The Empathy Project: Using a Project-Based Learning Assignment to Increase First-Year College Students' Comfort with Interdisciplinarity

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Cover Page Footnote

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Empathy and interdisciplinarity are both concepts that are current and relevant—across professions, in research, and in academia. This paper describes a large, interdisciplinary, project-based assignment, the Empathy Project, which allows students to delve into and increase comfort and skill with interdisciplinary thinking and collaborative learning, while improving the core college skills of written and oral communication, ethical and quantitative reasoning, and critical thinking. As I revised the assignment based on student feedback and results, I found that group conferences and time in class to work collaboratively were beneficial. Additionally, building increased scaffolding into the assignment, including greater student and group accountability, helped students develop and maintain self-direction. Students reported that the project was interesting and challenging and appreciated the opportunity to work with other students, to create something entirely different, and to be able to bring creativity into their projects.

Keywords: interdisciplinarity, active learning, pedagogy, first-year students, project-based learning, constructivism, student engagement

Introduction

Our university is diverse in a number of ways, including the more traditional categories of race, ethnicity, religion, and socioeconomics. This contributes positively to students' intellectual and emotional development, and adds quality and depth to discussions in class. The University's academic and political diversity are also important assets and encourage interdisciplinary courses to truly span departments and to promote the critical thinking of our students. Part of the University's commitment to interdisciplinarity is evident in the existence of and support for the required interdisciplinary first-year course, Focused Inquiry.

Focused Inquiry is a required year-long seminar-style class that develops and hones the core skills deemed necessary for success in college and beyond: critical thinking, written and oral communication, ethical reasoning, civic responsibility, quantitative reasoning, information fluency, and collaborative learning. Focused Inquiry is housed in its own department, with full-time faculty from many different disciplines. The faculty members are committed to the interdisciplinarity of the course and to teaching in a learner-centered manner.

Interdisciplinarity is often a new concept for our students—one that is a recurring theme in our course—as can be seen below in a reflection on a conversation with one of my students.

"It's an English class," my student Sharice tells me. "That's what I tell my family and friends when I talk about it," she adds a bit sheepishly. "Otherwise they'd be totally confused."

This comment comes up at the end of the year, after nearly two semesters of my reminding students, both subtly and forcefully, that this is not an English class. I have tried to convince them by pointing out that, if this were an English class, I would not be qualified to teach it (my degrees are in mathematics, Russian, and education). I have attempted to persuade them by pointing to the objectives in the syllabus. I have sought to prevent the misidentification by spending much of the first day explaining what interdisciplinarity and critical thinking are, and how this course embraces both. By the end of the year, it becomes a running joke, and I can rely on someone, possibly even an impromptu choir, to interject, "Because it's not an English class!" at appropriate moments in class.

But here we are later in the academic year, and Sharice is admitting that—except in class—she still refers to this as an English course.

The truth is that that may not change. And really, whether Sharice's parents and high school acquaintances think that this first-year course is only about writing compositions might not matter. What does matter is that Sharice, along with the other students in her class, learns to write while also learning to research and analyze, to express herself well in different media, and to think critically.

While our specific targeted skill set of Focused Inquiry, described previously, might not explicitly appear in the freshman curriculum at other universities, the skills are likely woven into many courses at other institutions, especially for first-year students. Thus, the experiences in this relatively small (22 students) face-to-face class could be applicable to classes at other levels and in other learning environments, as well. In Focused Inquiry, one of our core skills is collaborative learning. As I discuss further in the paper, both research and my experience suggest that collaborative projects benefit from a diversity of not just background, but also ideas, interests, and skills; collaboration also capitalizes on the students' ideas and experiences. Thus, a well-scaffolded collaborative project is an ideal assignment for a course made up of diverse students that emphasizes collaborative learning. The interdisciplinary nature of the course allows for the implementation of creative and challenging collaborative projects, including the one that I will present here.

Background

One of my most in-depth, interdisciplinary, and collaborative assignments is the Empathy Project. This multi-week assignment addresses each of the core skills and has the additional benefit of being connected with a topic of contemporary relevance. (See, for example, the article "Can Emotional Intelligence Be Taught?", which appeared in *The New York Times Magazine* in 2013 (Kahn); it addresses how elementary schools approach and develop empathy in students.) Though this project is designed with our curriculum's core skills in mind, both the motivation behind the assignment and the assignment itself could apply to a wide range of courses.

