

Assessing Interdisciplinary Learning in Theme-Based, One-Semester Communities

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Kennesaw State University's team of interdisciplinary scholars qualitatively assessed student learning within theme-based learning communities to determine whether content from one discipline was evident in student work produced within another discipline. Faculty concluded that they were likely expecting more disciplinary integration than first-semester college students were capable of providing, and that they were likely not asking for the integration they were expecting. By examining student work as evidence, the researchers became more acutely aware of the assignment instructions, prompting them to work more closely with colleagues in their future learning communities to develop interdisciplinary assignments with explicit expectations for integration.

The positive impact of learning communities on student learning has been established by a significant body of research that assessed student retention, improved student academic performance, and higher levels of student and instructor satisfaction (e.g., Dillon, 2003; Knight, 2002; Scharff & Brown, 2004; Taylor, Moore, MacGregor, & Lindblad, 2003). While these findings likely contribute to the popularity of learning communities in higher education institutions across the United States, one area in which research is lacking is the assessment of the distinctive type of student learning that is possible in learning communities (Taylor et al., 2003).

Learning communities, in which the same cohort of students share two or more classes, create a unique academic environment where student

learning can potentially be improved by the deliberate pairing of courses that require students to call upon similar cognitive skills regardless of the discipline that houses each course (Goldfine, 2006). For example, Pesante (1991) has found it effective to “draw parallels between the development of a software system and that of a document” (p. 206) when teaching composition to software engineering students. Similarly, Scharff and Brown (2004) linked an introductory computing course for non-computer majors with a logic course offered by the philosophy department based on their belief that each discipline supports the other, and that a learning community could serve as a vehicle for helping students better understand the connections between computing courses and other fields. In assessing the effect of their learning community on student learning, Scharff and Brown discovered that first-year students in their learning community were able to identify a greater number of connections between the two courses than were junior- and senior-level computer science majors.

Gammill and Hansen (1992) had a similar experience with a learning community they created in which two skills courses, Introductory Computer and Library Science, were linked with a content course, Introductory Economics, through “coordinated assignments that required the students to use all their skills in all three courses” (p. 1). In assessing the impact of this learning community on student learning, they found that entering freshmen produced term papers that surpassed faculty expectations for first-year students and “achieved the same level of mastery as did the more experienced students in the traditional sections” (p. 1). The researchers believe that the emphasis in their learning community on basic computer, library research, and writing skills gave students an “important and realistic introduction to the university,” and that having students “apply computing and research skills to a content course helps [them] see the real value of these skills for their future college success and may enhance mastery of these skills” (p. 6).

Given these findings, it seems plausible that learning communities might foster learning that transcends disciplines, allowing students not only to reinforce knowledge and cognitive skills through repetition in their linked courses, but also to identify and make connections between disciplines in ways that would not be possible if the courses were taught in isolation. The Kennesaw State University team, participants in Washington Center’s National Project on Assessing Learning in Learning Communities, decided to investigate examples of student learning produced by students enrolled in linked courses. We chose to adopt the Brower and Dettinger (1998) definition of learning communities as the ideal: “. . . integrated, comprehensive programs in which transformative learning takes place

through a community process as students develop professional, civic, and ethical responsibility” (p. 21). In this article, we discuss what our team discovered about student learning and our own expectations about integrative or interdisciplinary learning.

Institutional and Program Characteristics

Kennesaw State University, 30 miles northwest of Atlanta in Kennesaw, Georgia, began as a two-year institution attended by 1,000 students when it offered its first classes in 1966. Now more than 20,000 students are enrolled in expanding undergraduate and graduate programs, and Kennesaw State is the third-largest university in Georgia.

The Kennesaw learning community program, housed in the Department of First-Year Programs, has also grown exponentially since it began in fall 2000 when eight sections of the first-year seminar course (KSU 1101) were paired with general education courses in two-course learning community links. While initial results showed that first-year students in these learning communities had higher GPAs than a random sample of students enrolled in an independent section of the seminar or students not enrolled in either the seminar course or a learning community, these first learning communities were really “learning coincidences” (Casey & Hoerrner, 2005). That is, although student cohorts shared common classes, the learning communities were not themed communities, and the faculty participants did little to explicitly integrate the linked courses. They were primarily for social connections more than academic connections.

