

The IICC Project: Integration–Insight–Creativity–Character

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In March 2009, the president of Ithaca College issued a challenge to faculty and staff to step outside of their disciplinary expertise to create means for students to make connections across academic fields. The design team directly addressed this challenge by proposing four one-credit mini-courses, based on a series of learning activities that revolved around systems thinking and design. Our project was accepted and serves as an example of a formal design inquiry with a systems approach at multiple levels. In this design case, we describe the project history, the course designs, the many issues we have faced, and how we have made design decisions.

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Context

On his arrival to Ithaca College in 2008, President Tom Rochon engaged the college community in a strategic visioning process. A key outcome of this process was a campus-wide initiative for the development of integrative curricula. President Rochon outlined the broad idea of what he called Ithaca College Integrated Curriculum or (IC)² that involved innovation/original thinking, intentional communities of practice, cross-functional teams, disciplinary depth and content mastery, peer-to-peer accountability, and measurable outcomes. He left the details to faculty and staff to work out.

The notion of an integrative curriculum was not new to Ithaca College, which for a brief period ending in the late 1960s had a six-semester set of integrated course requirements in history, philosophy, and literature referred to as “The Ithaca Plan” or “The Triplum,” nor was it especially new to higher education. However, the renewed emphasis was welcome to many faculty members, including ourselves, who for many years had been seeking to draw closer connections between the College’s professional schools—the School of Business, the Park School of Communications, the School of Health Sciences and Human Performance, and the School of Music—and the School of Humanities and Sciences. The College promotes itself as a “comprehensive college,” and our thought was that “comprehensive” should mean a blending that is deeper than merely taking a smattering of courses in different areas. For example, I (the first author) had often promoted the concept of a “liberal professional education,” as opposed to professional training accompanied by liberal arts course requirements, and faculty had often talked about interdisciplinary, not just multidisciplinary, study.

At one of the first (IC)² planning meetings in March 2009, organizers shared a variety of possibilities, and participants prioritized them by placing stickers next to ideas on flipchart pages. Based on my previous thinking about how to promote deeper, interdisciplinary connections and, particularly, my experience teaching systems thinking and design as a three-credit first-year requirement in the Communication Management and Design (CMD) major, I recognized that many of the goals that were articulated could be addressed more directly than by the means that were being suggested. I added this possibility—“teach systems thinking”—on a blank flipchart page, and I seeded it by attaching all three of my stickers, which were supposed to be distributed to what we thought were the top three ideas. Other participants joined in and added another six stickers to this new idea.

A call for proposals of (IC)² demonstration projects was issued soon after, and to identify potential like-minded faculty collaborators, I shared the systems thinking idea on the college sustainability listserve. I had “broken the rule” in writing the new topic and adding all my stickers to it at the planning meeting,

and the support the idea received there had given me confidence that I might find a receptive audience for my idea and others who might join in and help shape it. I felt that the group of faculty interested and active in the transdisciplinary subject of sustainability education would help me identify more potential “rule breakers.” Importantly, also, success in breaking a rule here, very early in the project, gave me, and the design team that soon formed, the courage to break what we perceived to be rules later on (Grudin, 1990).

The idea of providing direct instruction in systems thinking (see Figure 1) gained support on the listserve and at a subsequent meeting of many of those on the list. I held a planning meeting to develop a brief initial proposal for an (IC)² demonstration project. Four faculty and staff members from the sustainability group helped me to shape the initial proposal. In addition, I did as much background research as I could on how integrative learning and integrated curricula were implemented at other institutions. We submitted the initial proposal in April, and the project was named one of ten finalists in May. The finalists were charged with developing full proposals to compete for funding from within a \$200,000 pool.

Colleagues,

I’m intrigued by ideas shared here, and I’ve been thinking about how to fashion a coherent (IC)² proposal. The key word “integrative” implies a central criterion of an idea’s potential to help students integrate what tend to be taught as differentiated subjects. I imagine you would agree that such integration is inherent in the concept of sustainability. I wonder, though, if a broad framework that accommodated a range of concepts might be more readily accepted and thus more scalable. In other words, sustainability might be the content, while the framework did not dictate that choice.

One idea for this that I have been sketching is a sequence of four one-credit courses taken over a student’s career that directly address skills of integration, essentially seeking to add glue to bind general, liberal, and professional education. (Yes, I know that the rfp says no individual courses; I think this would fall within a “broader plan.”) Below is a first draft of a framework with some sample titles, content, and methods, many of which are well aligned with thoughts shared by others on this list. I have many ideas related to implementation, further details, and so on; I’ll save those for now. If you find the framework interesting (or not), I’d enjoy hearing your thoughts, either privately or to the group.

Thanks,
Gordon

Figure 1. Body of the Art of Integration memo.

The proposal involved designing and teaching a series of four one-credit mini-courses on systems and design thinking (see Figure 2). The courses would start with basic systems concepts and tools, add design, then increasingly move toward applications in academic study, the workplace, and life beyond. Following what I suggested in the Art of Integration memo, we adapted the (IC)² letters to yield the acronym IICC for the course titles, Integration, Insight, Complexity, and Creativity, and sketched a concept for each. For example,

Integration symbolized systems thinking and connected directly to the “integrated curriculum” initiative, and *Insight* was thought to be a consequence of seeing issues from the perspectives of multiple disciplines. We imagined that students would take one of the courses each year over his or her undergraduate career. We decided to keep the proposal very succinct, and we added simple descriptive phrases at the outset and links to criteria at the end, all on a single page.

