Interdisciplinary Connections across the Curriculum: Fostering Collaborations between Freshman and Capstone Students through Peer-Review Assignments

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Abstract

Cultivating interdisciplinary connections between freshman and capstone students epitomizes a novel pedagogical approach to deepen student understanding of the learning process in a Community College environment. Within such a context, this article focuses on the outcomes of a two-semester collaborative effort that aims to establish and strengthen interactions between students at opposite ends of the academic spectrum. The work discussed focuses on an initiative in which capstone students in their final college class before graduating are supported in using their educational experiences to guide their first-year peers as they make the transition to college life. After discussing the creation and implementation of scaffolded collaborative assignments in which capstone students peer-reviewed freshman students work, the paper assesses the impact of the research on student understanding of the learning process by analyzing the quality of their work in the peer-review endeavor and the outcomes of their self-reflection activities.

Keywords: freshman, capstone, collaboration, peer review

1. Introduction

Effective pedagogical strategies serve to motivate students to think outside the confines of a single discipline and make associations among diverse areas. In this context, interdisciplinary pedagogy attempts to encapsulate student learning and experiences from both inside and outside the classroom and also infuses students with the ability to engage in collaborative interactions with their peers from diverse disciplines and cultures (Miller, 2005; Jones, 2010). Efforts to implement collaborative educational practices can lead to a more holistic, powerful, dynamic educational experience for students as it encourages them to connect concepts and ideas learned from different domains by themselves and their peers into a consistent association (Haynes and Leonard, 2010). These skills and capabilities are believed to be crucial for students to succeed in College and in their future careers and should be intentionally developed in the classroom (Klein, 2005). In this context, it is important to (i) actively engage students and encourage their participation in exercises both within and outside the class that they find meaningful to themselves and connected to real-life issues, (ii) motivate them to explore diverse perspectives and (iii) enhance their critical thinking skills in order to appreciate and reflect upon the different contexts of such competing viewpoints (Leonard, 2012). Our aim in this work was to generate a collaborative learning environment for students that encapsulates the above aspects.

The First Year Seminar (FYS) is a requirement for all new students at this northeastern community college who intend to ultimately major in Liberal Arts: Math and Science. In addition to introducing students to these disciplinary fields, a key aspect of the seminar is to aid students' transition to college life. This includes familiarizing them with the available on-campus resources, helping them develop a deeper appreciation of the learning process as well as acquiring fundamental academic competencies and skills. In contrast, at the opposite end of the community college spectrum, the Capstone course for all Liberal Arts major students represents a culminating educational experience. It is a writing intensive course that aims to further develop critical thinking and communication skills and draws on the educational and co-curricular experiences captured by students in their pathway through the college. In this project, the main objective was to instigate, develop and deepen collaborative interactions between students at opposing ends of the

college's longitudinal spectrum, such that the first year students can be guided and learn from the experiences of students in their culminating course prior to graduation.

Within this context, the research question we aimed to address was: Will the peer reviewing of FYS student assignments by the capstone students serve to provide a platform for (i) capstone students to critically assess the strengths and the weaknesses of their first year peers' papers, (ii) improving the quality of student output, and (iii) developing collaborative interactions between students?

The work described in this paper builds on the previous scholarly efforts of the investigators in terms of connecting FYS and Capstone learning experiences (Author, 2016). In subsequent sections, the collaborative interaction is discussed in detail and the impact of the peer-review activity on the quality of the student work is also evaluated. As student engagement is a critical component of this study, students in all the classes performed reflective activities and completed survey questionnaires based on their experiences (see Appendix B for an example of an FYS survey questionnaire based on the Women in Science theme).

2. Literature Review

In their foundational work, Kuh and Schneider (2008) targeted "a set of effective educational practices" that have been shown to correlate "with positive educational results for students from widely varying backgrounds." (p. 1). Such educational practices are deemed 'High-Impact' and encompass collaborative projects, learning communities, writing-intensive courses, undergraduate research, global learning, and capstone courses (Lidinsky, 2014). The aim of these intellectually stimulating, high impact practices is to enhance student achievement, success and retention rates as well as deepen their learning experiences.

