology 100 courses have the designation. Many courses are taught by different faculty and not all these faculty pursue the Sustainability designation for what they perceive as their course.

However, this SUST versus non-SUST course identification can be viewed as an assessment opportunity. We could, for example, compare measures 1 and 2 in SUST and non-SUST courses in the fall semesters, and measures 1 and 3 in spring semesters. We could compare measures 1, 2, and 3 in SUST and non-SUST courses taught by the same faculty in the same semester.

Over multiple semesters we could track students who complete 2 or more SUST courses and establish their average to certificate or degree completion and/or transfer. We could determine a baseline for students who in their first semester successfully completed a SUST course and then completed a degree of certificate and/or transferred in six semesters. We could determine the average number of SUST courses, on a degree or transfer pathway, that yielded the best completion and transfer results. In all these inquiries, we could assess what pedagogical approaches made the most beneficial impact.

The future curricular environment at Kapi'olani includes an Academic Subject Certificate in Sustainability, and we can track and assess these certificate pursuers and completers on measures 4-7 above. If we can show that these completers have better outcomes on these measures, we should then be able to request and receive additional funding from the campus, state, system, and external funders.

Learning

Pre- and Post-Test Survey

From 2014-2016, Kapi'olani, in partnership with the Community College National Center for Community Engagement, and the Maricopa Community College System (AZ), lead a 3-year Teagle Foundation-funded project entitled, "Student Learning for Civic Capacity: Stimulating Moral, Ethical, and Civic Engagement for Learning that Lasts" (see teachingtobigquestions.wordpress.com). Six community colleges participated in the project: Kapi'olani (HI), Mesa (AZ), Delgado (LA), Raritan Valley (NJ), and Kingsborough and Queensborough (NY). All participating campuses developed communities of practice engaging an average of ten faculty per year who taught to a single big question: How do we build OUR commitment to civic and moral responsibility for diverse, equitable, healthy and sustainable communities?

As a central component of the project, we developed a pre- and post-test survey with item sets targeting diversity, equity, health and sustainability. Each set addressed students' civic and moral engagement, behavior, and attitudes. The specific sustainability items on the survey are listed below. The allowable student responses were: completely disagree, disagree, undecided, agree, and completely agree.

1. I am already or will become active in environmental programs.
2. I am willing to consume less and go without some comforts if it helps to protect the environment.
3. When I buy a product, I assess the type of packaging and choose one that is recyclable.
4. If I had to choose between the construction of a highway that will alleviate traffic or the protection of a plant species, I would choose the highway.
5. Even if public transport were more efficient than it currently is, I would still choose to use my own car.
6. Solving current problems is more important than worrying about the future.
7. I want to find new ways to live more sustainably.
8. Climate change is a situation that demands our immediate attention.

The first survey was administered early in the fall 2015 semester and then matched with a second survey administered as late as possible in that same semester. Kapi'olani's results were analyzed with a T-test measuring gains from pre- to post-test survey and a two-way Anova comparing service-learning and non-service-learning students. In the first iteration of the survey, analysis showed that service-learning students, many doing environment-related projects, scored higher than non-service-learning students on one survey item: I want to find new ways to live more sustainably.

Analysis also showed all student gains on the following three items:

- I am already or will become active in environmental programs.
- When I buy a product, I assess the type of packaging and choose one that is recyclable.
- I want to find new ways to live more sustainably.

But analysis also showed student losses on three items:

- If I had to choose between the construction of a highway that will alleviate traffic or the protection of a plant species, I would choose the highway.
- Even if public transport were more efficient than it currently is, I would still choose to use my own car.

- Climate change is a situation that demands our immediate attention.

Two items showed little change either way:

- I am willing to consume less and go without some comforts if it helps to protect the environment.
- Solving current problems is more important than worrying about the future.

There were methodological challenges in the project-wide use of a pre- and post- survey learning assessment methodology. First, since the Teagle Foundation wanted broad publication and dissemination of project findings, we knew we would need institutional research board (IRB) approvals from the Maricopa Community College system as well as the six individual community colleges. These IRB approvals were easily attained at some campuses, but some campuses had more difficulty, especially if they were in multi-campus systems.