In brief, the Empathy Project is a collaborative, project-based learning assignment in which students design a test of human empathy and pitch it to a hypothetical business. My primary goals with this assignment are to get students (a) to work collaboratively early in their first semester together and (b) to see and apply interdisciplinarity. In order to achieve these goals, I created a project that I hoped would

be interesting and relevant, and that would challenge but not overwhelm the students. Thus the work of the Empathy Project can be broken down into discreet and manageable steps and is clear about the type of end product required, while still requiring self-guided analysis, interpretation, and creativity.

In order to design the empathy test, the students first have to learn about empathy, its place in society, and the current means of assessing it. My hope is that this grounds empathy in their everyday lives, as well as in their careers and life goals. Students also need to gain a solid (though elementary) understanding of psychological measurement. In conjunction with this, for students to effectively convince their business audiences to adopt the test, they need to not only be able to make an effective oral presentation but also have a good sense of how empathy is manifested, the role it plays in different environments, and its perceived value in society. Mastering these concepts takes time, interaction, and investigation, which I want them to experience; to this end, I have designed the assignment to mimic aspects of business collaboration. For example, students are tasked with creating and presenting a final product, and with making sure that each group member plays a role; however, the roles are not explicitly described, as the students themselves need to decide what roles there are and who will undertake different tasks.

Grounded in Project-Based Learning

The Empathy Project is centered on inquiry-based learning, the roots of which can be found in the Deweyan concept of learning by doing (Loyens & Rikers, 2011). Dewey proposes that true learning occurs when education incorporates and utilizes experience. Project-based learning, an instructional model that is one type of inquiry-based learning and is rooted in constructivism, is centered on the idea that knowledge and comprehension are formed by the learner, and grow out of previous experience (Loyens & Rikers, 2011).

Despite the range of levels and subjects for which project-based learning is applicable, there are certain specific elements that facilitate the creation of a successful project-based learning assignment. Loyens and Rikers (2011), for example, suggest that inquiry-based assignments, such as those that are project-based, often bring together four elements: "prior knowledge, social negotiation, self-regulation, and meaningful tasks" (p. 364). Additional guidelines often applied to project-based learning assignments include that they are student-centered (Loyens & Rikers, 2011); that the teacher act primarily or exclusively as a facilitator (Loyens & Rikers, 2011), as is the case with constructivism (Harris & Alexander, 1998); that assignments reflect real-life projects (Helle, Tynjälä, & Olkinuora, 2006); and that students have "a significant degree of control of the project" (Loyens &

Rikers, 2011, p. 366). Finally, and perhaps most importantly, the central problem in project-based learning is left intentionally incomplete, unsolved, or poorly designed, which allows students to seek out both causes for and solutions to the problem (Loyens & Rikers, 2011; Helle, Tynjälä, & Olkinuora, 2006).

Other important elements are that the topic be of personal interest to the students (Grant, 2011) and that the assignment center on a "driving question" and conclude with a tangible artifact (Blumenfeld et al., 1991; Grant, 2011). This driving question should not have a predetermined answer, and should structure and motivate the steps of the project. The advantages of project-based learning are woven in with the elements described above. While time-consuming and sometimes uncomfortable for students, project-based learning allows students to explore in much greater depth than traditional classroom structure permits, as Grant (2011) illustrates in the qualitative examination of one eighth-grade geography class's project-based assignment.

Because this is a project-based assignment, before any of these tasks are undertaken, I want students to find an intrinsic motivation—coming to the realization on their own that an effective empathy test is important. I attempt to do this through their explorations of the concept of empathy, and how it is expected, appreciated, and measured in our lives. Piquing students' interest and making them feel invested in the issue motivates the assignment. Using the structure of project-based learning helps me achieve this with the Empathy Project.

In well-designed project-based learning assignments, motivation to perform well on and successfully complete tasks can increase, as Helle, Tynjälä, and Olkinuora (2006) describe:

> [I]n project-based learning, there are several features that may advance the adoption of favourable motivational orientations (e.g., task orientation and deep study orientation) by the students. The projects that are chosen or designed are relevant, but complex enough in order to induce students to generate questions of their own. As students define problems and generate questions they may develop a sense of ownership of the learning process (p. 294).

Project-based learning also encourages and facilitates collaboration and cooperation among students (Mitchell, Foulger, Wetzel & Rathkey, 2009; Blumenfeld et al., 1991).

There are challenges inherent in this pedagogy, as well. As Grant (2011) describes, students often resist complex tasks and thoughts. Creation of the assignment is time-consuming for the instructor, and the time and organizational demands on students can be frustrating to both pupil and teacher. Finally, collaborative projects can falter or fail because of unsuccessful group dynamics.