The High-Impact educational practice considered here is a collaborative project that was designed based on the assumption that cooperative learning goes beyond developing an understanding of disciplinary topics as it emphasizes teamwork and team spirit. The literature uses several terms when referring to such learning: peer learning, peer assisted learning, peer-mediated learning, or cooperative learning. Cooperative learning is a pedagogical strategy that is defined as "the instructional use of small groups so that students work together to maximize their own and each other's learning." (Johnson et. al., 2014). These groups are typically comprised of 2-6 members, with groups of three students collaboratively working on structured activities often achieving the best outcomes in problem-solving exercises (Johnson et. al., 2006). In this context, cooperative learning is believed to be an essential tool for advancing participants' collaborative and team working abilities, interpersonal and peer relations, motivation as well as their higher-order thinking and educational learning skills (Slavin, 1985; Peng, 2010; Falchikov, 2013; Kulkarni et al, 2015). Interestingly, as well as developing collaborative skills, one of the key features of cooperative learning, as outlined by Johnson and Johnson (1986), is individual accountability, meaning that "each member is aware that he or she must fulfill responsibilities for the success of the group." (Moser Opitz et. al., 2018, p. 20).

Cooperative learning approaches clearly involve interactions between peers in their small groups. The closely related pedagogical approach of peer learning, in which students interact and learn from each other, clearly requires cooperation between students and has been found to enhance the development of students' critical thinking, lifelong learning and collaborative skills (Topping and Ehly, 1998; Boud, 2001). However, to be effective, cooperative or peer learning requires the establishment of individual accountability as well as group goals (Sukstrienwong, 2017). By allocating a grade to the task, individual students are provided with an incentive to take the assignment tasks seriously.As Sukstrienwong (2017) explains, "several educators firmly show disadvantages when all peers received the same reward, regardless of individual contribution." (p. 717). Based on this outcome, in the current project students were assigned individual grades reflecting their involvement and quality of work.

Within the cooperative learning paradigm, peer reviewing and peer assessment represent two complementary, yet distinct aspects of the process. The first step comprises the process of peer reviewing in which reviewers evaluate and commenting on the quality of the work of their peers. When applied to the classroom environment, peer reviewing typically involves students commenting on the writing output of their student peers (Liu et. al, 2002). Prior studies have demonstrated that peer reviewing not only supports and involves students in their learning (Kollar and Fischer 2010) but also provides a framework for encouraging student self-assessment and reflection of their own efforts in terms of how to build knowledge and make connections among interdisciplinary fields, diverse perspectives and different sources of information (Reinholz, 2016). To enhance the value and effectiveness of peer-reviewing, previous research has also demonstrated the importance of providing the students with detailed guidelines or a rubric about the specific requirements for the content of the review (Liu et. al, 2002). A key aspect of the peer review process is formative feedback, which provides students the opportunity to engage and interact with their peers in the review process and

refine their work based on the feedback from the peer review (Jeffery et. al., 2016). Such collaborative activities are important for enhancing the learning process and developing student critical thinking skills.

The peer assessment practice involves students grading the assignments of their peers based on a rubric carefully prepared by the instructor that explicates the assessment criteria (Sadler and Good, 2006). Peer assessment can have many benefits for students (Roscoe and Chi, 2007). It is argued that it supports learning (Kollar and Fischer, 2010) and self-assessment (Black et. al., 2003), especially, as in our case, when students are ascribed the same assignments. Students can then exploit the same dimensions of the rubric used to assess their peers work to critically think about and evaluate their own work. Peer assessment also "provides students with opportunities to reflect upon their own understandings, build on prior knowledge, generate inferences, integrate ideas, repair misunderstandings, and explain and communicate their understandings." (Reinholz, 2016, p. 302). Similarly, according to Kwangsu, Schunn and Wilson (2006, 891), peer assessment can help students (a) develop evaluation skills that are usually ignored in formal education, (b) develop responsibility for their own learning (Haaga, 1993), and (c) learn how to write (Rushton, Ramsey, & Rada, 1993). Most prior studies on peer assessment suggest that the outcomes of the process are valid (Falchikov & Goldfinch, 2000; Topping, 1998). Interestingly, in another study, Cho, Schunn and Wilson (2006) explore the validity and reliability of peer assessments of writing assignments from the perspective of both the instructor and the students. Their study confirms that the grades obtained by peer assessment are statistically both reliable and valid from the perspective of the instructor, as the instructor compares many student assessed scores with their own grades. In contrast, from an individual student perspective the reliability is lower. This outcome emphasizes the value of assigning multiple students to peer assess the same work (Cho, Schunn and Wilson, 2006).