Integration-Insight-Complexity-Creativity (IICC)

- * direct, intentional preparation for active synthesis, appreciation of multiple perspectives, and contribution to an evolving society
- * an essential complement to rich disciplinary study
- * a sequence of engaging experiences, one per year of students’ careers, one credit each, with flexibility in approach (block course, weekend, etc.)
- * a cohort model with students and team teachers from different schools
- * a broad framework in which many themes are possible
- * the glue that binds general, liberal, and professional education

Integration

Year 1. The Art of Synthesis

- systems thinking (e.g., interdependence, perspective, and complexity)
- a series of individual, small- and large-group learning activities

Insight

Year 2. Lenses to the World

- multi-, inter-, and trans-disciplinary views
- guest experts examine a significant issue(s), chosen by the instructor, from the perspectives of their disciplines; students are guided to differentiate and integrate

Complexity

Year 3. Where the Rubber Hits the Road

- design, innovation, influence, and power in specific contexts
- case studies of planned and unplanned, social and/or organizational change

Creativity

Year 4. Creating the Future

- ethics and responsibility; transformative individual and collective action
- individual- and team-based service learning project(s)

Match to criteria:

Originality — an elegant integration of (IC)2 concepts and a related acronym

Exemplification of the (IC)2 concept — a concrete manifestation of increased breadth and synthesis

Expansion potential to serve many students from across campus — an expanding number of instructors via team teaching and passing along content and methods

Clear, measurable student learning goals — pre/post measurement of systems and design thinking via instruments currently under development

Feasibility, both as a demonstration project and in expanded format — proven success in existing courses and programs and in expansion via team teaching

Potential to capture the imagination of students, faculty and the public — a signature skill set of IC graduates that society’s leaders promote as essential to meeting today’s and tomorrow’s challenges

Resource needs: for faculty members, a combination of workload credit for teaching and reassigned time for development (e.g., development in one block = 1 credit reassigned; implementation with two student groups in the other block = 2 credits of load)

Proposer: Gordon Rowland (with strong support from six H&S faculty members, two staff members, and three students with whom the proposal was shared)

Figure 2. IICC brief proposal.

On learning that the project was a finalist, I sent out notes to the sustainability listserve and to others whom I thought might be interested in joining. I met with the President and Provost, at their request, and in this meeting I was provided with some directions that would improve the proposal's chance of being funded. At the time, I was not sure of the true intent of the meeting, that is, whether it was truly formative or was an initial screening by key reviewers. It may have been a bit of both, but it proved helpful.

The Design Team, Recruitment of Instructors and Support, and Key Concepts

A core group of three other faculty members, all from the Biology Department, one staff member, and I formed the design team at this point, without any formal designation as such, and we made a number of decisions that would be reflected in the full proposal. We shifted the content of two of the courses, reflected in title changes from Complexity and Creativity to Creativity and Character. *Creativity* would involve the application of insight to a significant issue (via a design competition with teams of students, each team including members from different schools at the college), and *Character* would be developed through application and reflection in and on individual service learning projects. Thinking in terms of what was feasible for recruiting instructors and students and for developing content and strategies, we proposed developing and testing the first two courses over the funding period of two academic years. We anticipated that there would be significant difficulty in student recruitment if we insisted that the courses be taken in a specific order so we designed the courses to stand on their own. We were also concerned that the composition of the team, most from Biology, would weaken the appearance of interdisciplinarity and thus the proposal's chances. We set about recruiting participants from a wide range of departments and from all schools.

Also important in our faculty recruitment effort was a strategy to scale up the project by creating a pool of instructors. I had experience passing along the Communication Management and Design program's Systems Thinking and Design course to other instructors via a team-teaching model. In this model, my colleague would observe me teaching one section of the course, then I would observe my colleague teaching his/her section. We would meet before and after to reflect on what had happened and to plan the next class. This had worked well, so we saw it as a strategy for diffusion and built it into our (IC)² proposal. In particular, if the concept were to work, we would need to attract faculty from

diverse fields and to make the general approach work for all.

Our recruitment was quite successful, and eventually sixteen faculty and staff members as well as two business partners from the local community signed on to participate in our proposal. Faculty represented ten academic departments and all five schools of the college. The business partners were from a local firm that developed and sold products and services related to systems thinking. I had previously developed a relationship with them based on our similar interests, and they had visited the college and spoken with students on several occasions. They were interested in diffusing systems thinking across higher education and freely offered their assistance.

In the full proposal, individuals signed on for different roles. Some would be course instructors, others would be guests at the *Insight* course, and one of our business partners would be responsible for assessment. The full proposal was submitted at the end of June and reviewed by the school deans, provost and president in July, and in mid-August the project was selected to be funded.

In retrospect, a design concept that proved especially useful to us in the proposal stages of the project was thrownness- the natural state of entering a dynamic new context and reacting out of intuition and instinct (Weick, 2004). In line with this concept, we appreciated that, while the IICC Project was in some ways original, it was very much a part of an existing dynamic situation in which designing would unfold “in a world that is already interpreted where people are already acting, where options are constrained, where control is minimal, and where things and options already matter for reasons that are taken-for-granted” (p. 76). Ours was one of a number of demonstration projects seeking to achieve similar goals, competing for resources from a limited pool, compared against existing programs and pedagogies, and evaluated with respect to explicit criteria and larger political goals. We did not presume that we had “the answers.” Rather we expressed that we had an idea to try, that we knew that the idea would need refinement over time, and that we welcomed others’ input.