I try to mediate these challenges by paying attention to the support and scaffolding I offer: planning and preparing carefully plus allowing adequate time for completion of the project. Support includes preparing students for group work, particularly if they have not participated in collaborative projects before, and being available to meet with student groups. I have found that scheduling required and optional group conferences keeps students on task and gives them the opportunity to solve group dynamic problems before the group becomes derailed. Because these conferences offer an opportunity for students to describe their project and their plan for completing it, the conferences also seem to reduce the tendency for one student to get frustrated with the slow or seemingly unfocused pace of a group and "take over," or for one student to contribute less than the others in group work. In my experience, students frequently dread group work; my job, in class and especially with the conferences, is not to convince them that group work is fun or easy, but to hear their concerns and frustrations, and help them find ways to work through them on their own. Although the conferences take time and work on the instructor's part, having one brief required conference early on in the project seems to reduce later issues with group dynamics, by addressing concerns early on, and perhaps by holding students accountable. I then let students know that additional conferences are optional, but strongly recommended if a group is having difficulty and is unable to address or solve the issues independently.

Elements for Success

Based on my experiences with the Empathy Project, I have found elements that make this project more successful: It is important to scaffold this assignment, providing students with enough information about the project and timeline to ensure that they can identify and complete the individual tasks in a timely manner. Both the instructor and the students benefit from thorough planning and preparation, in deconstructing and building the project, and in completing it. Finally, students should be provided with enough time to complete their projects well. This might include in-class time to work together, though it can also mean simply making sure that students are aware of how much meeting and working time will be required for successful completion of the assignment. I have used different methods to get students to stay on task and for each group member to take responsibility for a fair share of the project. For example, I sometimes ask students to complete a self- and group-evaluation at the end of each class, and base a percentage of their grade on this. Other times, at the end of each class, I ask each group to write up the tasks that they need to complete before the

next class, and who is responsible for each task; in the next class, I check in with the groups and ask the students to grade themselves, based on how completely and how well they each completed the task(s) assigned to them. I have found students to be fairly honest and insightful about this, particularly when their other group members are present.

Evolution of the Project

I have assigned the empathy project three different times now. The original assignment was created in collaboration with one of my colleagues. We met multiple times during the month prior to the start of the semester. In these meetings, we developed the concept of the assignment, and then worked on details of the assignment. During the time that the students were actively working on the project, this colleague and I met weekly to discuss our challenges and successes. Finally, at the conclusion of the project, we discussed changes that we would make to the assignment in future semesters. After this, we both used the empathy project in our classes again, though we each made changes to it that reflected our own teaching styles, class dynamics, and curricular goals. My changes included adding scaffolding, such as group conferences and self-evaluations, and providing students with more guidance on the oral presentation aspect of the project.

The second time that I used this assignment, I asked students to complete a short questionnaire about it, the results of which are discussed in the conclusion of this paper. These student responses to the assignment led me to make additional changes, including clarification on aspects of the assignment description and conducting in-class discussions about successful group work. The version of the project that I describe in this paper is the most recent one, which I used the third time that I assigned the project, and which was influenced by my own reflections, as well as student feedback.

Description of Practice

In this particular course, the Empathy Project assignment is tied to a programmatic requirement that all Focused Inquiry classes have one group presentation per semester, and in this case grows out of an assigned science fiction novel, *Do Androids Dream of Electric Sheep?*, which touches on the centrality of empathy in human interaction. Though this is an interesting and effective way to bring up the concept of empathy, it is hardly the only way. Alternatively, an instructor could just as easily provide a newspaper or magazine article about concern with empathy in society, business, or primary education. The novel provides a starting point for exploration of empathy, and after a preliminary discussion,

students are assigned to do informal, independent research about empathy, in order to better understand what it is. In addition to the obvious goal of learning about empathy, this small assignment also provides an opportunity to discuss with students the appropriateness of Google searches. Students—particularly those who have completed advanced classwork in high school—often tell me that they were taught not to use search engines to seek out information for school assignments, while other students see Google as the right place to find information about anything. This assignment allows us to examine how neither of those extremes is correct, and to consider what useful information can be found through Google, and how to filter it.

Once the students have researched empathy, we can discuss and compare our definitions in class. By this point, students have been assigned or have formed groups, and I ask that groups create their own collective definition of empathy. If necessary, this first collaborative task also gives us a chance to discuss group work, task assignment, and goal setting; students are expected to be largely self-directed throughout the Empathy Project.