In the present study, a cooperative learning framework was generated by stimulating connections between students in FYS and Capstone classes at opposite ends of the College's educational spectrum. Common assignments were administered in these classes and the pedagogical approach of peer-reviewing was exploited to deepen student learning and develop their collaborative, team working skills. In this implementation, instructors graded student output of the assignments, including the peer-reviewing. Future implementations will also utilize the peer assessment approach in order to enhance students' critical thinking and reflections on the collaborative endeavor.

3. Method

In order to develop the connected learning framework and address all aspects of the research question, we created a novel collaborative network between faculty and students at opposite ends of the educational experience at LaGuardia Community College by generating common assignments in the FYS and Capstone classes and exploiting the pedagogical strategy of peer reviewing. In this case, Capstone students peer-reviewed the assignments of their FYS peers and provided feedback for revision.

In Fall 2017, we piloted the interdisciplinary collaboration to strengthen connections between FYS and capstone students with the aim of enhancing students peer review abilities and the quality of their assignment output. The Liberal Arts professor teaching a capstone course teamed up with her colleagues from Math and Natural sciences who were teaching FYS classes. Students from the three classes were given common assignments, but only capstone students assessed the assignments of the FYS students and provided them with feedback for revision based on a rubric specifically developed for this purpose. The collaboration was based on the societal issue of Women and Sciences during which students read two articles: *A Short History of Women in Science: From Stone Walls to Invisible Walls (*Barnett and Sabattini, 2008) and *Nobel Prize Women In Science: Their Lives, Struggles* (McGrayne, 1993). The professors of Math and Natural Sciences visited the capstone class and each led the discussion on one article. Students in the FYS and Capstone classes also watched the film *Hidden Figures*, wrote a reflection on it and engaged in a full hour of vivid class discussion about the film with their professors.

In Spring 2018, the collaboration was expanded by recruiting six more Liberal Arts, Math and Social Sciences faculty participants. Professors teaching the Capstone course paired with a professor teaching an FYS class and overall we had six Capstone-FYS pairings. Each pairing designed their own common assignments for their classes but retained a similar rubric for the peer reviewing process. Students were ascribed joint assignments based on Women in STEM in the pilot study in Fall 2017. In the expanded Spring 2018 collaboration, common assignments were developed and used based on other central themes, such as Humanism, Science and Technology, the New York Forum of Amazigh Film and Student Plans after Graduating. Students in each capstone class peer-reviewed one or two FYS student assignments. Students in the FYS classes then subsequently responded to the comments. The peer-review activity was formally graded and made part of the overall course grade for all students in the FYS and capstone classes.

The assessment strategies utilized to appraise the research outcomes and gauge student success focused on (i) the quality of the peer reviews by the capstone students, (ii) the responses to the reviews and the refinements to their papers by the FYS students and (iii) the reflective activities and surveys conducted by the students in all classes.

4. Procedure

The following procedures and pedagogical strategies were implemented to explore the research question. First, common assignments were developed and administered to the students in the paired First Year Seminar and Capstone classes followed by the peer reviewing of these assignments, reflective activities of the peer-review process and assessment of the research outcomes.

4.1 Implementation of the Peer-Review Process

While Fall 2017 comprised three faculty members and about sixty five students, Spring 2018 encompassed an additional six faculty participants representing six first year/capstone pairs and approximately two hundred students.

In the pilot implementation of this project in Fall 2017, students in the three classes worked on common assignments and the students in the Capstone class peer-reviewed the work of the FYS students. From our faculty reflections of the process, we identified several aspects in order to improve the pedagogical strategy and the connections between the FYS and Capstone classes, and we implemented them across the pairings in the Spring 2018 effort. For example, we created a more detailed rubric for the peer-review process such that students were aware of the expectations and the dimensions of their work that was assessed and all students worked on formal, graded reflective assignments based on their experiences and participation in this work.