Eight learning communities were again offered in 2001 with little change in pairings or integration. In 2002, the number of learning communities increased to 16, and by fall 2003, learning communities had increased to 25 with greater integration among the linked courses. Specifically, all learning communities were thematically based, and faculty were asked to integrate these themes into their course work. Team teaching has not been a component of Kennesaw’s learning community initiative since its inception.

The success of these learning communities, based on promising data gathered during a preliminary assessment including first-year students’ retention rates and GPAs (Hoerrner & Goldfine, in press), prompted Kennesaw State University to strongly recommend the learning community program for first-year students. The first residential students² that moved into the university’s new campus housing in 2003 were required to join a learning community during their first semester. (Approximately 10% of the university’s undergraduates live on campus.) Commuter students, though

not required to enroll in a learning community, were also encouraged to participate in the program. In fall 2004, faculty taught in thirty-four learning communities. By fall 2005, this number increased by 60% owing to the development of University College and a first-year curriculum requirement that took effect, which stated all first-time, full-time students with fewer than 15 credit hours must take either KSU 1101 or a learning community.

Beginning fall 2005, students were required to enroll in one of four curriculum options: an independent section of KSU 1101, a learning community that included KSU 1101 and/or BIOL 2101, a learning community that did not include KSU 1101 and/or BIOL 2101, or an independent section of BIOL 2101 (for biology majors). The requirement was changed again in fall 2008 because BIOL 2101 was no longer offered by the Department of Biology and Physics.

To accommodate the increasing number of students at Kennesaw State University and to promote greater faculty participation, a proposal process for learning community themes and composition was initiated. This process invites faculty across campus to develop either discipline-based or general-interest learning communities. Regardless of theme, enrollment is limited to 25 students through anchor courses, such as English composition and the first-year seminar courses. These limited-capacity classes frequently are linked to larger sections of other courses; thus, the learning community student cohort is sometimes embedded within a larger class. The intermingling of learning community and non-learning community students within a single class creates the challenge of promoting multiple learning community themes or imposing the theme upon non-learning community students.

From fall 2004 through spring 2008, 11 learning outcomes were utilized to assess all learning communities, regardless of theme or composition of courses. These were as follows:

1. Enhance study skills
2. Promote cognitive/academic skills
3. Improve critical thinking skills
4. Provide greater connection to faculty
5. Provide greater connection to student peers
6. Increase out-of-class engagement opportunities
7. Increase student knowledge of campus policies
8. Increase student knowledge of academic services
9. Promote skill in managing time and priorities
10. Improve knowledge of wellness
11. Enhance understanding of global perspectives

Faculty members teaching in each learning community were asked to collaborate in identifying how they intended to meet each of the learning outcomes by completing a three-page form asking primarily open-ended questions. At the conclusion of the semester, learning community faculty were asked to complete an end-of-the-semester self-evaluation form that was more quantitative to assess the degree to which they accomplished the goals set out in the planning form at the start of the term. Students were also asked in a quantitative, end-of-the-semester survey to evaluate the degree to which their communities fulfilled each of the learning outcomes.

No assessment had been done on student work prior to Kennesaw State University's participation in Washington Center's National Project on Assessing Learning in Learning Communities. Our team, consisting of seven faculty members and administrators who have taught in learning communities and who represent six diverse disciplines—business administration, communication, English, first-year programs, psychology, and visual arts—viewed participation in this national project as an opportunity to strengthen our campus learning community initiative by providing us with the means to take our program “to the next level.” Having developed an extensive and thriving program, we were in the process of investigating additional measures to assess the success of our program in order to determine how we might refine and improve upon it when the Washington Center invited applications for the project.

Method

Since Kennesaw State's learning community program is quite large and varied, we were eager to gather data that would help us determine the effectiveness of the program. The Kennesaw national project team chose to focus closely on the extent to which interdisciplinary learning occurred in thematically driven learning communities. We believe that meaningful exploration of student learning—both interdisciplinary and otherwise—will assist us in not only improving our learning community program but also in improving our teaching. Thus, our guiding research questions were as follows:

- RQ1:** What evidence exists for interdisciplinary learning within learning communities?
- RQ2:** To what degree does student work show evidence of the transferability of one discipline to others within a learning community?

