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## **MULTIPLE LAYERS OF PARTICIPATION: WORKING WITH STUDENT LEADERS IN OUR 360°**

*Jody Cohen, Carola Hein, and Victor Donnay, Bryn Mawr College*

### **Introduction**

In the spring semester of 2012, we — Jody Cohen from Education, Carola Hein from Growth and Structure of Cities, and Victor Donnay from Math — taught three linked courses as part of the innovative interdisciplinary 360° program at Bryn Mawr College. The goal of the 360° program is to look at a topic from multiple perspectives and from different angles; hence the name 360°. Our 360 was titled “Perspectives on Sustainability,” and included the three individual courses “Educating for Ecological Literacy,” “Building Green,” and “Math and Sustainability.” The sixteen students participating in the 360 had to take all three courses, leaving them time to choose one other course. The 360 also included activities and projects across our courses, such as a weeklong workshop with Korinna Thielen called “What a Waste” in which our students conceptualized and implemented mini-projects on campus; workshops with Karen Stephenson on social networks and Leith Sharp on becoming change agents; field trips to such sites as the Philadelphia Waterworks and Harriton House; group Praxis projects such as helping to develop school-based urban gardens and creating educational materials for a new community center; and final project presentations for an audience from the campus and the community.

We conceptualized and co-planned our 360 for almost a year before teaching it. Our work was supported by course development funding from sources including the Bryn Mawr Provost’s Office and the Andrew W. Mellon Foundation summer stipend for Environmental Studies courses in the Humanities and Social Sciences (“Building Green”). We also received support for the innovative teaching required by the 360 through the Provost’s office. And we were significantly supported by two programs sponsored by The Andrew W. Mellon Teaching and Learning Institute (TLI): the Students as Learners and Teachers (SaLT) program, through which faculty members and student consultants partner to prepare prior to teaching, analyze while teaching, or assess after teaching a course, and the TLI-2 program, through which faculty members who have already participated in a TLI forum work together (also with student consultants, if the faculty members wish) on a focal theme or project (see <http://www.brynmawr.edu/tli/participate/faculty.html> for all TLI options).

Even with this lead time and support, we found that as we taught and lived it, the 360’s multiple goals and many “moving parts” — working interdisciplinarily and collegially and in various kinds of contact with the world beyond our classrooms and campus — made this a dynamic and challenging experience. This was also true for the sixteen students, whom we had chosen from 23 applicants with the goal to create a diverse group. As a result, the students ranged from freshman to seniors, represented diverse majors and the three colleges in the Tri-College system (Bryn Mawr, Haverford, and Swarthmore). Many of them were active in groups that focused on green and sustainable issues. In the 360, students had the opportunity to connect their activism with academics and praxis-type research. This may be part of the reason that students opted to spend time together even beyond the countless hours that they met while taking all three courses and participating in all 360 activities.

## **Student leadership in our 360**

This learning community was further layered by the various positions of leadership and collegueship taken up by three additional students — all seniors who were not in the 360 but had been invited to participate in various ways by the professors — and one freshman who was in the 360 and chose to add an Independent Study as her fourth course to support her learning and leadership in relation to the Praxis component. In this essay we consider the 360 as a site where students can take up positions of leadership and collegueship that enhance individual courses and the cluster of courses, enriching the understandings of professors and students and building innovative learning communities; these opportunities for moving into new roles also offer the students who take them up (referred to from here on as student leaders) occasions to learn about learning and teaching and to blend theory and practice in ways that expand their understandings and their skill sets.

We view these multiple layers of participation as inviting situations for students and faculty to experiment with and experience new ways of researching, teaching, learning and changing society. In the following section, we describe the differently configured ways in which we as professors and the student leaders we worked with took up the opportunities to create roles to meet needs and visions, and we consider how these multiple players and perspectives informed our shared project. We conclude by asking what implications our experience — and our naming and discussing it in this way — might have for how the TLI supports diverse roles to, in turn, support and challenge professors and students in a range of teaching and learning situations. We also ask what other institutional and academic opportunities might exist to provide students with interdisciplinary and multi-layered learning experiences.

## **TLI-2 and student leaders' role in the planning phase**

The development of the collegial relationships among the professors was a critical foundation for bringing student leaders effectively into the mix. In the year preceding the 360 we had spent numerous hours discussing the overarching theme and content of the courses and the implications for our departmental and disciplinary teaching and learning goals, and therewith laid the foundations for the detailed preparation of the 360.