Each college chose which courses to include in the survey assessment and determined when to administer the pre and post surveys. We had initially hoped to have the capacity to pre- and post-match individual student responses. One of the greatest challenges was obtaining successful matches for the survey administered early in the semester with the one administered late in the semester. Every year, during annual meetings and through many electronic communications, the colleges worked together to devise strategies to help students remember what email address they had used on the first survey so that it would match with the later survey. In the 2015 assessment administration, all six campuses administered the pre-survey but only three campuses had enough paired responses in the post-surveys to identify statistically significant student learning gains.

Another challenge was interpretation of the survey results. Beginning in 1996, Kapi'olani Community College had originally conducted a survey every two years and it was only after three sets of surveys had been analyzed that the results began to show clear patterns (Renner). We had hoped that three consecutive years of the Teagle survey would also begin to show clear patterns, but the lack of coherent patterns within and across colleges led us to do a major revision of the survey in the third year. Our goals were to improve the matching of early and late surveys and thus increase sample size for each campus, and also to better align our questions – and hopefully our findings – with the themes within our Teagle project. We also increased the demographic section of the survey.

Ultimately, we believe that this survey approach can yield very useful information, especially if large enough matched samples are obtained. Kapi 'olani 's results that were described above

led to discussions among faculty and changes in classes. Further, patterns based on gender, ethnicity, experience providing community service, and involvement in undergraduate research and other high impact practices can be identified and used to help educators guide students toward the pathways that will best assist them in moving toward deeper and more meaningful engagement with their communities.

The pre- and post-test assessment gives a snapshot of student learning on a wide scale — not just from specific courses. In a separate focus group interview, we heard from students that they tend to connect learning about sustainability more with news, social media, and documentaries than with specific courses. This indicates that faculty need to be more explicit when teaching sustainability issues.

Student Assessment of their Learning Gains (SALG)

An interesting alternative instrument, which offers a pre and post type of view but from a more qualitative perspective, is the SALG: Student Assessment of Learning Gains. What is most interesting about the SALG is that it accepts student self-reflection as evidence of learning. This is in alignment with current research on learning, and perhaps with a community college pedagogical perspective.

The SALG was developed through funding from the National Science Foundation (NSF) which continues to recommend it for evaluation of education research. SALG data is accepted as *prima facie* evidence of student learning by some accrediting bodies, including ACCJC. The SALG has been used by over 17,000 college and university instructors since 1997, and currently supports over 14,000 individual users and 2000 group users. Use of the SALG is free; anyone may sign up at www.salgsite.org.

The SALG is similar to a student evaluation of the course, except it focuses on the student, not the teacher. Typically, Student Evaluations of Teaching (SETs) focus on teacher behaviors and use student satisfaction as a primary evaluative criterion. Extensive research shows that innovative teachers/pedagogies earn lower scores on SETs than traditional courses, *even when students learn more* in those innovative courses (Seymour et al). Similar to the “negative results” described in the pre- and post-testing, when it comes to assessing sustainability learning, traditional SETs may yield negative evaluations of sustainability curriculum — for example, if students didn’t like going outside, or working in a group.

The SALG was specifically designed to remedy these deficiencies by focusing exclusively on students’ learning gains. It was built around three essential principles:

- that assessment of a course should be relative to the explicit goals of that course—i.e., what students are supposed to learn;
- that students have something valuable to tell us about what helps them learn (and what doesn't); and
- students' learning should be enhanced by filling out the course evaluation (by increasing their metacognition about their learning).

SALG's design uses ten questions that comprise the central identity of the instrument and encourages instructors to create a customized instrument for each course they teach. For example, many of the question-stems include sub-questions that ask instructors to fill in details of class activities, assignments, key class concepts, and so on. Finally, instructors may add additional questions to the original list of ten. When writing these new questions, instructors may choose from a variety of established response scales, or they may create their own scales. This flexibility, too, is central to the identity of the SALG because it allows instructors to assess the effectiveness of their pedagogical choices in helping students reach the learning goals for their course.

