Heuristic Tracing And Habits for Learning:
Developing Generative Strategies for Understanding Service Learning

Laurie A. Pinkert,
University of Central Florida
& Kendall Leon,
California State University, Chico

Higher education research has demonstrated the positive effects of service-learning on students, with particular attention to the increased attaintment of institutional outcomes such as retention and graduation. However, traditional assessment models, focused on measuring outcomes, offer few strategies for developing a holistic understanding of service learning environments. In response, this article outlines the process of heuristic tracing, a generative assessment strategy, which can be used to make visible the experiences that can not only support students' learning gains but also value the engagement of all service learning participants—including instructors and community partners. Heuristic tracing can help stakeholders better understand the habits, attitudes, and experiences of learning that are central to service learning pedagogy.

UNDERSTANDING SERVICE LEARNING— WHAT'S MEASURED; WHAT'S MISSED?

In recent years, increased empirical assessments have demonstrated the positive impact of service learning pedagogies in

meeting institutional outcomes for student success, specifically with regard to retention and graduation rates (Lockeman and Pelco 2013) and undergraduate student GPA (Mungo 2017). In addition, service learning experience has been identified as a predictor for students' developed sense of persistence, which leads to increased reenrollment rates (Reed, Rosenberg, Staham, and Rosing 2015). Service learning's impact in this regard has been shown to be equally efficacious for full and part-time students (Reed, Rosenberg, Staham, and Rosing 2015), and for students of color (Mungo 2017). It is no surprise then, that college campuses and their respective instructional faculty continue to invest resources into such endeavors.

Running parallel to the connection of service learning to broader institutional concerns (e.g., retention, graduation rates, etc.), we have seen a similar broadening of the conversations about effective writing pedagogy. Scholarly conversations have embraced the necessity of integrating students' experiences and measuring student and program success through more than achievements of course-level outcomes. One document that evidences this shift is the *Framework for Success in Postsecondary Writing* (Council of Writing Program Administrators et al. 2011), which reframes the conversation about "college readiness" by emphasizing the kinds of experiences with and attitudes toward learning that benefit developing college-level writers. According to the *Framework* (2011), the habits of mind—openness, creativity, curiosity, engagement, persistence, responsibility, flexibility, and metacognition—offer "ways of approaching learning that are both intellectual and practical and that will support students' success in a variety of fields" (1). The characteristics outlined in the *Framework* highlight the discursive shift toward inclusion of habits, attitudes, or characteristics that cannot be measured in the same way as traditional course-level outcomes, which tend to focus on students' mastery or demonstration of skills.

For many of us who have been employing service learning pedagogies in college-level writing classes, the attention to "habits" such as engagement and persistence seems somewhat intuitive: they are the kinds of attitudes we've been attempting to foster even if we've never articulated them as such. However, knowing how to account for the role and relevance of these habits in high-impact courses such as those

that integrate service learning and writing can be difficult (Kuh and O'Donnell 2013). Krzus-Shaw (2017), for instance, notes the evidence of developing habits in her discussion of her service learning class: "though not necessarily a stated course objective, I would also argue that [students] were demonstrating a number of 'habits of mind,' which have been repeatedly linked to long-term college success" (360). Krzus-Shaw suggests that habits such as "perseverance, creativity, engagement, and responsibility, among others" were evident in her students' interactions; yet, she had no systematic way to trace their emergence because the cultivation of habits could not be captured through existing course or programmatic assessments.

As program leaders and instructors who contributed the integration of service learning in a subset of our program's first-year composition courses, we felt resonance with Krzus-Shaw's observations about the misalignment between service-learning's impacts and our program's traditional assessment measures, so we sought a strategy that would help us examine the dynamic environments created by service-learning pedagogy.[1] Our first-year writing courses were offered by an English Department on the main campus of a large, public, land grant university with a research intensive classification. At the time of our project, the university enrolled approximately 40,000 students (30,000 undergraduate and 10,000 graduate and professional students); the first-year writing program enrolled approximately 6,000 students each year and offered four different courses that met the same graduation requirement for writing. The program director decided to integrate service learning into the "advanced" composition option for first year students, making service learning a required component and distinguishing feature for this course.

In the new service learning-focused version of this composition course, instructors and students partnered with community organizations to write *for* or *with* an organization as a course project (see Deans (2000) for discussion of models including writing "for," "with," and "about"). Students and instructors, for example, produced community-facing videos and documents for City Hall and a local nature preserve. This approach necessitated that instructors and students continuously respond to the variables that arose as the service learning projects unfolded, developing and honing new skills

as they were needed. Therefore, much of the learning that took place for participants happened in the moment and was situationally responsive, akin to a stance. Capturing learning in these courses then became particulary challenging under assessment models predicated on measuring predetermined outcomes.

In this article, we outline heuristic tracing, a strategy that re-envisions assessment as a site through which we can better understand the habits of learning that are integral to service learning. We use the term *heuristic traces* to suggest that that the habits are traceable without becoming the objects of assessment and that program participants can collaboratively contribute to the articulation and redefinition of these habits for learning. Such an approach aligns assessment practices with service learning's "intention to… ensure equal focus on both the service being provided and the learning that is occurring" (Furco 1996, 5) and moves the conversation away from *measuring only student learning* toward *listening to all program participants*. This shift in the focus of assessment is necessary for those who aim to better understand the environments, conditions, and contexts that support meaningful service learning engagement.