Developing the *Integration* Course

With the new academic year about to begin, there was little time to celebrate. We jumped right into course development and treated this as an intentional design inquiry. To us, this meant intertwined research—discovering and building on lessons and learning activities that existed; designing—creating those that did not exist; systems thinking—managing all aspects with respect for complex interdependencies; and careful documentation of decisions and judgments that would facilitate reflection and sharing in a design case such as this.

Primary Systems Level

As we engaged in course development, a number of concepts associated with research, systems, and design proved useful to us. For example, relating to systems, we found the concept of “primary systems level” (essentially meaning the focus of attention as one thinks systemically) useful. Confronted with the challenge of composing multiple systems simultaneously, we recognized that this level needed to be explicitly chosen (Banathy, 1996) and, importantly, that a primary level was a perspective to the whole, not a choice of scale. Rather than thinking primarily in terms of lessons/activities, class sessions, courses, and curricula (scale or levels in a systems hierarchy), we explicitly agreed that student experience—a perspective focusing on what was learned—was more important than the nature of instruction, administration, or governance—what others involved in the project would do. In other words, as we attempted to balance multiple, simultaneous, rational/systematic and intuitive/creative processes in designing instruction, curriculum, a team-teaching approach, on-going evaluation and refinement processes, and diffusion strategies, it helped us to focus always on student learning.

Uncertainty

Continuing to draw on other concepts from the field of systems science, we recognized that there were many interdependent aspects of the project (e.g., goals, assessments, instructor and student recruitment, instructor training, logistics, course and lesson content and strategies, and intellectual property issues), that most were ill-defined, and that our efforts would involve composition at multiple levels. We returned to this recognition frequently as a reminder that it was unreasonable to expect all aspects to be clear and coherent. We would say “it’s okay,” often aloud and to each other, and live with uncertainty.

Sometimes the uncertainty required trusting in our own capabilities. For example, we wanted the students’ experience in our courses to be unique and powerful. We were aware of existing learning activities that we might use or adapt with a measure of certainty in their success, but risk repetition if students had encountered them elsewhere. Consequently, we agreed to create original activities and to use them only within IICC courses.

Relationships among Designers

At other times the uncertainty surrounded relationships, particularly between participants inside and outside the college. Through much of the initial planning period, we worked with partners from a local business whose members had considerable subject expertise. Distinct differences in expectations surfaced, however, and ultimately, these partners withdrew from the project in the middle of the first term. They cited scheduling difficulties, but other factors likely contributed to their decision. For example, they had a developed product that they were willing to adapt and offer to Ithaca College

students through the IICC Project, at what would be for them a significantly discounted rate. However, the project called for the courses to include design, which was outside their expertise, and to be passed along to other instructors via a team-teaching strategy, at which point the company would lose ownership and compensation. Perhaps more significantly, we on the Ithaca College side felt that college professors were not professional trainers who are comfortable or satisfied with operating from others' lesson plans. Such professors feel that part of their job and identity is to create, or at least adapt, strategies to their personal style and the circumstances (e.g., unique group of students). The partners from the local business resisted engaging in a collaborative development process with college professors who were not as well versed as they in concepts and tools associated with systems thinking.

Efforts to come to compromise proceeded through the first half of the fall term. A plan was agreed upon in a face-to-face meeting between Gordon and the business partners, and details of that meeting were shared with all team members in an e-mail message. The e-mail suggested that a collaborative development process would continue. It is possible that this was worded in a way that may have struck the business partners as different from what had been agreed. In any case, they withdrew in an e-mail response, and our efforts to understand the decision and the means by which it was taken were unsuccessful. As a consequence, with half of the scheduled time for planning gone, Ithaca College faculty became solely responsible for all course development and teaching. At this point, Jason Hamilton, co-author of this case, stepped in more strongly and became a co-designer and essentially co-principle investigator.

A sense of concern pervading the team prior to this point —did we have the ability to do it?—quickly turned over to a sense of relief. Without the second-guessing that accompanied the original partnership, we found that we could proceed expeditiously with the project as we had envisioned it. The experience of losing design partners, particularly our response to it, thus came to have much meaning in the project. We learned that we could recover from a process setback, and that our perceptions and attitudes would play a major role in our ability to do so.

During course design and delivery, we were confronted with a variety of wicked problems (Rittel, 1972), for which no amount of preparation, analysis, or research would have yielded a predictably satisfying solution. Instead of trying to anticipate all problems and develop solutions ahead of time, we held on to a sense of our general goals and tried to be flexible and mindful, and to expect the unexpected (Weick & Sutcliffe, 2001). One way we did this was to build skill and discipline diversity as well as redundancy into the design team. Thus, for example, when the business partners dropped out of the project, we were able to treat the change in composition of the project team as an opportunity to refocus on our original image of the project. In a sense, recovery was possible for us because of our designerly orientation toward solutions and goals rather than toward problems and processes (Cross, 1982).

Design Process

While the framework remained intact, we had to essentially start over with specific course delivery. The two of us, Gordon and Jason, started by generating many ideas for activities for the first course. This course would be offered in spring 2010, while the other course would start the following fall. We bounced ideas off one another, modifying each other's ideas, using each other's ideas to generate new ideas, and so on. We drew on our prior teaching, sources of which we were aware, and a search for new ideas and activities. We examined websites, books, and on-line syllabi. This led to a large list of possibilities, but no structure in which to teach the class. We selected approximately twenty of these activities that seemed to hold the most promise in terms of such criteria as relevance, potential for significant learning, meaningful student engagement, and fun. Bending our original plan to use nothing but original activities, a few activities were adaptations of existing tools (e.g., calculating one's ecological footprint, and conducting a sociological mapping of one's travels). All others were new (e.g., modeling the characteristics of one's major discipline in a particular manner and applying the results to a significant social issue, and considering the design of possible extensions of human traits/features). In what proved to be a key meeting, we sorted the activities into meaningful categories. We let the categories emerge from the sort, and then we named them. The five categories were perspectives, disciplines, complex systems, life cycles, and futures by design. These became the course logic and guided the sequence of activities.