As professors we hoped that the student leaders would provide a kind of intergenerational network, bringing their perspectives and resources as students and also as individuals who were student athletes, Math/Cities/Sociology majors and campus leaders in environmental issues, from different racial/ethnic backgrounds, etc. We anticipated that they would help us as professors to see from our 360 students' perspectives which was particularly important given the newness of all aspects of the endeavor: the courses themselves, the call to intellectual work across disciplines, the diverse extra-classroom components, and the structure of a cluster in which our students would take three of their four courses together and in a single space. How would layering student leadership into this mix complicate and also crystallize these occasions for teaching and learning?

During the semester before teaching our 360, we three met weekly in a TLI-2 that supported our planning. This structure was a great aid in bringing to fruition much of our earlier preparatory

work, e.g. fully articulating our goals and themes; locating, deciding on, and framing our speakers and other visitors; designing our field trips; coordinating all of these components as well as our three course schedules so that there was some (though certainly not full!) coherence; and making logistical decisions about everything from course times and location to the student application process for places in the 360.

Importantly, two of our student leaders, Steve, whose Cities thesis Carola was advising simultaneously, and Kaushiki, whose Math thesis Victor was supervising, were also able to join us for some of these sessions. Thus the TLI-2 gave us a forum to discuss our ideas and decisions with two of our student leaders, who offered us valuable insights regarding a range of questions, including how we should schedule our classes and field trips to respect other demands on students' time, our application questions and criteria for selecting students who applied to participate, and how we'd design our cross-course sessions. Kelly Sheard, as our Coordinator from the Praxis Office, which supports courses in the realm of service learning, also contributed her thinking and knowledge in terms of developing field trips and project-based partnerships.

While these are some of the specifics that occupied our time and attention, beneath this work — as we questioned, pushed, and encouraged each other — we were also reflecting together on what we saw as valuable for our 360 students and where we wanted to push, challenge, and support them. Thus we were developing the collegial relationships among ourselves and with the student leaders that would help us work intensively together while teaching our 360. We began many discussions by asking Steve and Kaushiki to give us “a student's perspective” on various questions, and this in itself was quite useful. As we got to know each other better, though, professors as well as student leaders began to both ask and offer more, blurring some of the usual lines between our role as “teachers” and theirs as “students.”

In one meeting at the end of the semester, not long before we'd start teaching, we were talking about what each of us might do to prepare and/or debrief students at our first field trip to Harriton House, to be held at the second meeting of the class, during the first week of the semester. As we thought through the ways we could both orient and disorient our students to serve their learning in our three disciplines, Carola suggested that we should do the tour of the grounds twice, in the morning and again in the afternoon; in the middle we'd debrief the first tour and offer inputs from our different disciplinary perspectives that would prepare students to guide the second tour with their questions. The Cities TA, Steve first helped to identify what kinds of knowledge would ground students from a Cities perspective; then he surprised us by using his lack of background in Education to help us consider how students might respond to learning about the relationship between experience and learning through this doing of it. Bringing her interest and experience in the field of education, Kaushiki built on this by framing the key question of how much uncertainty would prompt students' inquiry rather than shutting down their learning. Our multiple vantage points made for a lively exchange and an original and effective field trip the second day of class to a site no more than ten minutes from campus.

This very first fieldtrip also allowed us to bring in the voice of student participants, who gave small presentations on their topic of interests that were related to the themes of farming and rural-urban relationships addressed particularly during the visit. As we had selected 16 students for the course at the end of the fall semester, we had had the opportunity to meet the group

already during the fall semester, get to know them and even assign some preparatory work. This particular set-up allowed us to start the course without the usual “shopping period” and to involve students from the first week on. Furthermore, the student leaders had already begun to model a kind of collegiality that encouraged our students to also take up positions of knowledge in the group.

### **Becoming a teaching community**

While Victor and Carola were already working with Kaushiki and Steve, preparing them as TAs for their classes — a system that some departments use to create learning and teaching opportunities for advanced students — and offering them also the opportunity to work as student consultants, Jody began to talk with a third student about playing a student consultant role for the cluster as a whole. Mia joined our teaching team in December, as a student leader who would participate in and give feedback across the classes and activities of the 360. So when the course cluster officially started in January, we had already begun to come together as a teaching community.