Operational Definitions

The definition used for “interdisciplinary learning within learning communities” was developed by adapting Boix-Mansilla’s (2005) definition of *interdisciplinary understanding*, that is, “the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive advancement . . . in ways that would have been unlikely through single disciplinary means” (p. 16). Thus, our definition of interdisciplinary learning in learning communities was articulated as follows: the capacity for first-year students enrolled in a theme-based cohort of courses to integrate knowledge and modes of thinking drawn from two or more academic disciplines to produce cognitive advancement in ways that would have been unlikely through single disciplinary means.

The definition of “transferability of one discipline to others” was defined as the explicit evidence provided within student work products that knowledge or modes of thinking from one discipline was/were utilized in a course within another discipline.

Protocol

All teams participating in the National Project on Assessing Learning in Learning Communities were charged to gather evidence of student learning from works produced by the students. To collect the data, the teams were provided with a protocol, developed by Boix-Mansilla (n.d.), to guide the process and ensure teams, as nearly as possible, were gathering similar data in a like manner. This protocol is presented in Table 1.

Table 1. *Protocol for Washington Center’s National Project on Assessing Learning in Learning Communities*

COLLABORATIVE ASSESSMENT PROTOCOL

FOR STUDENT WORK [Developed by Boix-Mansilla]

The purpose of this protocol is to provide opportunities for teachers to discuss pieces of students’ work and notice integration and opportunities for growth. The protocol can be used to assess and support students, to advance professional development, and to reflect about assignment design.

I. GETTING ACQUAINTED—GENERAL ASSESSMENT

1. Introducing the work:
Presenting teacher shares minimal information about the work, avoiding value description—e.g., stating the course and the level, whether it is initial or advanced, and the assignment.
2. Clarifying specific goal:
The group makes sure that the goals for the conversation are clear. For instance, are we seeking to examine the degree to which a piece

represents integrative or interdisciplinary understanding? Are we trying to diagnose opportunities for growth in an initial or developing piece?

3. Looking at the work:
In silence, individuals read or observe the work brought in.
4. Pointing out:
The group points out any aspect of the work noticed, withholding judgment about quality or comments about taste.
5. Valuing the work:
Group members share general qualities of the work that they appreciate (e.g., student shows strong personal voice, paper is clearly composed, student uses primary sources, provocative use of imagery).
6. Raising questions:
Once everyone has a chance to describe appreciated qualities in a work, the group is asked to raise questions and concerns that have come up. Participants are reminded that not all questions will be answered. Questions open up the work and make the group's thinking visible.

II. ZOOMING IN—TARGETING ASSESSMENT OF INTEGRATIVE INTERDISCIPLINARY UNDERSTANDING

7. Discerning the purpose of the work:
Based on their reading (observations, etc.) of the work and their knowledge of the assignment (see #1 above), group members describe what they view as the purpose of the work, pointing to the evidence in the work that makes them say so.

Optional: Once the group agrees on the inferred purpose or purposes of the work, they can discuss the degree to which this purpose lends itself to or embodies integration or interdisciplinary work. Is there something in the purpose that invites students to make that integrative step?

8. Revealing disciplinary grounding:
Group members describe what they view as the disciplinary insights/modes of thinking or ability areas that seem to be informing this work, pointing to the evidence in the work that makes them say so.

Focusing on one discipline or ability area at a time, the group discusses these questions:

Are the particular disciplinary insights/modes of thinking selected appropriate to inform the purpose of the work? Does it make sense to bring them to bear upon the issue?

To what extent is the student able to use disciplinary insights/modes of thinking or ability areas in accurate and/or effective ways?

What suggestions might we offer to this student to deepen or develop his or her use of disciplinary insights or ability areas in the context of this work?

9. Revealing integrations:

Group members describe what they view as overarching integrations of disciplinary perspectives attempted by the student, pointing to the evidence in the work that makes them say so. How is the student bringing things together—for instance, is the student offering a complex explanation, an aesthetic synthesis, a contextualization, a pragmatic solution, or some other product based on integration?

(Note: The form of the integration may be signaled in the assignment itself; the focus here is on what the work itself does. The inferred purpose of these things—the initial assignment and the student's work—may be the same, or they may not.)

Once the group has gained a sense of how the disciplinary insights seem to be coming together, group members discuss: To what extent does the integration appear to enrich, enlarge, or deepen the student's understanding of the issue under study?