DISTINGUISHING HABITS FOR LEARNING FROM LEARNING OUTCOMES

Throughout this article, we use the term "habits" to describe attitudes and dispositions that have been linked to effective learning. The *Framework* (2011) provides a well-developed, although not exhaustive, series of such habits or behaviors that support successful learning in writing. While we want to call attention to similar habits for service learning, we are not suggesting that service learning instructors make these habits, such as curiosity or persistence, the outcomes for their courses. We maintain that course outcomes and habits for learning are separate but productive parts of program design and development.

This differentiation between outcomes and habits is important. Scholars have pointed to problems with positioning habits as outcomes. For example, Kristine Johnson (2013) cautions, "when habits of mind are outcomes, we must assume that they can be taught—a position that could again lead to ideological and political exclusion" (536). Asao Inoue (2019) reminds us that the move away

from ranking outcomes becomes deceptive if the habits are used by departments as another mechanism through which to judge student performance. Additionally, we believe that positioning habits *for learning* as if they should be outcomes *for demonstration* changes their potential. Course outcomes are often positioned as something we expect students to demonstrate and, therefore, ask them to perform. However, when we ask students to perform habits such as curiosity, so that we can measure it, the activity students perform is no longer curiosity: curiosity cannot really be curiosity once it is mandated by an external force. Rather than substituting habits for outcomes, we seek to reposition the habits as an important facet of learning alongside course outcomes, using heuristic tracing to understand how students who are engaged in service learning articulate their learning experiences.

The emphasis on listening to students and making space for their articulations of learning repositions learners as contributory experts rather than novices, in turn, positioning those who usually take up the expert role (the faculty, the program director, the assessment team) as learners who need to understand the ways of knowing that are being enacted by others and themselves. Service learning assessment is ripe for such reenvisioning of roles, as service learning courses themselves aim to instill collaborative skills in course and project design, and thusly, service learning assessment should account for this pedaogigcal feature. Heuristic tracing offers a mechanism through which the participants can collectively contribute to an understanding of the habits that foster their learning because this strategy does not have to begin with a predetermined set of habits that are confirmed. This generative possibility for heuristic tracing promises a different positioning for the habits of learning. Through heuristic tracing, habits for learning are not merely static but rather dynamic and reinvented through the tracing process. This shift moves away from the problematic suggestion that "all it takes to be 'successful' is to have the 'right' habits" (Summerfield and Anderson 2012, 545) and toward a recognition that understanding the habits demands understanding those developing them. Such engagement of learners as contributors furthers Brian Huot's argument to involve students in "instructive evaluation" by inviting them into the assessment process (2002, 69). The focus, however, is not on their involvement in the evaluation of their work but rather their involvement in articulating of their

learning experiences, knowledge-making practices, and developing expertise in the context of service learning.

To support the differentiation between habits and outcomes, we adopt language of "emergences," highlighting the more fluid process of the habits coming to be through a specific environment of learning, rather than the causal relationship that outcomes suggests. This move also supports an approach to writing assessment as part of an ecology in which students are treated as "agents in the ecology" (Inoue 2015, p. 84). By allowing service learning students and instructors to reflect on and respond to questions about themselves as situated writers and learners, rather than focusing on their texts or service projects, we aim to shift assessment dynamics. Such a shift is especially pertinent for service learning environments and other engaged learning evironments where knowledge work is distributed among students, faculty, and community partners (Getto, Leon, and Rivait 2014).

KEY ELEMENTS OF HEURISTIC TRACING

Heuristic tracing builds upon Cushman, Getto, and Ghosh's (2011) concept of "heuristic stages," which they use to describe a framework for ethically producing digital compositions with community partners. The heuristic stages process "begins with meaning-making practices already in place in the community being represented… [and then] products and practices are developed in deep and respectful collaboration with and in light of existing practices…" through increased understanding of heuristics, or ways of knowing, within that community (173). Similarly, we see *heuristic traces* as evidence of emergent ways of knowing that can be made visible by adapting new practices within existing assessment structures.

While the specific environments in which heuristic tracing can be used will vary from institution to institution or course to course, heuristic tracing involves three key elements:

1. Heuristic tracing recognizes the contributory expertise of program participants.
2. Heuristic tracing prompts reflexivity through its design.

3. Heuristic tracing examines participant narratives for emergences of habits, dispositions, or strategies.

Much like the heuristic research methodologies that Sullivan and Porter (1993) describe as important to the field of Professional Writing, our approach was interactive in its implementation. We were not simply "reporting on" practices but also providing a space in which participants could conceptualize, articulate, and potentially change their practices, and implementing an allowance for the program to shift and change dynamically as heuristic tracing. In this section, we outline the key elements of heuristic tracing as a strategy, and we contextualize these elements by describing the ways we implemented them. Although we were unable to include community partner data at the time of our tracing, we see potential for tracing community partners' experiences, an opportunity we further discuss in our conclusion.