At this point, I still have not assigned the Empathy Project to my students. This is intentional, as the exploration of empathy is crucial to developing curiosity and intrinsic motivation. The next homework, in preparation for the Empathy Project, is also an individual assignment: Students take an online empathy test at home and record their scores. There are many empathy tests available online, and I assign a mediocre one; for this step of the assignment, one that does not completely test empathy is optimal. For example, Googling "empathy test online," one finds the Greater Good Science Center's Emotional Intelligence test, which is based on recognition of facial expressions (see "Body language quiz," 2014). When assigning this quiz, I don't offer any qualifications—I just tell students that they will take this empathy test, should record their scores, and bring them to the following class.

In our next class, I ask students how they did, and tally up how many students got a perfect score (students rarely do). How many got 19 correct? How many got 18? Etc. I then open up a discussion about whether the students felt that this test accurately reflected their empathy. Overwhelmingly, they do not, and they voice frustration at being *measured* inaccurately. When I ask them to explain why they feel that the score on the empathy test they took does not accurately reflect their true empathy, they can name many flaws. In groups and as a whole class, they collectively critique the empathy test that they took. After listing their concerns with the test, I present evidence of society's—including employers'—growing interest in empathy. There are numerous articles available that discuss empathy programs, workshops, and tests; again, a quick online search of different professional fields

(e.g., medicine, law, business, education) drives this home to the students. These articles and searches make it clear that the students' future job prospects could be determined by their perceived level of empathy. Having seen the weakness of some available empathy tests, the students become aware of not only the limitation of empathy assessment, but also of how they could ultimately be directly affected.

The Empathy Project Assignment

Having explored the concept of empathy and its measurement, and now uncomfortable with the limitations of both, the students are ready to delve into the Empathy Project. The groups, comprising 4–5 students, receive the assignment (see Appendix A), and prepare for a couple weeks of very self-directed work, as shown in Table 1.

The design of the empathy test that the students create in this project requires that they develop and use all of our core skills. The development of their sales pitch calls on many of the core skills as well, while also making the assignment seem more relevant to students who are interested in going into a business or corporate environment. A successful sales pitch incorporates polished oral presentation skills and professional sales materials, such as slides, pamphlets or videos. In addition to our core skills, we are also trying to nurture our students' creativity, and the assignment allows for aesthetic, intellectual, and rhetorical creativity.

The empathy test is a creative endeavor, but must be rooted in the students' research on empathy, so the questions or scenarios that the students create for the test must accurately reflect empathy, and the tabulation—and resultant empathy score—must be quantitatively logical. To work on this quantitative piece, the students look at other online empathy tests, discuss their metrics, consider how valid and reliable they find them to be, and then determine how to create a fair and logical measurement system. Table 2 provides a description of the different core skills that the empathy test and sales pitch require and how these skills are manifested in the Empathy Project.

Collaboration. As with collaborative work in general, group dynamic issues arise. Because this is a required course for almost all students at this diverse university, tremendous benefit can be achieved through the sharing of background experience as well as academic information, but students do not always recognize the wealth of information that they bring to a collaborative project. One small issue that comes up often is that of students deferring to the "best" students, assuming that their own contributions are inferior or will not be heard. There is not a simple solution to this problem, but I remind students that, because the topic of empathy is considered important outside of academia or of school, they need to consider experiences, backgrounds, and knowledge as broadly as possible.

Another smaller issue that has come up is simple disagreement among group members about what empathy means or how to best measure it. When a challenge seems specific to a group, I try to address it and discuss possible strategies for handling it with the group during class or in a conference. When I have noticed multiple groups encountering the same frustration, I have brought up the issue to the whole class, and we have worked together to explore solutions.

Table 1. Implementation timeline for the Empathy Project.

Day	In-class work	Homework
1	Preliminary discussion of empathy	Independent research on empathy
2	Assignment of groups; discussion of empathy definition; discussion of group work, task assignment, and goal setting	Students take online empathy test
3	Discussion of online empathy test; discussion of society's and professional interests in empathy; assignment of the Empathy Project	
4		
5	Students work independently, in and out of class; conferences with instructor; some in-class guidance from instructor, such as whole-class discussion of elements of a good sales pitch or of oral presentation skills	Student groups determine the tasks that need to be completed and the assignments of these tasks within groups
6		
7		
8	Group presentations of empathy projects	
9	Wrap-up, reflection	

Table 2. Academic skills and manifestation in the Empathy Project.