Becoming a teaching community of students and faculty together engaged multiple members in seeking each other’s and offering our own perspectives on a shared set of processes and goals. We were learning the kinds of strengths, questions, desires, and uncertainties each of us brought to the group, and how to draw on these to further our common goal of designing and teaching our 360 effectively to our students. The situation was such that, like the professors, the student leaders needed to keep the interests of the 360 students in the forefront of their minds and intentions. At the same time, as professors we saw the student leaders as students as well as colleagues. For example, Victor was advising Kaushiki in her thesis in relation to this work, and furthermore, Kaushiki was preparing to teach after graduation, and was a student in Jody’s Critical Issues in Education class; together Victor and Jody decided on a way that Kaushiki could promote her own as well as Victor’s and the students’ needs by doing some regular teaching in the Math and Sustainability course.

And of course the student leaders were also looking to hear and meet our stated needs and desires while also at times discerning gaps and issues that we didn’t know we needed to address. While Jody had asked Mia to support a Praxis group that was creating curriculum, an area Jody knew Mia had significant experience with, Mia also discerned that she could offer her skills and insight to another Praxis group, and brought that to Jody. Likewise, as a student living and eating in the dorms, Mia was part of conversations with our students that then guided what she asked them in more formal venues such as interviews as well as the kinds of issues she brought to the attention of the rest of the teaching community. Again, the ambiguity of the student leader’s role allowed her to move in and out of peer, collegial, and even mentoring relationships with students and also, in a sense, with professors, with the goal of bringing to light the inevitable gaps and help us as a community to consider and sometimes address these.

### **Teaching the 360 with student leaders**

The complexity of the 360 not only in terms of topic and disciplines but also in terms of teaching became evident as soon as the courses started. The multitude of roles of the 360 participants — faculty, TLI students, TAs, students, Praxis Coordinator, Praxis teachers and students — but also the numerous layers of expectations — new knowledge and skills as well as desire to relate volunteering and activism to academia — made this a fascinating and challenging experiences. Meanwhile, we were all still very much in a process of getting to know each other and of exploring the parameters and possibilities of our own and each other's roles. In this section we examine specifically how each of us worked with student leaders: the TAs, the TLI student consultants, and the student coordinating a Praxis project. And to note about the student consultant role: As TLI student consultants, Kaushiki and Mia, not only participated in our 360 but also were part of a TLI student consultant seminar that provided a supportive, reflective forum for their work with faculty and courses.

### **Carola**

My approach to the multi-layered participation of student learners involved primarily the Teaching Assistant (TA) Steve, who had participated in the TLI 2 as an advisor, albeit not as a student consultant. While the regular 360 students had to take all three courses, this was an opportunity to install another layer of teaching and learning for a select senior with specific interests in this area and who could not free up three courses. He had originally planned on participating in the TLI but ended up not having the time for the pedagogy seminar.

The work as a TA is challenging in multiple ways, it also offers many rewards. A TA needs extensive disciplinary knowledge as well as social and pedagogical qualities so that he can engage with and lead other students who may be his peers. Close mentoring by a professor prepares the student for graduate work, allows him/her to gain teaching experiences and establishes a relationship of trust and support with a faculty that I see as a pre-requisite for successful graduate work (and convincing reference letter writing.) For the particular setting, I was furthermore looking for someone with interests and knowledge in sustainable construction.

A careful assessment of the student is an important basis for a successful TA. I had taught Steve in four different settings — lecture, 200 and 300-level seminars as well as senior seminar before the 360 and knew his academic and personal qualities as well as his interest in sustainability. In the seminar classes, Steve's skills as a listener and leader of discussions were evident. As a sophomore in a class with several seniors he demonstrated self-confidence and was not intimidated by the presence of seniors in class. He could easily keep up with them in terms of intellectual reflection, theoretical engagement and depth of research.

His analytical skills were similarly impressive. In his investigation on the question if and how the Olympic games 2012 in London are contributing to the sustainable renewal of a neighborhood, he used secondary and primary sources and reflected on urban regimes as the connecting force between planning and urban transformation. In his approach he was inspired by innovative interdisciplinary concepts and demonstrated that he is able to combine studies of the built environment and community development with his interest in economics and sustainability issues.