(One way to get at this is by asking what would have happened to students' understanding if discipline x had not been brought in.)

What suggestions might we offer to this student to deepen or develop the integrative or interdisciplinary nature of the work?

10. Assessing thoughtfulness:

Group members describe what they view as student's reflections about the nature of his or her work and learning (e.g., comments on the relevance of the work, the limitations of single disciplines, limitations of the work itself). Participants are asked to point to the evidence in the work that makes them say so.

Once the group has gained a sense of the reflective stance taken in the work, the group discusses how student reflections reveal a developing ability to do interdisciplinary work.

What suggestions might we offer to this student to deepen the reflective stance he or she takes?

III. STEPPING BACK

11. Hearing from the presenting teacher:

After listening without intervening, the presenting faculty adds her or his perspective on the general and targeted assessment comments. He or she may or may not choose to address particular questions raised or clarify aspects of context.

12. Implications for teaching:

By examining students' work in this way, what have you learned about designing assignments that invite integrative or interdisciplinary learning?

13. Reflecting on protocol:

It is always helpful to leave time at the end to revisit the process and the protocol, considering what was helpful in the conference structure and what was frustrating.

All teams were invited to modify elements of the protocol if necessary to accommodate their specific research questions. Consequently, after struggling through several months of applying the protocol, and after receiving additional insight on the protocol from Boix-Mansilla at the March 2007 National Project meeting in Seattle, our team developed a pared-down protocol that allowed us to more quickly and effectively assess student work. This protocol is presented in Table 2. The majority of our modifications appear in items 4–10; for these items, we developed abbreviated forms of the original questions that clarified for us the focus and goal of each step in the protocol. Additionally, for item 13, we developed questions that allowed us to consistently assess each work for trends that we saw emerging early in our research.

Table 2. *Kennesaw State University Modified Protocol*
(changes in italics)

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Presenting teacher shares minimal information about the work, avoiding value description—e.g., stating the course and the level, whether it is initial or advanced, and the assignment.
2. Clarifying specific goal:
The group makes sure that the goals for the conversation are clear. For instance, are we seeking to examine the degree to which a piece represents integrative or interdisciplinary understanding? Are we trying to diagnose opportunities for growth in an initial or developing piece?
3. Looking at the work:
In silence, individuals read or observe the work brought in.
4. Pointing out:
What do you notice about the work?
5. Valuing the work:
What do you value about the work?
6. Raising questions:
What questions do you have about the work?
What do you wonder about?

(cont'd)

II. ZOOMING IN—TARGETING ASSESSMENT OF INTEGRATIVE INTERDISCIPLINARY UNDERSTANDING

7. Discerning the purpose of the work:
What is the student's purpose in doing the work?
What is the student trying to achieve?
8. Revealing disciplinary grounding:
What disciplines are important for the students to consider?
What disciplines are apparent in the work?
What else could the student do to deepen her or his use of the disciplines?
9. Revealing integrations:
How is the student putting the disciplines together? What ideas bring all this together?
What would you like to see in this work that goes beyond what the student has done here? What would you like to see the student do to demonstrate a deeper understanding?
10. Assessing thoughtfulness:
Did the student put thought into the assignment?
Is the student being thoughtful about his or her work?
Where is the student being thoughtful?
What is the student's next challenge in terms of thoughtfulness?

III. STEPPING BACK

11. Hearing from the presenting teacher:
After listening without intervening, the presenting faculty adds her or his perspective on the general and targeted assessment comments. He or she may or may not choose to address particular questions raised or clarify aspects of context.
12. Implications for teaching:
By examining students' work in this way, what have you learned about designing assignments that invite integrative or interdisciplinary learning?
13. Reflecting on protocol:
How can we assess the interdisciplinary nature of a work if we aren't experts in all the disciplines we identify?

What do we need from the student to ensure integrative learning is taking place? We need a variety of pieces of work to ensure the student is learning and to ensure we can assess that.

Are we finding the integration/interdisciplinarity for the student, or did he/she intentionally do that in preparing the assignment?

Evidence

In gathering evidence of student learning, each team was directed to use the protocol to assess a piece of student work supplied by one of the team members. Given the breadth of disciplines represented by our team, we had the opportunity to assess brief in-class short response papers, three- to five-page essays, a PowerPoint presentation, a video production, an art project, a reflective essay responding to an out-of-class engagement,

and two public speaking outlines. In total, the team evaluated 11 pieces of student work during a five-month period.