1) Heuristic tracing recognizes the contributory expertise of program participants
Heuristic tracing positions all participants as potential contributors to a better understanding of the learning context. This approach acknowledges that learning, knowledge-making, and meaningful engagement take a range of forms for students, instructors, and community partners. When the attention shifts from measuring learning to understanding its contexts, program leaders can acknowledge the potential for a range of participants to contribute new knowledge and new ways of understanding habits for learning. In order to acknowledge the expertise of all program participants—a goal often cited in service learning pedagogy—heuristic tracing engages participants in constructing and revisiting their own articulations of learning. This inclusive approach is crucial because even the resistant student who says she isn't learning or the community partner who may not have gotten exactly what they expected out of the partnership has important insights to offer about the obstacles to effective engagement.

In our tracing, we worked to expand the typical targets for assessment, including not only students but also instructors. This expanded focus supports the positioning of instructors as learners (Leon, Pinkert,

and Taylor 2017) and suggests that, if we take instructor learning seriously, our assessment designs should, too. To meaningfully engage students and instructors, we designed qualitative survey responses, journal prompts, and interview questions that acknowledged partipants as the experts regarding their experience and allowed them to articulate their experiences of learning. As heuristic tracing allows the procedures of assessment to become more broadly learner-centered, we see potential to not only focus on what students *and* instructors learn about writing and learning/teaching but also on what service-learning partners learn about community engagement.

2) Heursitic tracing prompts reflexivity
By engaging participants in an examination and articulation of their learning experience, heuristic tracing is, by design, a reflexive activity. We know that reflection is vital to learning in writing and in service learning courses because reflection allows learners to connect learning across both learning spaces and time (Yancey 2016). Heuristic tracing creates the conditions for tracing the habits by employing assessment strategies that prompt reflexivity. In asking students, instructors, and/or community partners to describe and reflect on their experiences, heuristic tracing not only highlights their expertise, but also initiates learning through dialogic focus on their coming to be as writers, teachers, and engaged citizens (Hallman and Burdick 2018).

3) Heuristic tracing analyzes participant narratives for habits
Heuristic tracing relies on the collection of participant narrative, but it recognizes that participants can be prompted to not only share but also reconsider their narratives through carefully crafted combinations of open and closed ended questions. Unlike typical outcomes-based assessments which often involve scoring of writing, heuristic tracing involves the collection of narratives—written, verbal, or otherwise constructed. In our case, we engaged instuctors in writing and articulating their narratives through a combination of open-ended journaling prompts distributed throughout the term in which they were teaching and a focus group interview that revisited the topics about which they'd written, allowing them to reflect and reframe their earlier narratives. Additionally, we engaged students in writing their narratives through qualitative survey questions

that asked students to reflect on their writing experiences, scenario-based questions that asked students to connect their learning across spaces, and quantitative questions that asked students to rank important learning outcomes. Such an approach allowed us to attend to habits for learning as they emerged within students' reflections on their learning. By shaping the quantitative rankings around our program's existing learning outcomes, we were able to measure students' perceptions of disciplinary and programmatic learning. By using qualitative questions, we enabled students to reflect on their experiences with writing, and thus were able to trace more emergent types of learning that extended beyond our programmatic outcomes. For example, in the qualitative responses that asked students to reflect on their experiences in FYC and to identify what they found to be most valuable about the course, students revealed aspects of learning that were not reflected in our programmatic outcomes, such as an increased awareness of education's purpose and the value of writing outside the classroom. This engagement of students' own articulations of learning can be especially instructive in service learning classrooms because of the emphasis on helping students apply their learning to contexts outside of classrooms.

IMPLEMENTING SURVEYS, JOURNAL PROMPTS, AND INTERVIEWS AS HEURISTIC

Our implementation of heuristic tracing gathered data from 275+ students and three instructors in service learning and non-service learning first-year composition courses. To make space for narratives, we collected data from students and instructors through closed and open-ended survey questions. While modified versions of the instruments could be distributed to community partners, this article reports only the tracing of student and instructor responses collected in the four service learning sections that we studied. Instructors and student participants completed separate surveys; additionally, instructors responded to journaling prompts during the terms in which they taught their course and participated in a group interview after the conclusion of their course.

To prompt reflexivity, the student survey moved away from asking students only about their current composition class and instead asked them to *describe* three writing situations (one academic, one

professional, and one social). This strategy allowed us not only to see what kinds of scenarios students described for their writing but also to see how the service learning students positioned their service learning projects (as academic, professional, or social), if they mentioned them at all. After the students described their writing scenarios, the survey then asked them to quantitatively select and rank factors that were most important to their success in each of those writing situations. (See Table 1.) The list of factors contributing to successful writing was not exhaustive because, in an attempt to avoid survey fatigue, we tried to keep the list relatively short.