Skill	Manifestation
Written communication	Sales pitch materials; empathy test
Oral communication	Presentation of empathy test (sales pitch)
Ethical reasoning	Exploration of value of empathy and appropriateness of assessing it
Quantitative reasoning	Understanding and creating measurement tools, rubrics, and/or scores on empathy tests
Research and information fluency	Seeking out meaning and measurement of empathy, in popular culture and academically, exploring the appropriateness of online searches for informal and formal research
Collaborative learning	Informal discussion in groups, assigning of roles in project, preparation of empathy test and of presentation
Civic responsibility	Understanding power of assessment in work

One thing I have learned from incorporating versions of this large collaborative project in different classes over the years is that project-based learning is not clean, tidy work. The learning can happen in the messiness, and encountering obstacles and figuring out how to overcome them is as valuable for the students (and, often, for me) as figuring out how to sell an empathy test. The smaller issues are often fairly predictable; as with any collaborative project, larger, unexpected challenges appear. While these often have to be dealt with individually, I have had success with transparency: Discussing openly my own perceptions and ideas, along with my experiences, weaknesses, or uncertainties. I hope that this helps students recognize and discuss their own, and that through this, we might find temporary or long-term solutions.

Interdisciplinarity. Interdisciplinarity can mean combining multiple disciplines in order to better grasp concepts, or it can focus on using a variety of disciplines together in order to gain a better understanding of a social issue (Cargill, 2005). The Empathy Project, though just a single assignment, allows us to pursue both of these goals. Cargill (2005) describes the higher goals of interdisciplinarity in the curriculum: "As students advance through their education, we expect them not to only accumulate knowledge, but to build connections across classes, reconcile disparate theories, and evaluate methodologies" (p. 117). The Empathy Project is a meaningful assignment, but also, importantly, introduces students to a practical application of interdisciplinary study and pedagogy. Students from a variety of backgrounds bring their experience and knowledge to this project. Collaboratively, the students research across different fields and bring elements of these disciplines together. As interdisciplinarity grows in professions and in scholarship, students' exposure to it at all levels is crucial.

Students' previous exposure to interdisciplinarity is often markedly limited. In most high schools, subjects have traditionally been tightly compartmentalized: Writing takes place primarily within the English classes, computation is the domain of Mathematics, and drawing happens in art class (Siskin & Little, 1995). When students arrive at the University, they encounter the silos of higher education. Jonassen and Hung (2008) see this structure as a problem: "Unfortunately, interdisciplinary approaches are not supported well by formal educational institutions that divide and identify problems in terms of structured disciplinary perspectives" (p. 24). Though some classes may be cross-listed or co-taught by professors in different departments, the majority of courses that students take are in specific departments, taught by professors who are dedicated to their subspecialty within a specific discipline. Even when two disciplines merge, as has happened with biology and mathematics or English and foreign languages, the resulting departments—biomathematics or comparative literature—often quickly become silos themselves. Certainly there are fields and departments that are inherently interdisciplinary, such as Women's Studies or Environmental Science, but students' exposure to these departments is far from universal.

While undergraduates are studying in the world of siloed subject matter, the outside world—in research, professions, and doctoral programs—is becoming increasingly dependent on interdisciplinary knowledge and skill (Fortuin & Bush, 2010; Scott, 2010). Some graduate and professional programs already recognize and attempt to meet this need (see Fortuin & Bush, 2010; Scott, 2010; or Nandan & London, 2013, for example), but it does not happen sufficiently at the undergraduate level. Interdisciplinarity, and comfort with it, is especially important in growing fields like epidemiology

and sustainability (Jain, Aggarwal, N. Sharma, & P. Sharma, 2013; Du, Su & Liu, 2013; Fortuin & Bush, 2010; Nandan & London, 2013). Incorporating interdisciplinary assignments into undergraduate courses, including at the lower, non-major level, is one small but useful step.

The value and importance of interdisciplinarity might be clear to an educator, but it is also useful for students to be aware of it: first of its existence and then of its importance. Since students are not usually thinking directly about the structure or motivation of assignments, I find it valuable, at the conclusion of the project, to show them the interdisciplinarity of the assignment they completed. Because my most successful projects tend to be the most interdisciplinary ones, Jonassen and Hung's (2008) description of incorporating different disciplines in solving a problem is particularly apt: "When a problem requires intimate knowledge or consideration to solve, one critical element to successfully solve the problem is making sure that all facets (disciplines) have been taken into account" (p. 24). Any university major can be connected to the Empathy Project; when we are revisiting the assignment at its conclusion, I challenge my students to identify how the skills that their majors require were incorporated into the Empathy Project. A few examples appear in Table 3.

I provide these examples in order to demonstrate the interdisciplinarity of the assignment, and also to suggest disciplines in which a similar assignment could be used.