Here are a few of the items used to survey students in Kapi'olani's Sustainability Focused courses. The choices are: no gains, a little gain, moderate gain, good gain, great gain, and not applicable.

As a result of your work in this class, what GAINS DID YOU MAKE in your UNDERSTANDING of each of the following:

1. The following concepts that have been explored in this class
 - Sustainable Economics (triple bottom line, alternative to GDP)
 - Ecosystem Services
 - Ecological Footprint / Carbon Footprint
 - Sustainable Materials Management (Cradle to Cradle Design)
 - Climate Change Mitigation, Adaptation, and Resilience
 - Local First
 - Social Justice & Equity
2. How these core concepts of sustainability might relate to the class I'm taking.
3. How ideas from this class relate to other classes I have taken.
4. How studying this subject area helps people address real world issues

The SALG was created to promote and support thoughtful, effective teaching and systematic, rational improvement of that teaching by providing meaningful and detailed feedback about

the value and efficacy of classroom teaching. Because it provides valid and meaningful evidence of student learning, SALG data can be used to support cases for promotion and tenure far more effectively than SET instruments that focus on student satisfaction and have scant relevance to student learning gains.

Service-Learning Reflection Essay

Most sustainability designated courses at Kapi'olani do service-learning. This is based on the conviction that learning about sustainability means practicing it as well. Sustainability teaching can be disempowering and push students to thinking nothing can be done to fix these global problems, that their fate is sealed. Service-Learning empowers students to do something *now* about sustainability issues confronting their communities. The Kapi'olani Service and Sustainability Learning program requires a semester capstone essay in which students reflect on their experience. Here are reflection prompts:

- **Issue:** Identify the societal or ecological issue you have helped to address through your service. Explain how you have helped.
- **Learning:** Discuss 3 concepts/theories from your coursework that have helped you do your service. Describe experiences during your service that have helped you understand those concepts/theories.
- **Civic Context:** As an informed individual and citizen, discuss the issue you explained above as a public or community problem. What elements of unfairness or injustice does the problem have? Do you believe more people should care about the problem? Why or why not? Discuss one or more solutions to the problem.
- **Goals:** Explain how your coursework and service activities have shaped your personal, academic or professional goals. From the list below, select all the ones you are interested in doing and discuss at least one in detail. Explain how the action(s) you will take will help reduce the impact of the problem.
 1. Support family, friends, and/or neighbors who are affected by the problem
 2. Serve, or fundraise to support, a community-based organization that is working on the problem
 3. Patronize businesses that are actively working to lessen the severity of the problem or are committed to not making the problem worse
 4. Convene a dialog with policy-makers who are working on the problem
 5. Advocate with public officials and/or legislators who are working on the problem
 6. Start, lead or join a campus group that is working on the problem
 7. Take another course to gain a new perspective on the problem
 8. Complete a degree that will provide me with the knowledge, skills, and attitudes to work on the problem in my profession

9. Other (specify)

The prompts can demonstrate sustainability learning in these ways: Under Issue, the student can define a sustainability issue, such as invasive species. Under Learning, sustainability designated courses have sustainability SLOs, such as “Measure one’s impact on the triple bottom line: People, Planet, Profit.” Students can specifically explain how they learned and applied these concepts as part of their service. Under Civic Context, students often indicate social justice issues, such as environmental justice. For example: how does climate change asymmetrically affect Pacific Islanders? Under Goals, students explain their plans that support sustainability. For example: a lot of botany students want to make their own native plant gardens.

Written responses to these prompts more directly demonstrate what students have learned. However, well written pieces take time and experience to write, which many of the students do not have. About 2/3 of our service-learning students are taking a science or language (Chinese, Japanese or Korean) class in which substantial writing or writing in English is not a major component. These classes do not require first-year composition as a pre-requisite. Further, about a third of our students are international, and up to half speak English as a second language. It seems too much to ask the majority of these students to produce a high-quality (English-language) essay that their current class or prior classes/experiences have not necessarily prepared them to write.