TABLE 1: FACTORS INCLUDED ON STUDENT SURVEY

What others had previously said or published about my topic
What others would think of my ideas
My ability to meet my reader's expectations
The ability of my writing to address larger problems beyond the classroom
Learning about myself in the process
Using the best medium for the message
Knowing how people usually write this kind of document

The factors we included were intended to be student-friendly adaptations of concepts included in our first year writing program's Goals, Means, and Outcomes (GMOs), which focused on students' growth in rhetorical knowledge, critical thinking/reading/writing, writing processes, knowledge of conventions, and technology. After ranking relevant factors, students were asked to *reflect* on the strategies that they used to make each writing situation successful, providing narrative descriptions in students' own language of the ways that they employed the factors that they prioritized. Asking students to identify what they wrote in each of the scenarios and to explain what made it effective in their own words also served as a reflective moment for students, as they had to develop language to describe their writing and/or articulate what made it effective. It also positioned the students as experts who could articulate factors for success. In an effort to see how students' learning may or may not be

connected to what they were learning in their composition courses, we included a final question that asked students to *describe* the most valuable thing that they learned in their composition course during the current semester. This helped use to situate classroom-based learning and course outcomes alongside the learning and habits that students described in relationship to the writing scenarios. Overall, this design gave students an opportunity to reflect back on their writing experiences and use their own language to describe those experiences, and gave us as program leaders an opportunity to learn how students characterized their learning. This reflexive component was integral to tracing the habits for learning that emerged.

Recognizing the contributory role that instructors could play, we focused our interactions with instructors on the kinds of learning they might to do as they began teaching service learning courses. At the beginning of the semester, three instructor-participants took an online survey delivered to them via email. The survey incorporated both qualitative and quantitative questions about the participants' roles as teachers, the role of reflection in their classes and their teaching, the most important things that students learn in their writing classes, as well as a problem that they encountered in their writing classrooms and their strategies for solving it. In addition to the initial online survey, instructor-participants also received emailed invitations to respond to four brief writing prompts about their teaching experiences during weeks 3, 6, 9, and 12 of the semester. (See Table 2.)

TABLE 2: WEEKLY WRITING PROMPTS FOR INSTRUCTORS

Week	Topic	Writing Prompt
Week 3	Planning	Briefly describe the service learning components in your course for this semester. At this point in the semester, do you foresee yourself making any changes to your initial plans for the course? Are there still aspects of the course that are not yet solidified?
Week 6	Reflection	Since the beginning of the semester, what kinds of reflection are your *students* doing? What has been the purpose of the reflection and has this changed in the past six weeks? Do you anticipate changing the role student reflection plays in your course? Since the beginning of the semester, what kinds of reflection have you done as an instructor? How has this influenced your teaching?
Week 9	Teacher's Role	What role have you found yourself, as a teacher, playing in the writing classroom in the past few weeks? How does this compare to your initial survey response?
Week 12	Learning	What are the three most important things that students have learned in your class this semester? What did you learn as an instructor?

To contextualize the survey responses with additional narrative explanations, we invited instructors to participate in a follow-up group interview regarding their teaching experiences. The group interview was based on the instructors' survey and writing prompt responses, and included the following questions:

1. How do you think your students perceived you and your role?
2. In your writing responses, you indicated a shift in your role when teaching service learning. What made you feel like you needed to make this shift?

3. A lot of your reflection is about your role in the classroom. How did you think about your relationship with the people outside the classroom (community members, service learning partners, etc.)?

4. In your writing responses, we noticed an emphasis on your position within the classroom environment. Can you elaborate on how service learning changes the environment of the classroom?

5. Now that the semester is over, do you have any further reflections about your experience teaching service learning for the first time?

While the collection of narrative responses took additional time compared to the typical close-ended and outcomes-focused assessment techniques, this qualitative data enabled us to hear student and instructor values and also prompted a reflective cycle of learning and collective knowledge-making for all participants—including those of us assessing. Such collection of qualitative assessment data aligns well with similar moves to expand or reframe the role that assessment can play in writing programs (Broad 2003). By implementing heuristic tracing, we situated assessment as an activity to support what Scott and Pinkert have called integrative techne—"a capacity for intentionally enacting, connecting, and articulating learning as a principle-driven, adaptable, and cross-contextual knowledge-making experience" (Scott and Pinkert forthcoming 2020). An integrative techne framework aligns well with heuristic tracing as it recognizes that learning is honed, developed, and habituated through practices and experiences. Our approach then is one grounded in the fundamental assumption that the participants in our service learning classrooms—the students, the instructors, and the community partners—have valuable insights to share, and that these insights can (and should) drive not only our curricular purpose but also our intentional design of moments through which all participants can articulate and connect their learning across contexts.

HEURISTIC-TRACING AT WORK: EMERGENCES OF SERVICE LEARNING

In the following sections, we draw on the narrative responses to provide examples of students' and instructors' own articulation of three particular habits for learning that emerged within our

programmatic assessment: engagement, persistence, and flexibility. As noted above, we collected multiple types of data from both students and instructors. Using context clues, we analyzed responses for topic chains that articulated habits—activities, strategies, and dispositions—for learning. After identifying and coding these articulations, we completed a second level of analysis using Grounded Theory to develop an open coding schema (Miles, Huberman, and Saldana 2013) that identified the habit(s) on which the activities, strategies, and dispositions centered. An open coding schema allowed for the analysis to follow the participant-generated data in this study.

The examples we discuss in the following sections reveal how habits for learning emerged as learning practices enacted by both students and instructors—and served as experiential examples of habits rather than as static, assessable "states of being" (O'Neill et al. 2012, 545). The collection of such qualitative responses also enabled us to construct narratives of experience that shed light on the conditions that facilitated learning in these service learning contexts.