Over the years, I also had the opportunity to get to know Steve's work outside the classroom, particularly his interest in issues of sustainable business and their impact on local communities. He was personally involved in community building such as through an internship with Green Mountain Habitat for Humanity in the summer of 2010. The Sustainable Business Seminar offered through Haverford College's Center for Peace and Global Citizenship specifically inspired him to look at the Triple Bottom Line model that attempts to measure corporate success through impact on People, Planet, Profit.

In all these settings, Steve eagerly took on leadership roles during group activities. He was familiar with my teaching style and I was certain that he was reliable, hard, working, dedicated and independent. I knew that he was able to provide insightful and innovative comments and prepare inputs that would model research for the students and serve as a linkage between my courses and their work. Based on his personal qualities, his passion, reliability, thoughtfulness, independence and enthusiasm, I invited him to help me prepare and ultimately to be a Teaching Assistant in a new course called "Building Green." Throughout our TLI2 meetings but also beyond that he helped me reflect on the setup for the course. As student-head of Haverford's Committee for Environmental Responsibility he had additional credentials for being a leader in the 360 course.

Based on our close relationship I trusted him to be able to provide support in the presentation of the course materials, model research and research presentations for other students, lead discussions, connect to the other students in the course, help them and test their responses. During the course, Steve took on teaching assignments and helped facilitate discussion. For the 360, I worked closely with him in preparing the syllabus and the weekly units. We discussed the different course units and he prepared short presentations on select topics that helped exemplify my broader ranging lectures. For example, I asked him to introduce students to the definitions and implications of different approaches to sustainability from a physical, cultural, social, or economic standpoint. He also gave a presentation on native American architecture, on the passive house and on ecotopian novels. I was impressed by how well he did and how well his presentations and discussion prompts were received by the class.

Inviting select students as Teaching Assistants for course credit, involving them in pedagogy and teaching, and using them to model presentations and discussion leadership is beneficial for the faculty, the advanced student and the 360 students, and allows a select student to gain new skills as well as participate in a single course of the 360 in a particular and well-framed context. His closer ties to the other students also served as checks and balances for the 360 as a whole (s. Jody's discussion). In the context of close supervision and collaboration, many pedagogical issues can be addressed directly in conversations between the faculty member and the TA. This particular role may be yet another facet of a TLI to be developed.

A student who participates as a Student Consultant through the TLI may bring other kinds of questions and interests to the table.

## **Jody**

As an Education professor schooled in Freirian notions of partnership between “teacher-students” and “student-teachers,” I have long held a philosophical commitment to engaging students as advisors and partners in the classroom. I have incorporated this kind of work in formal and informal ways in my teaching, including brief one-on-one conversations with all students early in the term; collective brainstorming of classroom aspirations to which the class returns periodically throughout the semester; and simply remembering to check in with students about their perspectives on our work together.

Since the inception of the TLI at Bryn Mawr, I have had the opportunity to reflect on and deepen this approach in conversation with colleagues and with student consultants in my classes and in an earlier 360. In this case, the fact that my course was most intimately associated with the Praxis II piece of the 360 which involved intensive project-based work with sites informed my invitation to two students to take up leadership roles: I invited Mia to serve as the overall 360 student consultant, including Praxis support, and Samyuktha to act as coordinator for the two closely related Praxis projects.

My beliefs as a teacher and my experiences with soliciting student perspectives and, more specifically, with the TLI and 360s all contributed to shaping the way I entered into this work with Mia this past semester. Also relevant are my relationships with my 360 colleagues and with Mia herself. I hadn't really worked with Victor and Carola before this, and though we'd had a great collaborative experience with designing our 360, I was aware that they also had students supporting their courses in various ways and didn't want to presume on their turf in terms of working with Mia across the 360; on the other hand, I knew from my previous 360 that there would be value in having a student consultant working with the cluster as a whole. Also, I'd had Mia in three classes, and had talked with her about her work with the TLI. I trusted the quality of her thinking, her relationships, and her intentions. We were both willing to take the risk of diving into this situation without first clearly and openly defining her roles; instead we agreed to be in lots of communication as we felt our way to what would be the richest and most useful things for her to do, in relation to the other student leaders, my co-teachers, and of course the 360 students.