Early on in course development, we decided to emphasize a pedagogy of "learning through meaningful action." We envisioned rapid-fire learning activities with little or no lecturing, designed to take students out of their comfort zones, keep them intellectually "unbalanced," and challenge their assumptions to try to facilitate new patterns of thinking. For example, we included activities that examine the limitations as well as strengths of traditional college education within academic disciplines.

Some of our decisions were based on what we have been learning regarding the nature of transformative or powerful learning experiences (Bolger, Codner, Reuning-Hummel, & Rowland, in press; Wilson, Switzer, Parrish, & the IDEAL Research Lab, 2007). More generally, we consciously attempted to connect systems thinking and design action. For example, along with the concept of thrownness, a basic understanding of the implications of complex systems (e.g., unpredictability, non-linearity, indeterminacy) (e.g., McDaniel, 2007) helped us stay open to the unexpected, avoid fixation on particular ideas, and trust that something special would emerge from a process to which we gave special attention. As a result, our design sessions frequently involved a sense of mindfulness and enhanced creativity. One of us would say "what if," and the other would see new connections. Often this was strengthened by our differences, for example our applications of systems

science in different fields. Thinking in terms of systemic relations suggested constraints that could purposely be imposed to assist our creativity, also (e.g., “suppose we want to explore the concept of perspective, and we have just 15 minutes, primitive technology, and a group of students who don’t really understand the nature of their own academic disciplines ...”). We adopted a similar mindset as difficulties occurred in preparing to teach and in teaching, and we found that systems thinking helped us in both sides of designing—conceptualization and innovation.

A difficulty we encountered in our early conversations was the lack of a common language. For example, Gordon’s academic degrees are in music and instructional technology and he teaches in a school of communications. Jason’s degrees are in physical chemistry and plant ecology, and he teaches in a department of environmental studies and sciences. As we developed activities and, particularly, as we sorted these into categories, we realized that the content itself offered a common language. As implied above, we had each used and studied systems science, but from two different perspectives: one with respect to social or human activity systems; the other, physical or natural systems. Systems concepts and principles, which drew on nearly the same vocabulary between these disciplines, became the language we would turn to when we needed a firmer ground of shared understanding. For example, we spoke of holism, interdependence, variety, systems hierarchy, emergence, and so on, and this offered entry points for appreciating contextual distinctions in the use of other concepts such as complexity, adaptation and evolution. This mirrored our image of what systems thinking could do for students in the courses, also.

Another way that we managed complexity was to adopt a standard form for lesson plans, adapted from Gordon’s experience in designing corporate training programs, that sought to account for key elements and their interrelationships—goals, assessment, learners, learning environment, time, resources, and strategies. An example of an activity documented in this form follows (see Figure 3).

Course: Integration

Unit: 1. Perspectives

Lesson: Map Travels

Objective: Students will learn to localize themselves and their peers in time and space and relate this to how they perceive the world.

Assessment: Students able to complete time logs and maps and to draw conclusions about social interactions and groups based on comparisons to their classmates’ maps.

Materials/media:

Blank overhead transparencies (2 X number of students)

Map of Ithaca College (1 per student)

Map of the world (1 per student)

Time logs of location for campus (15 minute intervals)

Time logs of location through your life (6 month intervals)
Wet erase markers (several colors)

Total Time: 60 minutes

Strategy (tactics & timing):

1. Have students stand up and group themselves into individual majors (to the extent possible)
2. Hand out materials and give each different major a different color of marker
3. "This activity is modified from a research technique developed by social scientists to determine resource use by indigenous peoples."
4. "It allows us to divide up the world the way the users of the resource divide things rather than our pre-conceived notions of how the world is divided and used."
5. Instruct students to fill out the time log of where they are on a typical school day.
6. Instruct students to place a transparency over the map and trace the compass (but nothing else).
7. Instruct students to transfer their locations to the map with a separate dot for every 15-minute interval.
8. "If you were at a location that is off the map, put a dot on the edge of the map closest to where you were."
9. "After you have finished making dots, draw direct straight lines showing how you get from one place to the next. Do not follow sidewalks."
10. Collect the transparencies, major-by-major.
11. Stack and put one set on the overhead projector and have the class guess what major this group represents.
12. Stack and put up a different major.
13. Ask the students what this means:
 - a. Do the majors mix?
 - b. Do different majors start to see the world differently simple as a result of where they go?
 - c. How does this shape such concepts as what campus buildings are important and where money should be spent?
 - d. If you never go somewhere, does it exist for you?
 - e. How do your daily travels determine what is important to you?
 - f. How about the natural areas? Are they part of campus? Are they important?
 - g. Who do you intersect with? Where are the important intersection points?
 - h. Is there a campus community? How do we create community & identity?
- [from here down is optional]
14. "Now consider your life through time."
15. "Go back and do the same thing with the map of the world & your life time log."
16. "For every approximately 6-month interval write the country (and state if it is the U.S.) you were in. If you visited a different country (or state) briefly, were you there long enough to really gain some perspective of the people who live there?"
17. Ask:
 - a. How is where you are determined by where you have been?
 - b. How is your perspective shaped by where you have and haven't been?
 - c. How did intersections change your path?