Based on my observations of the ongoing collaborative group work and the final products, the most successful groups are often those whose members represent a variety of disciplines, so that they can draw upon different group members'

strengths and bases of knowledge. In this way, the academic diversity of our university is beneficial. Hmelo-Silver (2015) incorporates the concept of problem spaces in problem-based learning in medical education, describing problem spaces as "specific ideas and concepts that are part of the goals of the problem at hand" (p. 43). In the Empathy Project, successful groups' varied academic backgrounds are part of this problem space, contributing useful specific ideas or concepts, ultimately generating a more informed and in-depth final project.

One aspect of interdisciplinary work that is often overlooked is creativity. Dillon (2006) makes the case for interdisciplinary, which is an aspect of what he terms "integrativism," in part because of its tie to creativity. He discusses the merits not only of teaching interdisciplinary subject matter but also of teaching in an interdisciplinary way. Additionally, seeking out and making connections between related or disparate fields inspires creativity. Though creativity is not one of our core skills and has not received as much discussion in higher education as other important pedagogical topics like collaborative learning or critical thinking, it may be of rising interest and concern.

It is my hope that project-based learning assignments also help students see that collaborative work is central in many jobs, and that interdisciplinarity is embedded in many professional projects. Convincing students that interdisciplinarity and collaboration are part of most careers is important, as students can be resistant to both, seeing them as irrelevant. Explaining the value of interdisciplinarity in education, Harris and Alexander (1998) describe learning as "enhanced" when the subject matter is "functional, relevant, and stimulating" (p. 116). It is safer and easier to stay in one field, just

Table 3. Academic disciplines' connections to the Empathy Project.

Discipline	Example
Sociology	Value of empathy in society; connections between empathy and professions, and between empathy and criminality
Biology	Neurological basis of empathy; question of whether empathy is innate; physical measurement of emotion
Computer Science	Layout and implementation of measurement tools and tests
Visual Arts	Sales pitch materials
Business	Oral presentation of sales pitch and pitch materials
History	Progression of attitude toward empathy in society
Psychology	Personality measurement; nature vs. nurture debate
Mathematics	Quantitative element of empathy test scoring
Drama	Sales pitch presentation
Literature	Novels and other texts as basis for discussion of empathy

as it is simpler and more predictable to do one's own work. Through this assignment, students can see that interdisciplinarity doesn't mean that each of us is good at everything, but rather that while we all bring in different talents we also all need to look for the connections between our fields, and need to figure out how to access the resources (including human resources) to help us develop those connections. When I first used this project-based assignment in my class, I thought these lessons would be self-evident. I have since learned that we all benefit from visiting the concept of collaborative learning during the project and reflecting on its successes and challenges after the project has been completed. This connects back to my dedication to transparency in the class and assignment.

Self-direction. Working on this project-based assignment, students have to be self-directed; in other words, they need to be able to identify on their own the next steps in the project, and to determine effective means for taking those steps and moving the project along. This requires self-regulation, as I am not able to check in on each student group at each stage of the project; furthermore, I do not want to oversee each step of their project, because learning to make these decisions both individually and together is part of the students' collaborative learning process. As is the case with constructivist learning, to be successful, the students need to be encouraged to be self-regulated and fully involved in their own learning (Harris & Alexander, 1998). They receive the assignment and guidelines about what should be finished at what time. For example, the empathy test itself should be completed by the end of the first week, and the second week should be devoted primarily to preparing the sales pitch. I try to allow students to determine on their own the timeline and necessary steps for their assignment work, keeping in mind the project-based learning idea that "[s]pecific end products need to be reached and those are clearly defined, while the processes to get to the end product can vary" (Loyens & Rikers, 2011, p. 367). As I discussed earlier, though, sometimes I have stepped in when a group was clearly flailing, often indicated by silence or palpable frustration at a group's table or by their self- and group-assessments. Generally, in these cases, I have asked how the group work was going, and have tried to address concerns or problems that the students brought up. Though I do not have a specific "plan of action" for group problems, such a plan could be a useful addition to this assignment.

Interpretation

The final products for the Empathy Project are as diverse as the students. Some groups lean toward the scientific side of empathy and produce an empathy test based on physical response. For example, the test might have students watch emotionally difficult scenes in a movie and have the time and appropriateness of their responses measured using a rubric. Other groups create more traditional multiple choice empathy tests, asking their audience how they feel or would respond to different scenarios. A few groups have very creative strategies for both testing and presenting. One group, for instance, presented a five-question multiple-choice test and scored it in a fairly predictable way. At the end of the presentation, however, they threw in a surprise: One of the presenters had come in on crutches, and the group revealed that the injury was a ruse, designed to see which class members responded to her by offering help, or opening the door for her, or asking if she was OK. They gave bonus points on their empathy test to the audience members who, before or during the presentation, had responded to the 'injured" student with concern or compassion. This is just one example of the creativity—and critical thinking about empathy—that groups brought to the project.