Mia played a complex, multifarious role in our 360: she attended and participated in many 360 events and a number of my classes; interviewed students individually and in small groups throughout the semester about their experiences in the 360; took notes and helped facilitate several full group feedback sessions; and supported another student leader and two Praxis groups in their work with outside community organizations. She also and simultaneously participated as a student in another 360, which complicated her insights in rich ways. Listing Mia's activities is important but also doesn't do justice to the depth and quality of her role in our 360, testified to in other ways as by a student's chance comment to me about how valuable Mia's presence was to our class, and by Mia's own balancing of advocacy and investment in our 360 with her genuine curiosity and skills with data collection and reflective analysis.

Even now as I write this in July, Mia continues to analyze and write from several data sources, including our students' final (anonymous) surveys, their portfolio writing about the 360, and the notes from our final feedback session, with continued support from the TLI.



Throughout the semester, Mia's perspective was consistently rich and helpful to me and I'd say to all of us: she offered regular feedback on students' perspectives, sometimes confirming my/our hunches and sometimes alerting me/us to questions and issues that I/we hadn't been aware of; she brought an invested, carefully considered ear and eye to our students, particularly critical early in the semester as we were all riding a roller coaster of excitement and dissonance; and she provided insights and support to particular students and professors as pertinent issues arose for us. Often Mia's observations and insights, communicated to me in person or via email, struck me as important for my 360 colleagues to hear, and I either arranged for us all to communicate directly or, given difficult schedules, acted as a conduit so that Mia's insights could guide the professors to respond in thoughtful ways to our students' concerns.

As an example, I note an instance early in the semester in which Mia was using her overlapping experience as student in another 360 and as Student Consultant in this 360 to reflect on what it's like to be a student in this new program. After a round of interviews/focus groups with students in our 360, Mia wrote me this email:

“Much of what was raised by students (in the Sustainability 360) is similar to what has been discussed in my own 360. I think because the students are all in the same classes together and are part of a ‘program’ that the stress they feel is compounding. I do not necessarily think it is even more work than if they were to be taking three separate classes it just feels like more work. I would say this related to both 360 [clusters]. I think that the students should be told in some sort of way that the environment/infrastructure of a 360 might lend itself to students feeling more overwhelmed because there is less of a mental break and because what they are all studying is in relationship to each other. I think normally students shut down their receptors to thinking/questioning/etc when they read for other classes or take other classes because you are taught to read and learn within a discipline as opposed to cross disciplinary approaches. Because there isn't that division between one subject and another content-wise, socially or environmentally (classroom wise) it might be making students feel as if the presence of the 360 is constantly there.

“I am not sure exactly how to work with this issue, but I think by having a conversation and asking students to think about why work/thinking feels/is experienced differently. I do think this raises a larger issue about how as students we think that courses should be separate, that disciplines are separate from one another and that learning cannot be done in layers of difference or disagreement. I think that transition from courses as individual entities to the 360 program where the community, organization, curriculum and infrastructure create this alternative and integrated learning community is forcing students to confront their learning differently.”

The perspective that Mia offered here was one that I brought back to my colleagues and that we all then used as a springboard for conversation with our students. It informed the ways we planned and reflected on our work together thereafter, not simply as a caution to “lighten up” our expectations — in fact, in some senses we intensified our expectations but were more deliberate about articulating them — but more complexly as it drew our attention to the meta-cognitive level for ourselves as well as our students. For example, we designed an intensive, cross-course final project and built in significant points of scaffolding along the way, including several

structured points for students' meta-cognitive reflection on the hands-on and interdisciplinary dimensions of this learning experience.

As someone who graduated from an innovative urban high school and then become an Education and Sociology student at Bryn Mawr, Mia brought relevant frameworks for thinking about how 360 students were engaging with the opportunities and challenges of this new program. More broadly, she smudged the lines between her student self, her researcher self, and her teacher self — all facets of her work as a student consultant — giving her a unique insight into not only the meaning of students' experiences but also how as professors we might understand and address this. Although our students were aware of Mia's role, early on they nevertheless seemed to experience the way that the professors stayed attuned and responsive as surprising, perhaps in light of their many years as students without a mediating presence. Later in the semester, though, as the roles of Mia and the other student leaders became a more familiar part of our dynamic as a group, and students began to take up parts of these positions themselves — for example, offering feedback to professors.