Procedure

From our first meeting in September 2006 where we discussed the protocol, we met once a month to discuss student work. At each meeting, two team members brought student work from a learning community to review, selected at random with varying quality, based on the process outlined in *The Evidence Process* (Harvard Project Zero, 2001). At each meeting, we discussed two pieces of student work, allotting half of the available time to each piece (approximately 45 minutes per item). A timekeeper was assigned to ensure that we did not spend too much time on any individual piece of work. A note-taker was also assigned for each meeting to keep a record of our discussion.

Results

In the first stage of the protocol, "Getting Acquainted," we tended to notice superficial elements of the student work we were assessing. Often, these were obvious attributes that might generally be overlooked because they were commonplace. For example, our observations might include the fact that a paper was double-spaced, that a video clip was in color, or that a drawing was two-dimensional.

At the next stage, "Zooming In," we became more interpretive as we attempted to discern the purpose of the work and identify examples of disciplinary grounding. Although we attempted to remain focused on only that which was apparent in the student work, it became difficult at times not to apply our own disciplinary understanding and identify examples relevant to our individual disciplines. Furthermore, we became aware that we might inadvertently be "seeing" evidence or connections that may not have been intentional on the part of the student. Our realization of the lack of student intentionality led us to wonder whether we can expect students to make integrative or interdisciplinary connections without explicit direction to do so.

In the final stage, "Stepping Back," we attempted to discern from the student work what the actual assignment asked students to produce. In many instances, the team members found it difficult to articulate the particulars of the assignment (i.e., the instructions or guidelines provided by the instructor) based on the student work under evaluation. Our efforts at this stage were quite illuminating as we discovered that the instructions given to students at times did not at all resemble what the student produced

or, in some instances, what the instructor intended. This realization led to discussions of how we might revise our assignments to better elicit the result we envision.

Three significant trends emerged in our findings. First, for those assignments in which students were specifically asked to make connections between disciplines, the work they produced typically bore evidence of those connections or at least of attempts to make such connections. Second, the disciplinary connections which were apparent, whether intentional or not, tended to be superficial rather than thoughtful or in-depth. Third, team members experienced tremendous difficulty in articulating the specific assignment or instructions that the student work was intended to fulfill. Given the regularity with which this occurred, our team concluded that perhaps the assignments themselves were unclear and did not necessarily provide sufficient (or sufficiently clear) instruction to produce the results faculty sought.

In those instances in which the instructor provided very specific, clear instructions for integrating disciplines, team members could typically determine (or at least discern a close approximation) of what the instructions or objective of the assignment had been. For example, in a learning community with an ethics theme, the KSU 1101 professor asked students during an in-class assignment to explain how a reading from their linked English 1101 course (that was a general discussion of resolving ethical dilemmas) related to a specific global issue they were discussing. The student work presented as evidence showed a clear ability to draw on the reading from the English class to answer the question in KSU 1101.

In another notable sample of student work, a student in an introductory art studio course produced a drawing of a man walking along a path. The drawing included some very specific and telling details that provided clues as to the nature of the assignment. Specifically, the subject in the drawing was clearly walking along a path, and he was wearing pilgrim shoes (i.e., the style of shoe one typically associates with early United States settlers). The shading in the background was created through the careful and deliberate placement of words and phrases such as "worldliness," "sin," "Dante," "the straight and narrow path," and "the woods of error." The English professor on the team noted that many of the distinct features of the drawing alluded to the pilgrim traveling through the circles of hell in Dante's *Inferno*. Once this association was made, other team members quickly identified other aspects of the work that were representative of the language or message in the *Inferno*. Based on these observations, the team concluded that the assignment was to produce a two-dimensional work of art that depicted a work of literature.

The presenting team member verified that the assignment had been for students in ART 1100, a two-dimensional studio class, to select a work they were currently studying in their linked English course and represent it in a drawing. That is, they were not just assigned to demonstrate specific artistic techniques in their drawings; they were instructed to demonstrate these techniques while creating a work of art that demanded they reflect on material from their linked course to determine how to best capture the essence of that work in a drawing. Though most team members evaluating the work were impressed by the student's ability to interpret and vividly illustrate the *Inferno*, the presenting art instructor reported that the work had not received an A because it failed to achieve certain artistic requirements, such as perspective.