The peer-review process, which represents a key component of this work, was organized as a scaffolded process in the following fashion in Spring 2018 (see Figure 1). The approach was built around the peer-assessment structure of Kollar and Fischer (2010). The Capstone and FYS students were designated common readings and writing assignments (top box in Figure 1). Capstone students then wrote a letter as journal editors to the FYS students with regard to the review of their assignment work (Step 1). Joint class meetings were then held by most pairings to allow students to discuss the review comments face-to-face (Step 2). FYS students subsequently responded to the peer review through a letter to the capstone editor justifying the changes incorporated in the paper (or explaining why changes were not made with respect to specific review comments) and highlighting the text modifications (Step 3).

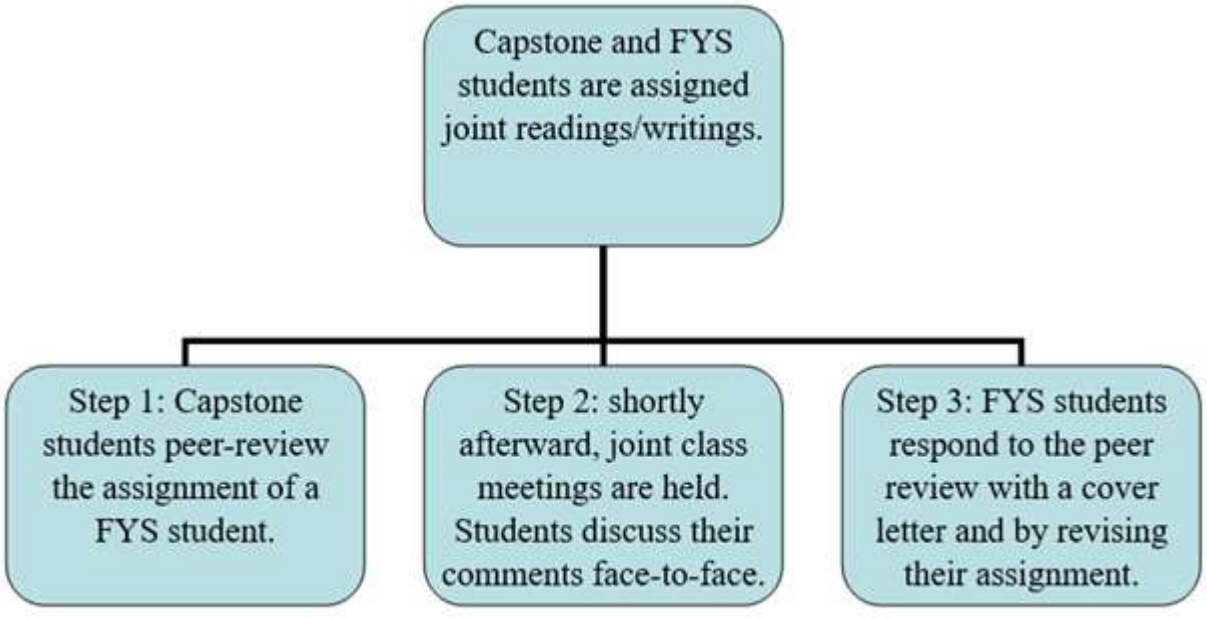

Figure 1. Stages involved in the Capstone/FYS peer-review process.

The crucial intermediate step of the process, involving the joint class meetings (Step 2) served to encourage the students to collaborate closely and work together on the reviewing exercise. The peer-reviews of the Capstone students and the assignment revisions conducted by the FYS students were formally graded as high-stakes activities.

In terms of the role of faculty in this process, the instructors of the paired Capstone and FYS classes developed appropriate common assignments and peer-review activities and utilized them in their classes. They collaborated to pair together students of similar ability to work on the peer-reviewing and they organized class discussions and joint class meetings to engage students in the process.

All faculty in their pairings were heavily involved in generating appropriate assignments for this project based on the common theme of the pair. This comprised common assignments for use in the FYS and Capstone classes of each pairing, the peer-reviewing process and associated activities and reflective assignments based on the process.

4.2 Assign Student Reflective Activities on the Peer-Review Process

Student reflective activities were assigned in order to gather the perspectives and opinions of the students with respect to the peer-review process.