I also want to briefly mention Samyuktha, who was in the 360 and also did an independent study with me that put her in a leadership role with a group of 360 students. Mia, along with our Praxis Coordinator, Kelly Sheard, and I supported Samyuktha in this role, which involved her in some delicate negotiations as both a freshman taking on leadership with older students and also a student in the courses. By taking up a role in which she was a liaison with our partner high school and coordinated two groups of 360 students — one group designing and teaching Environmental Science classes and another working in tandem but focusing community organizing to support the creation of an urban garden — Samyuktha made possible a complex, multifaceted relationship between our 360 and the partner school. The principal, teacher, and five students came to our final presentations, and currently Samyuktha is an intern for our 360 working with two interns from the high school to continue to develop the garden and to create a video about the project.

Even though or perhaps because her role was different from that of other student leaders in some key ways, Samyuktha's inclusion here exemplifies the kind of flexibility and expansiveness of this notion of students as leaders, in this case inside the complex housing of a 360. Rather than shying away from working with students as multiply positioned as simultaneously learners, leaders, and teachers, we are encouraged by this example to experiment more widely with possible student roles and configurations.

## **Victor**

I first met Kaushiki the spring before we did the 360. She was interested in undertaking a senior thesis the following year that would have a math modeling component to it and I was the faculty member in the department who was most experienced in this area of math. As we talked, I learned that she also had a strong interest in education, was completing a minor in education and would be going home to Sri Lanka for the summer to teach mathematics at the Pannalgama School, a rural school in a high needs area of Sri Lanka. I was impressed by Kaushiki's commitment to education and her strong academic record and agreed to supervise her thesis although we did not yet have a clear idea what her project would be about. Over the past decade,

my academic interests had widened from straight mathematics to include mathematics education and so I was very pleased to have the chance to work with a student who was interested in combining mathematics and education.

When Kaushiki returned to Bryn Mawr in the fall, we brainstormed what her senior research would be. Our goal was to find a project that would combine math and education and we came up with the idea that Kaushiki would learn mathematics related to sustainability, help me develop the teaching materials on sustainability that I would use in the course and then do some teaching of this material during the actual course.

In the fall semester, we met weekly and worked through portions of the text *Alternative Energy without the Hot Air* that I would be using for the class. Each week, Kaushiki read sections of the book and then presented the material to me. When there were issues she did not understand, we worked through them together. These meetings were very helpful to me as they kept me focused and moving forward on developing the material for the course. With the many competing demands on my time, it was a challenge to set time aside to work on course development; but having the weekly meeting with Kaushiki insured that this planning would take place. While I could have done the work on my own, I prefer to work in a collaborative environment engaging in discussions with others. Thus it was much more enjoyable to learn the material by working with Kaushiki than it would have been if I had done the work on my own.

A challenge in linking Kaushiki's senior thesis work to the Introduction to Math and Sustainability course was to make sure that she had the opportunity to engage in mathematics material that was challenging for her. The course was aimed at a general level of student without assuming any math background beyond high school algebra. Fortunately, the text we were using would split topics into two parts. The first half was aimed at just this general level of reader. The second half was presented at a more advanced level involving challenging mathematical derivations of the results. By studying both parts, Kaushiki was able to prepare material that would be used in the Introduction to Math and Sustainability course as well as being challenged in her own mathematical learning.

Some of the sustainability material had a strong science component. For example, energy, power and the variety of units used to measure these quantities such as joules, watts, and kilowatt-hours were to be an important topic in the course. Often in mathematics, we do not put a heavy focus on units so I was rusty on these topics. Fortunately, in addition to her background in both math and education, Kaushiki also had a strong background in chemistry which made her well qualified to study these topics and then, through our discussions, to help me re-learn them.

During the fall, in addition to our weekly meetings focused on math and sustainability, attended our weekly 360 planning meetings and gave input to our 360 development as described above. She also attended the weekly meeting of all the TLI student consultants run by Alison Cook-Sather.

When our 360 finally started, Kaushiki attended all the math classes. She also held a weekly evening problems session to help students with their homework, although only a few of the students attended. In addition to continuing our meetings focused on her math research, we also

met regularly to discuss how the course was going. From her observations of class and discussions with students, she was able to give me useful feedback on the pace of the class and what the students were finding easy and difficult. The students in the class had a wide range of math backgrounds from very advanced math majors to students with math phobia and weak preparation. One of the main topics we discussed was how to teach in the class in a way that would work well for this wide spectrum of students.