Emergences of Engagement as a Condition for other Learning Activities
Participant narratives repositioned engagement as an integral link between different learning activities for both students and instructors. For example, when reflecting on the most valuable learning outcomes of their composition courses, students in the service learning courses described their engagement with the greater community and their attempts to use writing to address community problems. The *Framework* defines engagement as "a sense of investment and involvement in learning" and suggests that engagement is fostered through experiences in making various connections. Such connections may be made between their own ideas and those of others, between the meanings they bring to a project and those that emerge through experience, and between students' newly gained understandings and their decisions to take action.

Engagement also emerged within our results as students emphasized "deep" learning in their composition classrooms. One student in particular wrote that she learned to "dig deeper" and "find hidden meanings." Another student noted that "composition isn't just about creating perfect papers." Yet another student connected learning

the "deeper purposes" of composition with addressing community and civic problems. Among other indications of learning related to engagement with the course, other responses focused on writing as action, writing as discovery, and writing as a "messy process" that involved leaving one's "comfort zone" to take risks. While these students did not always use the word engagement to describe their feelings, habits, or activities, their responses highlighted that being engaged is a necessary precursor to a willingness to take risks and identify complexity.

The instructors participating in our assessment similarly described conditions for engagement as they reflected on the shifts in their teaching roles after adopting a new service learning pedagogy. In the initial survey prior to teaching their first service learning course, one instructor noted a problem in his teaching as struggling with student motivation to complete a group project. The instructor's response was to have the students regularly check in to ensure that the project deadlines were being met. While this most likely resulted in increased engagement with the course and the project, it is telling to see how engagement was seen as vital to their service learning courses. Rather than just implement check-ins, the instructor described re-evaluating their pedagogical approach, which included an active relocation of themselves and their positioning in the service learning class as a necessary condition of student engagement.

The re-evaluation of their pedagogy included an active relocation of themselves in the classroom metaphorically and figuratively. More so than in their previous "traditional" first-year composition courses, the instructors indicated taking a "hands off approach" to teaching in order to encourage engagement—an approach that, at first, may sound antithetical to engagement but that, in fact, encouraged students to engage anew. In a weekly journal response, one instructor described a scene where they sat up on the window sill, out of the way, so the students would become more actively involved in discussion and project planning, explaining, "now's the time when they do their work, whereas they're not actually engaged the other times." During our follow-up group interview, all instructors reflected on how the physical relocation of their own teacher bodies prompted a shift in the learning environment. When reflecting on the necessity of

taking a step back from being at the center of the classroom, one instructor added: "[the students] are responsible for doing their service. If I'm telling them what to do, then they're not engaged…" The instructor here draws a parallel with students doing service and being engaged: throughout the instructor responses, the two are treated as interconnected.

Although instructors did not specifically name engagement as an integral student learning experience in their initial surveys, the need to foster engagement became a centralized experience for all of the instructors we interviewed. Arguably, engagement also emerged as a learning experience for instructors. In their initial surveys, instructors indicated that they planned and taught their courses by speaking with other instructors and drawing on past materials or experiences. While teaching their first service learning class, instructors explained, they were adapting their pedagogy in the moment in response to the rhetorical situation of the class, the service learning project, and the classroom environment, as it related to fostering student engagement. Instructors learned to be more engaged and responsive teachers of writing as their students also participated in engaged tasks and projects.

Emergences of Flexibility as Both Response to Writing and Concept for Writing
When asked to identify the most important outcomes from their service-learning course, our student-participants often mentioned a kind of flexibility that appears to result from "writing for an audience that is public and not just a teacher" and writing for "a larger audience than in the classroom." As we would speculate, writing for these audiences allowed students to respond to the current situation at hand and determine how best to communicate to a given audience. One student engaged in a local government-based service learning partnership explained: "I think the most valuable thing I learned about was professional writing and interaction. I wrote many things that were ultimately sent out to a partner working for the city government…I developed some real world experience in communicating and meeting the expectations of someone other than my teacher."

To write for outside audiences, students learned that they had to be adaptable in terms of what they expected to know and write for in an English class. As one student indicated, she had expected to write more traditional papers but learned that "there are so many places for writing outside of the classroom. Writing doesn't always have to be in the form of a literary analysis or research paper." Writing for an audience other than the teacher also necessarily assumes that students must adapt their writing and be willing to take on different styles, tones, and genres for those audiences. As we analyzed the responses, we saw traces of a willingness from students to be flexible as they address diverse audience expectations and develop an understanding of how that ability adds value to their learning. This perspective on flexibility aligned well with the description outlined in the *Framework*: the ability to "adapt to situations, expectations, or demands" (2011). The *Framework* ties the habit of flexibility to approaching writing in ways that are dependent on task and audience, situating expectations such as citation conventions within larger contexts, such as academic disciplines or writing exigency, and reflecting on choices one makes in response to a given writing scenario.