Resources:

Fikert Berkes Sacred Ecology

Instructor Notes: Make sure to use marker colors that will be easily seen when projects through multiple layers.

Figure 3. Sample lesson plan.

Approaches to scheduling and recruiting

With the spring 2010 term approaching, we needed to address a series of logistical challenges. Most significant among them were scheduling classes and recruiting students. The scheduling of instructors, class times, and facilities is normally handled administratively, for example, by department chairs and deans' offices, in association with the registrar. However, our project was not under the umbrella of a department or school, and instructors were available only after and beyond their departmental teaching responsibilities. This led to many e-mail exchanges and non-routine requests to the college staff and administration.

A concept that helped us understand what underlay these circumstance was "enabling system" (Banathy, 1996). We recognized that we would need more than occasional assistance with logistics and student recruitment. We need enabling systems that improve through actions taken on feedback, in a sense, a similar infrastructure to that of departments and schools without becoming a department or school. Among other effects, such systems would reduce the need to invent marketing approaches each term and to negotiate with each instructor's department chair how the instructors would be compensated (e.g., reassigned time or overload pay).

Student recruitment was especially challenging, since the courses would count only in terms of general credit hours. In other words, they would be neither a requirement nor elective for any major or minor program at the college. From students' self-reports we learned that word-of-mouth and recommendations by instructors, especially those who were teaching large-lecture introductory courses and who could expand on talking points we provided, were most effective. Other approaches we tried were, according to students, less effective included posters, list-serves, direct e-mails to advisors, and the announcements made via the campus' on-line news service.

Another effective and unique recruitment tool that we developed was a competition to construct what we called "the IWE Block." We polled a small group of students who unanimously agreed that a gift card to the college bookstore was a desirable prize and offered a \$100 gift card prize for the competition. Early on in course design, we had determined that a useful construct to weave throughout the course was the hierarchical nesting of the individual (I) interacting with the community (We) and the world (Earth). We came up with a two-dimensional cut-out pattern (Figure 4) for a three-dimensional form that, when held between three light sources would reveal in shadow the letters I, W, and E. (Our inspiration was the cover photo of Douglas Hofstadter's book *Gödel Escher Bach*.) Patterns were distributed around campus, and students were challenged to construct the block and submit proof in the form of a photo showing the shadows. There were only a few successful entries (e.g., see Figure 5), but many students and faculty learned about the courses through this tool.

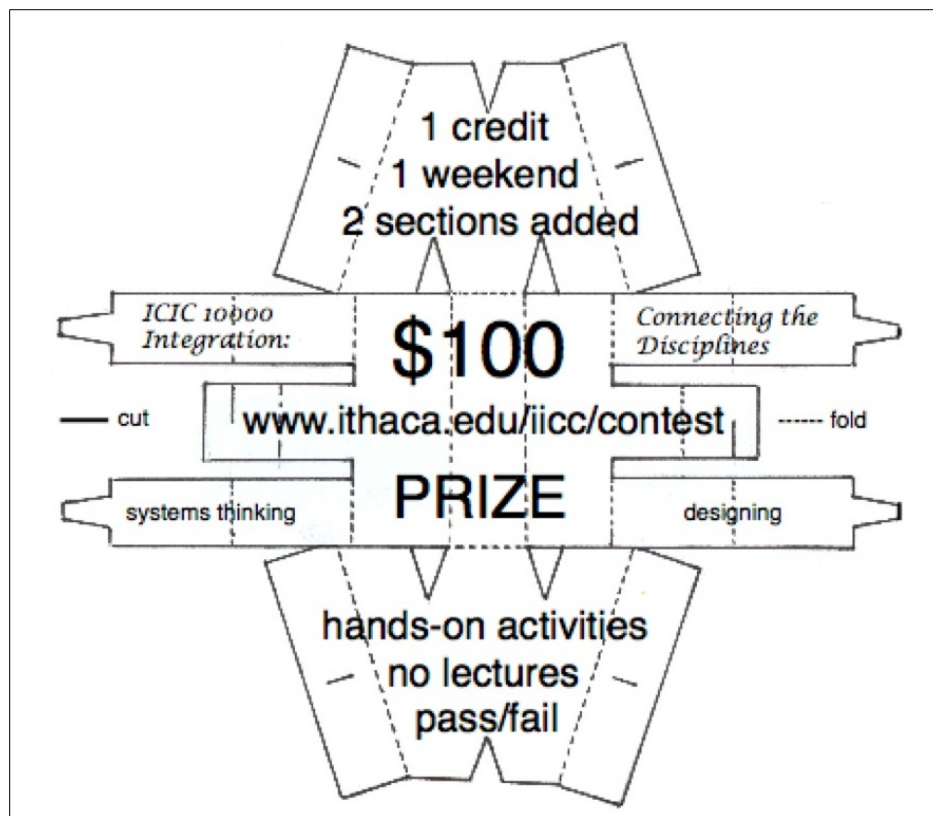


Figure 4. IWE Block pattern.