The second trend that emerged in the student work we studied was that connections between the disciplines were generally superficial rather than thoughtful. For example, a review of the transcribed notes from all 11 pieces of evidence revealed that both English and communication appear in the "discipline grounding" responses for each piece of student work, yet the supporting statements simply note that words were used to communicate a message in each assignment. In a video produced by 7 students in an ART 1107 (Arts in Society) course, theatre, radio/television broadcasting, and music were three of the primary disciplines found in the work. Again, the mere fact that students were performing does not constitute true "disciplinary grounding" in theatre and performance studies. In the two-dimensional drawing previously discussed, the student artist keyed in on specific words and included detail in the drawing that represented those words, as in drawing pilgrim shoes to prompt the notion that the subject represents the pilgrim in the *Inferno*. A more thoughtful piece of artwork might have synthesized the meaning and message of Dante's work and created a more abstract drawing instead of literally depicting individual words.

This second trend speaks to two of Boix-Mansilla's (2005) assertions regarding interdisciplinarity. While our sample of student work supports her argument that a "performance view of [interdisciplinary] understanding . . . privileges the capacity to use knowledge over that of simply having or accumulating it" (p. 17), it fell rather short of her assertion that "interdisciplinary understanding is highly 'disciplined'—that is, deeply informed by disciplinary expertise" (p. 17). It should be remembered, however, that the student work selected for study were all works from first-semester students. The in-depth understanding of numerous disciplines that would be required for students to demonstrate interdisciplinarity in their work, according to Boix-Mansilla's full interpretation, is likely beyond the

ability of these students, many of whom may be experiencing their first introduction to some disciplines during their first year of college.

The third trend identified was the inability of the team to elucidate the assignment or instructions from the student work. In some instances, we came close to discerning the requirements of the assignment, but many times we were woefully inaccurate in our presumptions. For example, we were unable to determine that a public speaking outline focusing on Senator Hillary Rodham Clinton was not for an informative or persuasive speech but, rather, for a commemorative speech. The regularity with which this occurred suggested to us that perhaps the product did not match what the instructor had anticipated not through any fault of the student but rather due to the instructions for the assignment. That is, if the instructor did not clearly structure and articulate the assignment, the work students produced was not of the type or caliber that was expected. In short, we get what we ask for.

Thus, while our research was an attempt to identify interdisciplinary learning among students in learning communities, it seems we instead gained insight into our role, as instructors, in crafting assignments that lead students to make the types of connections we are looking for. Clearly, in order for students to produce work that demonstrates connections between disciplines, we must develop and clearly articulate assignments that foster these connections.

Given that the purpose of our study was to examine interdisciplinary learning and transferability in learning communities, the results were not what we expected. While we were able to identify numerous superficial connections between disciplines, these may or may not have been disciplines linked in the particular learning community from which the student work was taken. Additionally, it is impossible to determine whether these connections were intentional. In fact, we concluded that much of what we noted might have been the result of the depth of our own grounding in our individual disciplines. That is, we might have been reading into what we saw rather than simply making an observation.

Discussion

Though our research did not produce the type of insights into student learning in learning communities that we had hoped it might, we instead discovered much about the scholarship of teaching and learning. Specifically, we were confronted with evidence time after time demonstrating that poor student work may, in part, be the result of poorly designed and poorly communicated assignments on the part of the instructor. This led to the

modification of some assignments by team members in order that we might compare the results of the original assignment with that of the newly modified assignment.

One of the stated goals of the learning community faculty was to create a situation for integrated learning, but what we found was a disconnect between this goal and the coordination between the faculty teaching linked courses. We found that many faculty previously taught these learning community courses as independent sections and had not modified their assignments to create integration among courses linked in their community. In fact, some instructors may teach the same course the same semester—some linked in learning communities and some as stand-alone sections. Furthermore, it is unreasonable to expect that first-year students, new to the college environment and accustomed to receiving specific instructions for each assignment in high school, would take the initiative to go beyond the basic requirements of an assignment in order to provide a multi-interdisciplinary perspective. Students tend to provide what they are asked for, what they think is expected of them, and what they have enjoyed rewards for in the past. This may lead students to become more concerned about page limits or associated assignment details rather than embracing the opportunity to explore their interdisciplinary knowledge. This is essentially scholarship of teaching and learning, as the question arises of how students learn and also how faculty structure their assignments.