However, when adding to this our understanding of conditions for flexibility, students noted that flexibility was not only a habit they might develop in response to situations but also to a newly found understanding of writing as something that is in flux and not pre-determined. For some students, flexibility meant moving away from composition as production to composing as "discovery," with effectiveness as something that is contestable and changeable in interactions with different audiences and purposes. This required "thinking outside of the box" and, as one student noted, using different mediums: "I learned that composition isn't just about writing perfect papers but is rather the creating of something using many different mediums." Learning what to use and how to create within different contexts and mediums appears to be a habit of flexibility facilitated by service learning, as students saw writing as an unfolding process with means and ends that may not be clear from the outset. As one student explained:

> There are multiple ways to approach a problem, and at times, the best way doesn't make itself apparent until when it's inconvenient.

Though I would never recommend procrastinating, there were moments when, because I waited a bit longer than I would have liked, the final project was much more efficient and attractive. It may have made the project more difficult as a whole, but the end result benefitted because of it.

In a way similar to students' responses, flexibility for instructors involved learning to adapt their pedagogy to fit the new rhetorical situation of the classroom. One instructor wrote that more so than in their other classes, their service learning project (and class) was less planned ahead of time. Indeed, teaching service learning seemed to facilitate the instructors relying less on predetermining how and what students would accomplish and more on allowing learning to unfold, with students taking on more agency for the learning. Another instructor attested that when she moved away from the front of the classroom, students ended up taking charge and getting everything planned. She reflected in our group interview that, "maybe we needed a day like that where my external authority needed to be removed in order for that to happen." A third instructor added that service learning was "a lot about trusting them [students] to take responsibility." For the instructors, teaching a new pedagogy went hand in hand with becoming aware of the value of flexibility as a teacher.

Emergences of Failure as Integral to the Development of Persistence
To see the success of being engaged and flexible means that the students had to follow through with their choices to reach course goals and to see their writing in action. In other words, they had to develop "persistence: the ability to sustain interest in and attention to short- and long-term projects" (*Framework* 2011). A student response provides a useful analogy: "[the writing for my service project] was a little different than just what I had written before. Using analogy, it was like now I solved and built a house using my Math and Science knowledge whereas before I only solved for equations and problems for Math and Science." To see the house built means that students cannot stop part way; rather they must be persistent in order to achieve their goals, and as another student indicates, not shy away from the oftentimes tedious diligence it may take to ensure success:

The most valuable thing I learned is the need for attention to detail when composing. When you are writing for a public audience, every rhetorical detail of your piece makes an impact and must be carefully considered. Taking the time to scrutinize every element of your work can pay dividends in terms of accomplishing the goal of pursuading [sic] your audience.

Although the student couches persistence and diligence in terms of "persuading your audience," this student's response evidences a willingness to fully engage in the process of writing and to see both the short-term (attention to detail) and long-term (accomplishing the goal) persistence required of this process.

Another element of persistence that emerged across the students and the instructor data sets was the acknowledgement of failure as a learning outcome for the course. Congruent with students who described writing as a "messy process" that involves risk-taking and necessitates "being unafraid of failure," instructors also all noted in their responses how they had learned the value of "failure before success"—and for giving space for this in the classroom. This pushed instructors to "grapple with challenging ideas, texts, processes, or projects." Instructors noted that, more so than in their previous "traditional" composition courses, students in their service learning courses revised and revised again until a project was "professional." Revision was not tied to a preset required number of instances— you'll write three drafts and then a final version—instead, it was responsive—we'll keep revising until it's in a format that can be shared with the community partner. This recognition of necessary flexibility in response to service learning also paralleled instructors' processes for course planning. Instructors noted that their course planning shifted away from predetermined calendars and guidelines to instead, as one instructor participant put it: "emphasize how a capable writer must figure out for him/herself what characteristics a given piece of writing should have based on its rhetorical situation." Redefining themselves as primarily facilitators in the service learning classroom, instructors indicated having to take a step back to allow students to discover their own answers to problems; giving this space to students enabled them to become more responsible for their own learning.

The learning experiences evident within the above examples depend upon instructors and students acknowledging that habits of mind like engagement, flexibility, and persistence cannot be artificially extracted from one another. Tracing habits for learning within the practices and sentiments of students and instructors reveals the ways in which students engage with the world around them and learn to see writing as integral to that engagement. Habits for learning, in these instances, are not predetermined outcomes, but rather heuristic traces that emerge within both students' and instructors' reflections on learning.

Emergences and Implications
Through heuristic tracing, we developed a better understanding of the environments that would support our students' and instructors' development in service learning courses. For example, by understanding students' descriptions of engagement and instructors' redefinition of engagement, we were better able to prepare service-learning instructors to consider the ways that engagement in an active, service-learning classroom might, in fact, appear very different from their expectations. That is, actions that they might have traditionally perceived as disengagement—leaning on the wall, sitting on the windowsill, etc.—could be purposeful physical moves that removed the teacher's embodied authority in order to reinforce the shared responsibility of all members of the service-learning class. This insight had implications not only for adjusting teacher training but also for reexamining other programmatic processes such as teaching observations in which certain kinds of activity and certain teacher placements are sometimes privileged.

Additionally, by understanding the integral role that failure played in the service learning classes we studied, we developed new ways to help instructors make time and space for failure and to communicate to students the expectations for their work and its quality. This often involved emphasizing that writing situations beyond the classroom require constant, regular revision and revisitation across many moments and across different writers. The reimagining of the students' roles and the potential of their "failures" to help answer a question or develop an alternate strategy, further aided students and instructors in reimagining their roles as contributors rather than

culminators—a positioning that better reflects the reciprocal nature of the service-learning relationships our program aimed to cultivate.