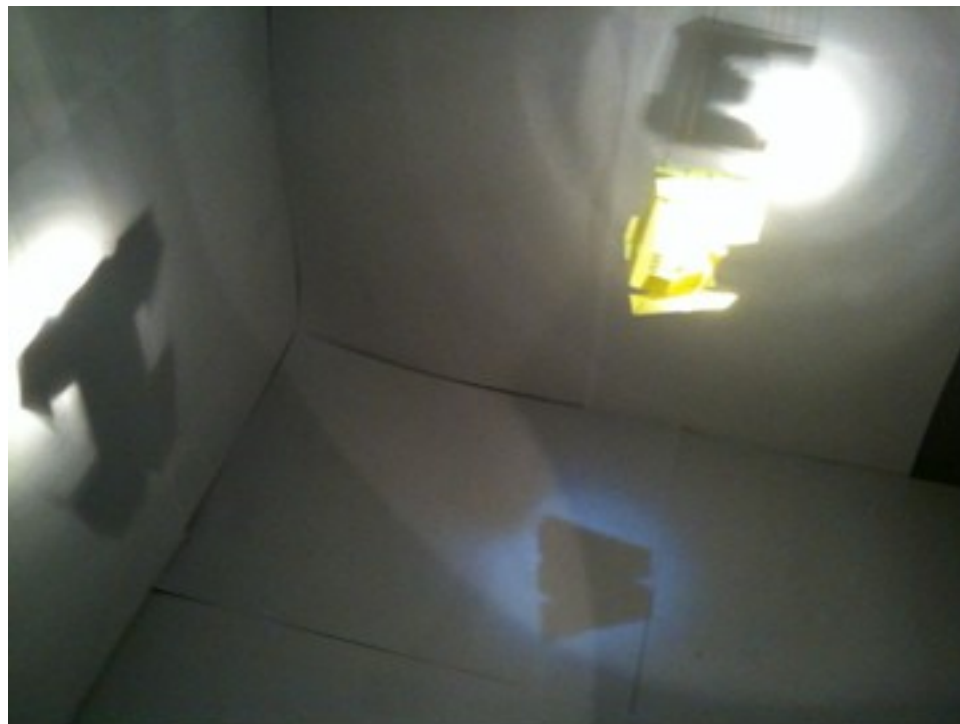


Figure 5. IWE Block projected

Integration, Pilot Testing, and Revision

Pilot testing of the first course proceeded through the spring 2010 semester with sections offered on three separate occasions. We set a target of 20 students per section, thinking that this would afford a good mix of students and work best in terms of timing for several of the activities. We were pleased that the three sections we offered averaged 17 students each. The course sections were each offered over a single weekend, that is, Friday evening, all day Saturday, and Sunday afternoon. We thought that the activities would build on one another most effectively in an intense, continuous time period and that students would be more likely to enroll in a mini-course that would be completed quickly and not interfere with their weekday course schedules. There was also a precedent in Gordon's department of offering mini-courses in this fashion.



Figure 6. Group work

The courses were held in traditional classrooms, although we required fairly rich media support and movable tables and chairs to best enable group activities. For some activities, students would sit at small two-table pods and work independently or with others in the pod (see Figure 6). For others, the tables were rearranged for larger groups. Wall spaces were frequently used for posting completed work, and students and instructors would walk around the room to conduct critiques (see Figure 7). Various postings were left up to accumulate and provide a visual sense of development over the weekend.



Figure 7. Preparing for a critique.

We encountered a procedural difficulty during the testing in 2010, which involved the revision of lesson plans because the limited time for course development prevented us from becoming skilled in the use of a collaborative development tool. We relied instead on simply sharing files on a common website (a course website in Blackboard). As the classroom testing proceeded, more instructors became involved, and a long list of issues surfaced: who would make revisions, how would they be shared, how would versions be archived and recognized as archival, would individual instructor's notes be incorporated, if so, how, and so on. These issues are yet to be fully resolved, but assigning lesson and website maintenance to Gordon and Jason, with revisions and notes from all others going through them, has helped.

Because of the short, intensive nature of the delivery of the course, (one weekend), we attempted to jump-start a feeling of community among the students in our first course using online introductions via Facebook before the course started. Our thought was that students would all be familiar with the application and be using it daily for similar purposes. Some students joined in; others did not, and we gained no sense when the course began that this had lead to earlier or stronger connections among students and instructors. It was discontinued in subsequent sections. As this implies, because we were able to deliver the first course three times in one semester, we were able to integrate student feedback into the course immediately and modify activities as we went along.

Simultaneously with course development, Gordon and Meghan, our graduate assistant and co-author, constructed a set of competencies and rubrics

for assessment. An early, ambitious version of the competencies can be seen in Table 1.

Table 1. Initial version of IICC competencies

<i>Category</i>	<i>Competency</i>
Perspectives—reasons; why we care	* enhanced sense of self in the context of and in relation to whole systems (e.g., groups, social systems, cultures, and natural environments) * appreciation that these systems are artificial and that multiple perspectives are valuable
Disciplines—concepts and tools	* understanding of the nature of academic disciplines and fields, and appreciation for their contributions and limitations * skill in integrating knowledge from disciplines (to meet complex real-world challenges)
Complex systems—concepts and tools	* ability to distinguish simple and complex systems, and approaches that are appropriate to each (e.g., recognize when a complex system is being treated as if it were simple) * ability to apply systems concepts and tools
Life cycles—connections	* appreciation of multi-causality of changes over time (i.e., dynamic behavior of systems) * recognition of evolutionary processes in a wide range of systems
Futures by design—application	* appreciation for the human role in evolution * application of design (and systems) concepts and tools to address significant real-world challenges
Overall	* understanding of how to use systems thinking and design to connect knowledge from different disciplines and to address significant challenges

We tested a competency that was most closely aligned with the course title—skill in integrating knowledge from disciplines—in the first section through a pre-course assignment and a series of post-course on-line journal entries. The pre-course assignment was posted to the course website, which allowed students to complete it anywhere and any time at their convenience,

and allowed easy access without making multiple copies for all instructors and, Meghan. This assignment asked students about connections they may have noticed or could potentially make among their past courses. Then following the weekend course, students were asked to look for such connections in their current courses and report on them in two online journal entries per week for three weeks. All responses were then evaluated using the rubric, and each pre-course assignment and journal entry was given a rating of basic, proficient, or advanced. Gordon and Meghan did the ratings independently, then compared them to check inter-rater agreement. We found that students were able to reflect upon years of coursework in the pre-course assignment, while connections were more difficult for them to recognize multiple times in a single week after the course. Consequently, as the weeks went by the journal entries seemed rather forced and often went off on tangents that did not clearly respond to the question asked and address the competency. We found ourselves second guessing the questions—"What is this question actually testing?"—and revisiting the competencies, eventually learning more about our assessment method than about gains in student competence.