In any case, essays are collected by the Kapi’olani Service & Sustainability Learning Office and a randomized selection of essays are assessed twice a year (see teachingtobigquestions.wordpress.com). While work intensive, this assessment helps faculty better understand student learning achievement while providing a sense of collegiality and constant improvement to the service-learning program.

COMMUNITY AND CIVIC ENGAGEMENT

To assess the impact of sustainability curriculum and pedagogy on community and civic engagement, we can expand the student capstone reflection methodology discussed above. We also need to develop a similar qualitative assessment approach with the community and civic partners we engage in our sustainability programming. After more than a decade of participation in the development and implementation of the Carnegie Foundations’ Community Engagement Classification, and following the national research in this area, it is useful to envision how that classification might help us assess and improve community sustainability and resilience efforts. Here is the Carnegie Foundation definition of community engagement:

Community engagement describes the collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.

The purpose of community engagement is the partnership of college and university knowledge and resources with those of the public and private sectors to enrich scholarship, research, and creative activity; enhance curriculum, teaching and learning; prepare educated, engaged citizens; strengthen democratic values and civic responsibility; address critical societal issues; and contribute to the public good.

Further, Carnegie states,

[Engagement] requires going beyond the expert model that often gets in the way of constructive university-community collaboration...calls on faculty to move beyond 'outreach,' ...asks scholars to go beyond 'service,' with its overtones of noblesse oblige. What it emphasizes is genuine collaboration: that the learning and teaching be multidirectional and the expertise shared. It represents a basic reconceptualization of...community-based work. (O'Meara and Rice)

Kapi'olani's 2015 application for the Carnegie Community Engagement Classification identified its top 15 most important community partnerships and 11 of these were working with us on sustainability-related projects and programs. New partners have been developed since 2015, and we need to develop our assessments of these partnerships.

In the Carnegie Classification process and ongoing research, there are five major components of authentic partnerships:

1. Clear lines of communication
2. Clearly defined roles and responsibilities
3. Identifying and elevating both the needs and assets of the campus and the partners
4. Identifying mutually beneficial, reciprocal, long-term goals.
5. Active and collaborative learning for all

These five components would shape future assessment and evaluations of the community and civic engagement of our sustainability programming.

KAPIOLANI'S FUTURE DIRECTIONS IN ASSESSMENT

The college is piloting use of the International Sustainability Literacy Test, or Sulitest (see sulitest.org). The mission of the Sulitest is to:

[I]mprove Sustainability Literacy worldwide by providing citizens and organizations with internationally recognized and locally relevant tools to engage learning and to collect meaningful indicators on the awareness of sustainability challenges and solutions. Sharing these indicators may allow researchers, educators and other relevant stakeholders to tailor pedagogical approaches and learning experiments to support Education for Sustainable Development. (“Vision and Mission”)

We are using the Sulitest as part of a suite of program-level assessments of Sustainability Focused courses, comparing results from students who take those courses versus those who do not. (There are approximately 20 S-Focused courses at the college, which can be taken as part of an embedded Academic Subject Certificate in Sustainability.) The SALG is used as a pre- and post-test for student reflection; the SALG can also be customized by faculty to gain student input on specific assignments, texts, or class activities and how those affected their learning.

In addition, a group of five faculty worked together to design and pilot a rubric assessment tool for final projects and papers across sustainability courses. This rubric is informed by the work of Arnim Wiek et al. They established specific criteria for umbrella competencies in sustainability: systems thinking, anticipatory competence, normative competence, strategic competence, and interpersonal competence. Where the Wiek rubric establishes Novice, Intermediate, and Advanced levels of demonstration, we created a level “below” novice to reflect the level of entering community college students. While the analysis is not yet completed, simply the process of collaborating across disciplines in the development of the rubric has helped us to more effectively engage with students at different levels of ability, experience, and engagement with sustainability. These dialogues about assessment help us to understand what matters.

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