Although we were not able to implement it during this initial offering of the course, one potential way to deal with the wide range of abilities in the class would have been to occasionally split up the class and have Kaushiki take the small group of more advanced students. She could have taught them the more mathematically challenging material (the textbook's second half).

On several occasions, Kaushiki taught the class using material that she had developed in the fall. On those occasions, she had also developed homework problems that were assigned to the class and that she then graded. During these classes, I got to be the observer watching how the students reacted to her presentation and how they interacted as they worked in groups on the problems she assigned. I found the opportunity to be a classroom observer very valuable and informative.

One of the topics Kaushiki had been studying, energy use in campus buildings, that we had thought to use in the course, eventually became the main mathematical focus of her thesis. She did a detailed study of the energy consumption of all buildings on campus and estimated how much energy could be saved if a variety of energy reduction measures were implemented. For the class, we were going to have the students carry out these types of calculations for one building but unfortunately we ran out of time before we could cover this topic.

In summary, it was very useful to me in developing and teaching the Introduction to Math and Sustainability course to have a student leader working with me. And our partnership provided Kaushiki with an enriching opportunity to learn and research a new area of mathematics and to explore her interest in teaching. When she was applying for various types of teaching positions at the end of spring semester, potential employers were intrigued by the idea of combining linking math teaching to sustainability and she felt that having this experience strengthened her applications.

## **Conclusion**

Our experience preparing, doing, and reflecting on this 360 suggests the richness of having multiple perspectives intersecting — our own, one another's, our student leaders'. Not only do the three of us as professors bring different disciplinary backgrounds and approaches, but also we worked with student leaders who brought their interest and depth in our respective disciplines as well as an array of backgrounds, knowledge bases, and predilections that we hadn't necessarily known to expect. The many angles of vision available to us here were eye-opening and energizing to our shared project.

Having opportunities to talk through what we were each seeing, thinking about, and doing led to the development of richer, more engaging teaching and learning. With the support of the TLI

and the 360 programs, we took up a number of forums for dialogue: Professors met with individual student leaders, student leaders sometimes attended our TLI-2 sessions, and we informally checked in, planned, debriefed before and after field trips and classes, on campus, and online.

While the diverse ways that our student leaders were positioned — as TAs, Student Consultants, and Praxis team leader — made for a somewhat complicated picture of leadership in our 360, this diversity also contributed to our collective vision of what the role of “student leader” might entail. Layers of collaboration and blurred boundaries between student leaders, professors, and 360 students created a fertile space for teaching and learning.

We want to highlight here the importance of extensive preparation for such a complex, collaborative undertaking — and how beneficial it is to have student leaders as part of that preparation. Likewise, it’s been invaluable to have a student leader participating in our post-360 reflection and learning process. In fact, considering the role of student leaders makes more evident to us the ways that teaching extends beyond the “real time” semester, both before and after; preparing and processing with each other and with student leaders make manifest the reciprocity, the mutually engaging and enriching quality of the experience, and the shared responsibility for the 360.

The TLI and the 360 worked beautifully in tandem to support this kind of collaborative teaching and learning across the usual roles of professors and students. Each of the students we designate here as a student leader had a somewhat distinct relationship with the 360, with two of the four participating in the structures set up to support Student Consultants. In our experience the TLI has been remarkably flexible and responsive in its support for professors and students developing new ways to work together in diverse teaching and learning situations. We hope that our experience, and our sharing of it here, will help to shape TLI’s continued reconsideration and expansion of the range of roles it supports — and how it support students and teachers in these roles — as integral to this innovative work.

Further, we are compelled by the breadth and depth of the learning opportunities available here for all of us in our different and overlapping roles. The world increasingly requires that as teachers and learners we not hold rigidly to our disciplinary and role boundaries, instead looking for ways to consider junctures between and across disciplines and roles in order to assemble teams and ways of thinking sufficient for taking on the complex, specific, and always shifting challenges of our world. Given these worldly demands, which constitute also an exciting invitation to new possibilities in education and particularly in such fields as sustainability, we end with this question: what other institutional and academic opportunities might exist already or be within the realm of our imaginations to provide students with interdisciplinary and multi-layered learning experiences equal to the world’s complexity/challenges?