In the two subsequent course sections, we assessed a second, revised competency—*Perceives how his/her self is formed by social interactions in multiple contexts*—and modified our questions. For example, as a means to prompt reflection on how perspectives influence our thoughts and actions, we asked students to consider the roles they play in social systems. Simultaneously, though, we discovered that while the pre-assignment and journal entries were effective tools to prepare students for the course and to extend and transfer what they had learned afterward, a different form of feedback was proving to be more useful to us in evaluating and improving the course. From the start and throughout each weekend, we asked students to complete feedback forms on each learning activity. We used an appreciative method (e.g., Norum, 2001) in the design of the forms, meaning that they focused attention on strengths that we could build upon rather than weaknesses that needed to be diminished. We asked students to reflect on what they had learned, what aspects they had enjoyed, and how they might suggest improving the activity. We asked similar questions for the course overall.

The feedback forms were another example of rule breaking. We gave ourselves permission to use the appreciative approach to course evaluation, while the typical process for gathering feedback from students, required in some schools, includes rating instructors along a wide range of criteria. These ratings become primary data in faculty reviews for tenure and promotion, and, consequently, often lead to risk avoidance. Because the project was outside departments and schools we had the opportunity to take greater risks without putting instructors, particularly untenured instructors, in what might be perceived as dangerous waters.

Meghan and Gordon did independent analyses of student responses to the forms, then compared their results. We found clear themes, and we could readily distinguish when responses were aligned and not aligned with course objectives (i.e., competencies). For example, nearly all students responded that

one activity led them to appreciate how perceptions were influenced by culture, which was precisely our goal. Another activity was intended to foster an understanding of how communities developed or diminished based on human interactions; some students thought the main point was to illustrate their limited travels. Feedback from these forms gave us a clearer sense of what was working and not, and clear direction in making revisions. As we looked ahead, we saw the need to continue to modify and utilize the competency model, rubric, and the pre/post instruments, but for formative purposes and the early stage of course development, the immediate feedback forms proved most useful.

The three sections provided an excellent test of our team-teaching and diffusion strategy, and allowed us to modify this during the semester. Gordon took a primary role in teaching the first section, while Jason observed and took a secondary role. Then the two switched roles for the second section. A third instructor observed the first section, began to take a teaching role in the second, and then took primary responsibility for teaching the third. A fourth instructor scheduled to teach the course in fall 2010 observed the third section. These class observations proved to be critical for instructors who were not involved in the design of activities. The lesson plans provide fairly detailed directions for conducting each activity, but seeing the activity conducted by someone else adds considerable richness. College professors are not accustomed to working from others' lesson plans; in this they are very different from professional trainers. Consequently, we rearranged faculty schedules for 2010-2011 in order to allow all instructors to observe at least one full section prior to playing any role in teaching.

As we prepared for the next round in fall 2010, we continued to explore an unanticipated matter that arose from the team-teaching approach regarding teaching style. Gordon and Jason, thinking that the groups of students in each section would be short-lived and that interpersonal connections among students would not be essential, focused primarily on the course content and the learning activities. Instructors that followed expressed the desire to make group cohesion and interpersonal connections a high priority. One possibility for this difference in approach, discussed among the team, was differing genders of the instructors (male co-developers focused on content; female subsequent instructors focused more on human relationships). Another possibility, or contributing factor, is academic background: co-developers from the natural and social sciences emphasizing rationalistic approaches, and subsequent instructors from the humanities and fine arts emphasizing naturalistic or intuitive approaches. We have made modifications and additions that are designed to build greater cohesion and trust among students and between students and instructors. For example, we have dedicated more time to introductions and getting to know one another, and modified another activity to lead students to interact closely with one another rather than simply display and describe work products as individuals in front of the class. A subtlety that we learned to appreciate from this question of style is that our selection of primary systems level—student learning experience—needs to be

supplemented by a conversation about what we mean by “learning experience,” that is, what type of experience we believe leads to learning.

At the conclusion of the spring 2010 term, the designers and instructors gathered to review the *Integration* course. One activity, an attempt to explore the nature of complex systems by solving a crime from details of the scene, was dropped because it did not clearly align with course goals, and because other activities were often rushed to include it. Revisions were made to nearly all others, primarily to include ideas that had been generated as the courses were taught in the spring. The feedback form and competencies were modified again as well (see Table 2), the latter in response to seeing how a simpler set of objectives that we developed for our second course, *Insight*, could be more easily implemented.

Table 2. Revised *Integration* course objectives.