LEARNING TO SEE HABITS OF SERVICE LEARNING THROUGH HEURISTIC TRACING

Heuristic tracing helped us understand habits of learning as they emerged within the service learning contexts of our composition program. By including students' reflective responses alongside reflections from instructors, heuristic tracing enabled us to gain a broader view of learning across all participants in the service learning classrooms. While many assessments focus only on student learning, our combined participant pool of instructors and students offered valuable insight into the relationship between instructor and student learning. Habits for learning, in this case, were not limited to students; they were just as recognizable in instructors' reflections: both instructors and students tended to espouse their learning—about engaging with audiences outside the classroom, adapting to community expectations, and persisting with multiple revisions for better results—in ways that aligned with the habits of mind.

As we noted earlier, at the time of our tracing, we were working not only to expand the kinds of activities included in programmatic assessment but also to expand the participants. Through heuristic tracing, we were able to extend inclusion to instructors with the intention to include community partner data in subsequent tracing activities. While this article does not report on our tracing with the community partners involved in these service learning courses, we see great potential for integrating the narratives of community partner experience to triangulate and contextualize the student and instructor narratives. Additonally, we imagine fruitful possibilities for activities such as focus groups that include members from each group of participants—students, instructors, community partners, and program leaders—in order to facilitate conversation and reflection that draws from a range of expertise and experience with the service-learning activities. By including further data from partners, we might consider whether the habits that emerged were productive (or not) for the community partners involved and whether these emergences aligned or conflicted with the their goals and approaches, especially as the habits that are typically defined in formal statements or scholarly

conversations tend to privilege school and career readiness (Gross and Alexander 2016). For example, in the course in which students worked with partners at city hall to develop videos that raised community awarenss of local history, our informal conversations with the community partners highlighted the levels of experience expected of students who may or may not have had previous access to structured support for composing videos. Heuristic tracing could have structured opportunities for community partners to articulate these expectations, allowing the partners to teach the students and instructors about those expectations and to learn about the limits inherent in partnering with a composition course as opposed to an advanced one.

By extending heuristic tracing to community partners, composition program participants might better understand community expectations for writing and the ways those expectations align with or diverge from their program's aims. Such contextualized learning about local community perceptions could help program leaders to develop outreach regarding the possibilities for composing and/or to integrate broader community perspectives into the ways they articulate and create program goals. By creating mechanisms for involving all program participants in articulating service learning's value and understanding the elements that are key to its effectiveness, heuristic tracing offer a meaningful, participatory model of engagement and assessment.

Opening programmatic assessment to heuristic tracing also better reflects an ecological model of classroom environments. We end this article with a claim then, that heuristic tracing ultimately endeavors to shape service learning environments. For us, heuristic tracing productively affirmed beliefs we had about the affordances of service learning, as well as what made the classroom experiences in these service learning and non-service learning courses distinct. At the same time, it shifted our perception of the primary learning outcomes for students and helped to highlight what students valued about effective writing inside and outside of the classroom. In this way then, heuristic tracing is an assessment approach that is less about measuring what we or students know in order to uphold our student learning outcomes, and more about positioning assessment

as an opportunity for collaborative, programmatic learning and change. Such opportunity for change is not unique to service learning contexts, and we see great promise for the practice of heuristic tracing in other high impact learning environments that seek to harness context and environment as catalysts for habits of learning that are often left untraced.

REFERENCES

Adler-Kassner, Linda, Robert Crooks, and Ann Watters. 1997. "Service-Learning and Composition at the Crossroads." In *Writing the Community: Concepts and Models for Service-Learning in Composition*, edited by Linda Adler-Kassner, Robert Crooks, and Ann Watters, 1-17. Washington, DC: American Association for Higher Education.

Broad, Bob. 2003. *What We Really Value: Beyond Rubrics in Teaching and Assessing Writing*. Logan, UT: Utah State University Press.

Council of Writing Program Administrators. 2014. *WPA Outcomes Statement for First-Year Composition (3.0)*. Council of Writing Program Administrators. http://wpacouncil.org/aws/CWPA/asset_manager/get_file/350909?ver=278 .

Council of Writing Program Administrators, National Council of Teachers of English, and National Writing Project. 2011. *Framework for Success in Postsecondary Writing*. WPA Council. http://wpacouncil.org/files/framework-for-success-postsecondary-writing.pdf.

Cushman, Ellen, Guiseppe Getto, and Shreelina Ghosh. 2011. "Community Mediation: Writing in Communities and Enabling Connections through New Media." *Computers and Composition* 28: 160-74.

Deans, Thomas. 2000. *Writing Partnerships: Service-Learning in Composition*. Urbana, IL: NCTE.

Furco, Andrew. 1996. "Service-Learning: A Balanced Approach to Experiential Education." *Expanding Boundaries: Serving and Learning*. Washington DC: Corporation for National Service, 2-6.

Getto, Guiseppe, Kendall Leon, and Jessica Getto-Rivait. 2014. "Helping to Build Better Networks: Service-Learning Partnerships as Distributed Knowledge Work." *Reflections* 13, no. 2: 71-95.