Despite the overall success of the final projects, students (and I) faced frustrations and challenges during the collaborative process. Though I was aware of many of the issues that arose, I knew that I was not cognizant of all of them, nor did I have anything more than observational and anecdotal senses of their experiences. To ameliorate this, I decided to collect student feedback specifically about the Empathy Project. Near the end of the semester, I asked the students to complete anonymous questionnaires. In their reviews of this major assignment, students were mostly enthusiastic about the Empathy Project. The most common complaint was about having to work in groups. The most common praise, amusingly, was about enjoying group work and finding other groups' presentations interesting.

Loyens and Rikers (2011) describe how project-based learning draws on students' prior knowledge, which is shared through social negotiation. Similarly, Mitchell and colleagues (2009) and Blumenfeld and colleagues (1991) discuss how project-based learning facilitates collaboration and cooperation. Many of the student comments illustrate how this is successfully achieved:

I remember this being a challenging assignment b/c of the group work. But I found that I have leadership skills and enjoyed seeing the fruits of my labor (Student 1).

It was a fun time and working with [group members] was a blast. I learned more about working as a group and working with acting etc. (Things that help me express) Assignment was good and watching other projects was both serious and comical (in a good way) (Student 2).

This was my favorite thing to do of the semester. I feel like I learned more about others in a way, how people see things different because of their own personal experiences (Student 3).

Other comments described an evolution in students' feelings about having to share, work, and compromise with others:

I learned how to combine my ideas with other people's ideas, it was difficult to think of it at first, but once we did our project turned out really good. I did enjoy watching other projects (Student 4).

I didn't get to do what I really wanted to do with the project but I was proud of what we were finally able to produce (Student 5).

Students were often able to identify that the most difficult stages of the project were early on, as they were acclimating to the student-centered aspect of the assignment and figuring out how to navigate the social dynamics of the group:

The project was mainly difficult during the brainstorming stages, because we had a difficult time agreeing on what to do. After we made a decision, it was not bad at all (Student 6).

The empathy project was hard I thought because my group could not think of a way to test empathy at first. I really learned the difference between empathy and sympathy doing this (Student 7).

One student expressed a frustration that frequently arises when project-based work is introduced to a class and the teacher takes the role of facilitator rather than leader:

It was difficult to work with an unorganized group. I think roles within the groups should be assigned (Student 8).

It is not surprising that some students would feel resistant to the students' taking "a significant degree of the project" (Loyens & Rikers, 2011, p. 366). This new student role, in conjunction with the fact that there is no simple or specific answer to be found or produced, can be disconcerting, as these students describe in their mixed reviews of the project:

It was really challenging to find an innovative empathy test. I don't think I enjoyed it. I learned to create something totally new. I did enjoy watching students' presentations because they were original and inspired (Student 9).

I liked the assignment, but I did not like that we had to work in groups. From this experience, I learned how to better work in groups (Student 10).

In their responses, many students mentioned creativity. The assignment description encouraged creativity, both in the design of the empathy test and in the oral presentation "pitch" for this empathy test. Observing groups working together in class, I saw an additional benefit to collaboration: Students' enthusiasm about the creative aspects of the assignment seemed to build as they interacted with one another and designed their empathy test and pitch, and their work was ultimately very creative. In the students' words:

I thought it was a fun and interesting way to show the class what we had learned. I think creative thinking helps keep the information in our minds longer (Student 11).

The empathy project was cool and was enjoyable to watch and make. I [would] change it a little by encouraging the more creative side of it (Student 12).

I loved the creative process for the Empathy Project. And also seeing what other groups came up with (Student 13).

Next Steps

The student responses illustrate that through collaborative projects, students undertake the challenges and satisfactions of working together in a setting that can mimic professional environments. Through project-based assignments, they have a chance to not only recognize problems, causes, and solutions, but also to figure out how to move from the problem to a solution. Interdisciplinarity teaches not only what to learn but also how to learn. Content is always central, but I hope that my students leave my course with a sense of how different ideas and disciplines connect to one another, and gain a greater interest in learning, a sense of what questions to ask, and an awareness that improved writing and speaking are crucial for expressing critical and creative thinking.

I made significant changes to the assignment after the first implementation. I discovered after the first year that scheduling group conferences was crucial; ideally, two conferences take place with each group: early in the project and in the middle of it. Of course, this can be logistically impractical, and modifications are helpful. For example, teaching assistants can conduct conferences, or group and individual memos can substitute for in-person conferences.