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| <ol style="list-style-type: none"> 1. Students will appreciate the nature of disciplines and other lenses to the world. As one form of evidence within the course, they will define their major (or another) discipline along a given set of dimensions, and compare and contrast the results with other majors defined by their classmates. 2. Students will draw connections between what is studied in their classes across different disciplines and fields, and speculate on how these connections could help in addressing significant social issues. They will demonstrate these abilities with respect to the content of their current courses in journal entries for three weeks after the course. 3. Students will develop more sophisticated perceptions of themselves as parts of and contributors to various whole systems, including social and cultural groups, professions, disciplines, and fields, and as participants in designing the future. They will demonstrate this ability by successfully completing a variety of in-class activities that explore their personal place in historical, cultural, ecological, and social context and cause them to consider their role in shaping the future. On feedback sheets during and at the conclusion of the course, students will be asked to offer examples of how their self-perceptions have changed, also. |
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Over the summer and early fall, we updated the *Integration* lesson plans, and Gordon and Meghan developed a full Instructor Guide including course specifications, and all lesson plans and assessment instruments.

***Insight* Course Development**

Development of the *Insight* course was quite different from *Integration*, primarily because the design was much more straightforward and depended more on instructional decisions in the moment than on pre-planning. We would pick a significant social issue for each course section. We would invite faculty members from a variety of disciplines to explore the issue from the perspective of their disciplines. Then we would ask students to model (i.e., represent in some fashion with graphics and text) the individual disciplinary perspectives and their combination. The initial course concept came from two sources: an activity that Gordon had developed for his systems thinking and design course but had not used in some time; and a course at Cornell University that Jason and our business partners had helped develop.

The issues we picked for fall 2010 were Designer Genes (genetic modification), A Nation in Pain (pain management), and Out of Time (cross-

cultural perceptions of time). Designer Genes was taught in the first half of the term and served as the test case for *A Nation in Pain* and *Out of Time*. We invited many of our colleagues to be guests at the courses to offer the perspectives of their disciplines, and we were thrilled by the strong response. Rather than just rely on who was available and interested, we could specifically choose disciplines and sequence them in a way we thought made best sense for the issue. For example, we began Designer Genes with two biologists who were able to give students a quick review of genetics and concepts associated with genetic modification. We followed this with guests having expertise in public health, philosophy, politics, and business management.

Prior to guest visits, we helped students generate questions that would help them determine the nature of each disciplinary perspective, draw distinctions among them, and synthesize perspectives. The course met for 75 minutes twice per week for five weeks, typically with a guest(s) the first day, then modeling the second. We asked students to model the disciplinary perspective of the guest as an assignment between classes, then we conducted an informal critique at the next class. Modeling was new to students, and we saw the sophistication and insight of their models steadily improve over the course. Originally, we had prepared to share a set of dimensions along which disciplines would vary. Early in the course we recognized that this would limit students models, so we decided to not share it.

After the critique, we asked students to work in groups on synthesis (i.e., on models that combined disciplinary perspectives of the issue), and these syntheses were displayed on flipcharts for comparison. As a final assignment for the last class, we asked students to individually create a single model that synthesized the perspectives of all our guests. Then after they shared these in the last class, we proposed a series of scenarios and asked students how insights from their syntheses might help them decide how to respond. A sample scenario from Designer Genes was: You own a dairy farm that is just scraping by. You are offered a deal on genetically modified heifers said to produce more milk, although total effects of the modifications have not been well studied. What will you do?

For *Insight*, we adopted the same team-teaching approach that we used in *Integration*. With the exception of Designer Genes, since it was the very first course, new instructors would always be paired with someone who had taught the course before. Then, following the original plan for *Integration*, they would teach a course section on their own. For example, one instructor from Designer Genes was paired with a new instructor for *Out of Time*, while the second instructor from Designer Genes taught *A Nation in Pain* on her own. We have found that this pairing is especially important to the modeling activities, since most faculty members have no experience with facilitating a design critique.

We adopted a more straightforward approach to assessment in *Insight*, to a large degree in response to the difficulties we had in assessing *Integration*. Objectives were tied closely to the modeling activities, and evidence could be gathered during the class itself. The three objectives appear in Table 3.

Table 3. Objectives for *Insight*.

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| <ol style="list-style-type: none"> 1. Students will depict the perspectives of multiple disciplines on a complex-real-world issue by constructing a textual/graphic representation (model) of each. 2. Students will distinguish between the perspectives that are fostered by individual disciplines, including the discipline(s) of their own majors, by comparing and contrasting models, and identifying dimensions along which perspectives vary. 3. Students will apply systems thinking to integrate disciplinary perspectives with respect to a complex real-world issue. They will demonstrate this capability by creating syntheses of multiple models/descriptions from various disciplinary perspectives and identifying how the syntheses lead to better understanding, new insights, and greater capacity for informed action [or greater capacity “to resolve the issue”]. |
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Immediately after Designer Genes, we examined course feedback (from a form similar to that used in *Integration*) and debriefed the process. We made a number of quick modifications in our plans for A Nation in Pain and Out of Time. For example, students found it helpful to interview pairs of faculty from each discipline, noticing how this could reveal differences that had more to do with the individual faculty members’ views than what might naturally emerge from his or her discipline. A Nation in Pain and Out of Time were rich and rewarding learning experiences for students and instructors alike.

Overall Assessment

The IICC Project has succeeded on a number of levels. Student feedback has been very positive. Over the 2010-2011 academic year, we will have offered 12 courses: six sections each of *Integration* and *Insight*. The faculty continue to be enthusiastic and cite, in particular, the rewards of our conversations of faculty across the schools. Jason and Gordon have presented the project at conferences, faculty development workshops, and at a meeting of the Board of Trustees. We recently learned that IICC is one of two projects among the originally funded group to be invited to prepare a budget for continuation past the demonstration period.

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