Based on the findings of our research, we believe that, first and foremost, administration of first-year programs should purposefully link courses together to meet interdisciplinary goals. Furthermore, learning communities should be populated by faculty who are skilled in working with first-year students and inspired to creatively integrate the courses in a coordinated fashion. As a first step in facilitating this integration, the faculty members within a single learning community should examine the basic learning outcomes they hope to achieve. Each discipline will certainly have its own learning objectives that must be included, but the community must also meet the objectives specific to the first-year program.

Finally, learning community faculty need to spend time together well before the semester begins with the goal of creating clear overlaps in their semester's curricula. Ideally, the teaching faculty should meet multiple times during the term to deal with any changes. To promote this degree of integration and coordination, there should be some accountability, a reward system (either intrinsic or extrinsic), and protected time together. It cannot be overstated that this attention to the coordination is fundamental and paramount in creating integration in learning communities.

As a next step in developing a thoroughly integrated learning community, the learning community faculty should design assignments that elicit the desired learning outcomes. However, carefully articulated assignments alone are not sufficient; faculty should also actively draw connections between the linked courses within their learning community and make explicit reference to relevant disciplines in class lectures and discussions. Introducing the relevant disciplines in the classroom is vital because students arrive at college with widely varying degrees of knowledge in the many disciplines represented at the university; thus, it is incumbent upon the instructor to ensure all students in his or her class possess a baseline understanding of the disciplines they will be expected to call upon for the course. That is, we can help students make interdisciplinary connections by specifically asking that those perspectives be included in their work. By stating different expectations, we will elicit different and, hopefully, integrative results.

Through this research, we gained insight into how our assignments might be better designed and more clearly articulated to students. While in some instances students seemed to intentionally integrate various disciplines into their work, we identified cases in which the integration of disciplines seemed to be a “happy accident” or drew upon disciplines not anticipated. We concluded that both the intentional and unintentional integration of disciplines are evidence of interdisciplinary learning. The former suggests that some instructors are successfully promoting and facilitating interdisciplinary learning sometimes, while the latter implies that students are sometimes making interdisciplinary connections on their own, bringing their own experiences in the disciplines to the particular assignment.

In analyzing student work, our team has come to realize that linking courses alone—even under specific themes—is not sufficient to ensure that students recognize and understand the relationships between disciplines and to ensure they use their knowledge of the various disciplines to produce interdisciplinary work. To echo our insights in the other areas, if our learning communities are to promote interdisciplinary learning, we must intentionally lead our students into interdisciplinary thought through examples, stories, and suggestions that draw them into this perspective.

Limitations

A significant limitation of this study was that, while following the protocol, we examined the assignments in isolation without access to the written or oral assignment directions. Since the point of this research was

to determine if interdisciplinary learning was taking place, we did not need to know what the assignment was about to determine if there was evidence of such learning. However, under these conditions it was nearly impossible to determine what the faculty had asked for or if students had missed the opportunity for a truly integrative approach. Although the protocol allows in the section, "Stepping Back," for the faculty who had given the assignment to answer questions or elaborate on certain points, we had to make assumptions as to how the assignment had been interpreted by the students.

The second major limitation to the study was the team members' lack of expertise in researching "integrative" versus "interdisciplinary" learning and utilizing the protocol instrument to discern disciplinary connections. A team leader grounded in this area of expertise, rather than learning communities in general, would have provided greater focus for the study.

Areas for Further Research

The benefits of moving beyond baseline quantitative research (i.e., grade point averages and retention rates) to determine the effectiveness of learning communities were evident as a result of this national, qualitative research initiative. The benefits of integrative learning, which have been shown repeatedly by Boix-Mansilla (2005) and others (Huber & Hutchings, 2004), are also evident. Because of their unique attributes, learning communities lend themselves to integrative learning. Their structures should be studied further; the intentionality of the faculty members and their assignments should be explored; and their effectiveness in encouraging students to integrate knowledge and modes of thinking beyond the walls of a single discipline should be assessed. Accomplishing these objectives will require time and conscientious effort, but the reward will be integrative learning that is greater than the sum of the individual courses being studied.

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