Guided reflective activities and questionnaire surveys were conducted to gain insight into the student perspective on the central theme of the pairing, the peer-review process and the influences on their major/career choices. These activities included: 1) Capstone students writing a letter to the FYS students regarding their College experiences, comprising advice on how to achieve success on the pathway towards graduation. 2) FYS students responding to this with their observations about their progress and future plans. The face-to-face FYS/Capstone joint class meetings proved to be an excellent medium for initiating the reflective process. A key goal of the peer reviewing process and reflective activities was to develop and enrich student critical thinking skills and collaborative learning by encouraging them to appreciate, contextualize and evaluate the perspectives of their peers.

4.3 Assessment

Evaluation and assessment of our findings represents a key feature of the work. In this context, we monitor the project based on the student educational output from this research.

Quantitative assessment involved the gauging of student success and achievement based on the quality of the assignment output and peer-reviews. This included analysis of the peer-review output from the capstone students and the responses and assignment revisions conducted by the FYS students.

Qualitative assessment was conducted with student questionnaires and surveys as well as guided reflection activities, which were administered to gain insight into the student perspectives on the central theme chosen for the FYS-Capstone pairing, the peer-review process and the influence of this work on their major and career choices.

5. Results

In the pilot study in Fall 2017, students in the Capstone and FYS classes were deeply engaged in class discussions about the Women in Sciences central theme during visit exchanges between faculty as observed by the highly interactive and dynamic nature of the discussions, and from student reflections. The Capstone students peer reviewed FYS students assignments, and, although some high quality student work was observed, overall, the reviews were not particularly deep or structured and very few FYS students modified their essays based on the reviews. After the experiences of the pilot study, the challenge was clearly to motivate students and engage them in the peer-review process.

The implementation of the refined pedagogical strategies in the Spring 2018 session generated more active engagement of students in both the FYS and Capstone classes in all pairings in the peer-review process. The reviews produced by the Capstone students were generally of higher quality and most of the FYS students improved their assignment essays by revising them according to the reviewers comments. Further details of these outcomes and some samples of student work are provided in the subsections below.

5.1 Improve Student Output Quality Students Reflections

After the mixed experiences of the pilot in Fall I, 2017, the challenge was clearly to motivate students and engage them in the peer-review process. The pedagogical revisions that were incorporated based on our reflections from the pilot successfully addressed these issues. These refinements comprised a more detailed rubric for the peer review process to explicate expectations of the students, formal grading of all aspects of the process, including the quality of the peer review by the Capstone students, the original assignment and the revised version by the FYS students as well as the reflective activities. The other key aspect to encourage more in-depth collaborative interactions between the students at longitudinal extremes were the joint class meetings conducted by most pairings. Some of the paired sections incorporated two such sessions to enable the student groups to discuss the original FYS assignment output and the Capstone peer review with a subsequent meeting to consider the revised FYS assignment output. As a consequence of these improved pedagogical strategies, in the Spring 2018 implementation, students in both the FYS and Capstone

classes in all pairings were actively engaged in the peer-review process, the reviews were generally of high quality and most of the FYS students improved their assignment essays by revising them according to the reviews (or explaining why they did not agree with any of the suggested revisions). See Appendix A for an example of an FYS student assignment, the peer reviews on the work by Capstone students and the revised assignment based on the Capstone feedback. In this case, the original FYS student essay is of relatively high quality, but it is improved significantly after refinements based upon the excellent, critical comments from the Capstone peer reviews.

5.2 Survey Results about Capstone Freshmen Collaboration

After obtaining the approval of the Institutional Review Board, a survey was administered to all sections of the FYS and Capstone courses that were part of the study. Additionally, a reflection was assigned to Capstone students, and we will share samples from those who provided consent.

The survey asked students several questions, based on a Likert scale of 1 to 5, to state the extent to which they agree with certain statements. We will share the results of two key statements:

1. For Capstone students, the statement read "My peer review of the FYS students' work helped me deepen my understanding of the course material", with an equivalent statement for the FYS students stating "The peer review of my work by the LIB200 student helped me improve the assignment."
2. For capstone students, the statement read "I provided helpful feedback to the FYS students", with an equivalent statement for the FYS stating "the peer review of my work provided helpful feedback."