Gross, M. Daniel, and Jonathan Alexander. 2016. "Frameworks for Failure." *Pedagogy*, 16 (2): 273–295.

Hallman, L. Heidi, and Melanie N. Burdick. 2018. "Service-learning, Writing and Reflection: A Bakhtinian Analysis." *Changing English* 25: 331-350. doi: 10.1080/1358684X.2018.1504619

Huot, Brian. 1996. "Toward a New Theory of Writing Assessment." *College Composition and Communication* 47, no. 4: 549-566.

---. 2002. "(Re)Articulating Writing Assessment for Teaching and Learning." *All USU Press Publications.* https://digitalcommons. usu.edu/usupress_pubs/137

Inoue, Asao. 2019. "How Do We Language so People Stop Killing Each Other, or What Do We Do about White Supremacy?" *Conference on College Composition and Communication.* Speech presented at the Conference on College Composition and Communication, March 14.

Johnson, Kristine. 2013. "Beyond Standards: Disciplinary and National Perspectives on Habits of Mind." *College Composition and Communication* 64, no. 3: 517-541.

Krzus-Shaw, Kassia. 2017. "Bridging Gaps and Creating Rich Service-Learning Experiences for Marginalized Students." *Teaching English in the Two Year College* 44, no. 4: 351-371.

Kuh, George D. and Ken O'Donnell 2013. "Ensuring Quality & Taking High-Impact Practices to Scale." Washington, DC: AAC&U.

Leon, Kendall, Laurie A. Pinkert, and Kathryn Trauth Taylor. 2017. "Developing Accounts of Instructor Learning: Recognizing the Impacts of Service-learning Pedagogies on Writing Teachers." *Composition Studies,* 45, no. 1: 39-58.

Lockeman, Kelly, and Lynn E. Pelco. 2013. "The Relationship between Service-Learning and Degree Completion." *Michigan Journal of Community Service Learning* 20, no. 1: 18-30.

Miles, Matthew, Michael Huberman, and Johnny Saldana. 2013. *Qualitative Data Analysis: A Methods Sourcebook.* Los Angeles, CA: Sage.

Mungo, Monita Hollis. 2017. "Closing the Gap: Can Service-learning enhance Retention, Graduation, and GPAs of Students of Color?" *Michigan Journal of Community Service Learning* 23, no. 2: 42-52.

O'Neill, Peggy, Linda Adler-Kassner, Cathy Fleischer, Anne-Marie Hall, Carol Severino, Bruce McComiskey, Kristine Hansen, Judith Summerfield, Philip M. Anderson, and Patrick Sullivan. 2012. "Symposium: On the 'Framework for Success in Postsecondary Writing.'" *College English* 74, no. 6: 520-553.

Pine, Nancy. 2017. "Deeper and More Personal: The Role of Narrative in Service-Learning." *Teaching English in the Two Year College* 44, no. 4: 372-387.

Reed, Susan C., Helen Rosenberg, Anne Statham, and Howard Rosen. 2017. "The Effect of Community Service-Learning on

Undergraduate Persistence in Three Institutional Contexts." *Michigan Journal of Community Service Learning* 21, no. 2: 22-36.

Scott, J. Blake and Laurie A. Pinkert. 2020. "Integrative Techne, Transdisciplinary Learning and Writing Program Design." College English 83, no. 1. (forthcoming).

Sullivan, Patricia and James E. Porter. 1993. "On Theory, Practice, and Method: Toward a Heuristic Research Methodology for Professional Writing." In *Writing in the Workplace: New Research Perspectives*, edited by Rachel Spilka. SIU Press, 220-37.

Summerfield, Judith and Philip Anderson. 2012. "A Framework Adrift." *College Engish* 74, no. 6: 544-547.

Wurr, Adrian. 2002. "Text-Based Measures of Service-Learning Writing Quality." *Reflections: A Journal of Writing, Service-Learning, and Community Literacy* 2, no. 2: 41-56.

Yancey, Kathleen Blake. 2016. *Rhetoric of Reflection*. Logan, UT: Utah State UP.

NOTES

1   We would like to acknowledge the contributions of Kathryn Trauth Taylor to the collection and preliminary analysis of the student and instructor data that is discussed throughout this article. Katie was an invaluable member of the initial research team whose insight shaped our development of the strategies we describe here as heuristic tracing.

Laurie A. Pinkert is an Assistant Professor and Director of Writing and Rhetoric Undergraduate Programs at the University of Central Florida, where she oversees undergraduate service learning and internship courses that engage community and industry partners. She previously served as a faculty member and Writing Program Director at Humboldt State University where she partnered with local middle school teachers to engage college-level composition theory students in the development of literacy-based units for subjects across the curriculum in K-12 settings. Having participated in service learning as a student, instructor, and program administrator, she is committed to designing innovative writing courses and programs that connect students to their communities. As a scholar, Laurie draws on her background and experience in program administration to investigate the relationships between writing practices, pedagogies, and programs across the curriculum and beyond the university.

Kendall Leon is currently an Assistant Professor of Latinx/ Chicanx rhetorics in the Department of English at Chico State University. Her teaching employs community engaged pedagogies across courses and levels, and her research interests include community writing, organizational writing, and professional writing.