Determining the correct level of structure is an additional challenge. Some groups prefer (or possibly need) more guidance than others, as I described earlier. Some groups are more able to create and complete meaningful small tasks that lead to the final product. Other groups stumble, and benefit from

more direction in creating the small tasks. Finding a balance that best serves most or all groups is a constant consideration, and the conferences and self- and group-evaluations are invaluable in determining this.

Deciding on the composition of groups can also pose difficulties. In the first year, I allowed the students to select their own groups, which led to some groups being much stronger than others but also meant that students were comfortable working together; the following year, I assigned groups, which created more balanced and diverse groups overall, but less cohesion.

When I created my first version of the Empathy Project, I was not very familiar with project-based learning, though I had experience creating group assignments and projects for my students. The first application of the Empathy Project was interesting and aligned with my curricular goals, but it presented enough challenges that I considered abandoning it for something simpler. Shortly thereafter, however, I began reading about problem-based and project-based learning, and realized that I could apply these concepts and applications to my Empathy Project assignment. This made a significant difference, as research and descriptions of others' experiences are not just affirming. More importantly, these descriptions address ways in which collaborative learning and large group projects can overcome challenges and be useful and successful to students and faculty alike.

Each year, this project-based assignment changes. Each set of changes makes the assignment better but also compromises or abandons some elements. Ultimately, I am hopeful that the experience and the project improve with each year, and that students leave my class more comfortable with both interdisciplinarity and project-based group work.

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Appendix A

Empathy Presentation and Project (Formal Group Presentation)

The large corporation for which you work is convinced that empathy is critical to success in its sales force. You and your team have been tasked with creating an empathy test that will be administered to the entire sales force. While the fate of employees will depend on the accuracy and validity of your test, the company is wedded to the idea that empathy is important; your own jobs therefore also are at risk.

For this project, your group will *1) create a good empathy test* and then *2) pitch it to your company*. Your group may review empathy tests available online to generate ideas, but your empathy test must be your own. Your group must be able to justify why you chose to design the test the way you did—the questions you selected, the content you included, and the format you used.

Details about the empathy test: Be creative in designing your test. You do not have to use only text-based questions—you can build questions which incorporate images, videos, or audio clips, for example. Use whatever medium or media you think will best help you accurately gauge empathy.

In understanding empathy and designing the test, you will want to consider some of the ideas from our readings and discussions.

Due to time limitations, your group can decide whether you want to actually administer the test during the presentation. If you do choose to administer the test during your presentation, you can decide if you will administer it to an individual, a handful of students, or to the whole class. Even if you choose not to administer the test during the presentation, it must be a test that you **could** administer and measure within less than 20 minutes, using the resources available to you.

You will need to turn in the empathy test (either a digital or paper version) the same day that you present.

Details about the presentation: Because you are trying to convince this corporation that your empathy test is accurate and superior to others, you will want to make sure you have a good, polished pitch. Your group should select a medium (PowerPoint, Prezi, web site, video, pamphlets, posters . . .) that you feel best sells your product. The "selling" aspect of

your presentation is as important as the test itself, and you'll want to pick the medium that bolsters your pitch.

I strongly encourage your group to try a medium you've never tried, and for each group member to undertake a role that challenges him or her.

Your group's presentation must include:

- An explanation of what empathy is (You are pitching this to a company, and they might not have a good understanding of what empathy is);
- A demonstration of the test (though you do not have to administer the test during your presentation; see details above);
- A justification of how your empathy test does in fact measure empathy, as you have explained it;
- An explanation of why you designed and formatted the test in the way you did;
- An acknowledgement and description of the limitations of the test;
- A scoring rubric and interpretation of the scores (in other words, how will the test be scored, and what scale or categories will be used to compare one score to another?).

Part of the sales aspect of this presentation is about your ideas, but the rest is in your verbal and nonverbal communication skills and your professionalism. These presentation skills include the overall structure of your presentation and the transitions you use between speakers. Your entire presentation should last 15–20 minutes, and everyone should play some role in the presentation.

Details about grading: Your group's grade will be based on the following three elements, equally weighted:

- Empathy test and justification;
- Oral presentation skills;
- Pitch materials (PowerPoint, posters, pamphlets, Prezi, etc.).

Details about the individual grade: In addition to the group presentation grade, you will receive an individual grade, which is based primarily on your having done a fair share of the group work and the self-assessment that you complete after your oral presentation. In this assessment, you will be asked (individually) to describe your role(s) within the group and in preparing the empathy test and presentation, and the group dynamic. I will also ask you what role or medium you undertook that was new and challenging to you, and how that worked out.