We received 85 responses from the Capstone students, summarized in Table 1 below.

Table 1. Summary of the responses of two statements from the Capstone student survey

	Question 1	Question 2
Scale of 1 and 2 (Disagree and strongly disagree)	10%	6%
Scale of 3 (neither agree or disagree)	31%	23.5%
Scale of 4 and 5 (Agree and strongly agree)	59%	70.5%

The majority of the Capstone students agreed or strongly agreed with the statements that conducting the peer-review of the FYS students' work allowed them to enhance understanding of their own course material and that they gave useful feedback to the FYS students.

An example of an FYS survey questionnaire is depicted in Appendix B (the FYS class is given the code LMF101 and the Capstone has the code LIB200). This one is based on the Women in Science central theme. Other pairings conducted very similar surveys with the Women in Science aspect replaced by their own central theme. The survey outcomes from the FYS sections in the pairings were very encouraging. Questions 1-8 all yielded a mean score within the range 3.8 - 4.2. This indicates that the students did not know much about the central theme prior to the class, but they learned a lot about it by working on the assignments and actively participating in the class, they enjoyed the class discussions and thought that the peer-review of their work by the capstone student(s) was valuable and helped them not only improve their work in the specific peer-reviewed assignment, but also for subsequent ones as well. They also found the peer-reviews to be useful because they were given the opinions and ideas of another student on the same pathway as themselves and who is where they eventually want to be. Interestingly, the biggest challenge they encountered was typically the writing intensive aspect of the course and the large number of essay-based assignments throughout the semester. In response to the final question in the survey, some students stated that they would appreciate more joint class discussions involving both the FYS and capstone students.

Capstone students provided insights through their reflection. We identify two main themes that emerged from the reflection: 1. Value of the Peer-Peer Collaboration, 2. Deepen Students' Understanding of the Course Materials.

1. Value of Peer-Peer Collaboration:

This theme was the predominant one. Students felt the experience was rewarding and that they valued the opportunity "to know other students", and to "share goals with other students." Capstone students felt empowered while giving feedback to the FYS students and found it rewarding to work with a freshman student, share their College experience with them and build their confidence. Some stated that it was a moment where they finally realized how far their

journey at the college has taken them. The peer review has given some a 'sense of accomplishment", especially when they used knowledge acquired from other courses to help their peers. Almost every student enjoyed giving feedback, they found the FYS students to be receptive to their advice, but some felt intimidated during the face-to-face meeting. They also thought that the experience helped them to think more deeply and critically not only in the Capstone class, but in their other studies as well. Some stated that they would have appreciated being involved in this process and receiving such advice when they were in their freshman semester. Interestingly, some of the Capstone students found the peer-reviewing to be challenging in terms of being analytical and providing constructive criticism without wanting to "say/write anything that may seem mean." In summary, the Capstone students valued the collaborative aspect of this work, and they thought that they provided helpful feedback for the FYS students.

2. Deepen Students' Understanding of the Course Materials

Capstone students stated that they felt that their understanding of the course materials improved as a result of the peer-review. For example, a Capstone student wrote that:

> **"***The rewarding aspect of the peer review of FYS student' assignment was learning how to organize my writing. I never understood the importance of writing in a chronological order until reading someone else's paper. You always want to avoid repeating yourself when writing a paper and you want to keep all similar information together. The paper that I read was sort of all over the place in terms of context therefore this encouraged me to organize my writing. In fact now when I write a paper I do a quick outline simply to make sure that all the information is there yet not repeated. Overall however, I had fun being the professor for an hour."*

The reflective surveys also showed that the Capstone students enjoyed the peer reviewing activities and they believed that their feedback would help the FYS students improve the quality of their assignment output.

To the question: What was the most challenging/rewarding aspect of the peer review of FYS student' assignments? a capstone student wrote:

> "*The rewarding aspect of the peer review was to notice few mistakes in their response which could have been easily made by me in my paper. I was only able to notice it since I was the reviewer and not the writer. So, stepping on a reviewer's shoe helped me to see what common mistakes I make while writing my paper*."

The same student addressed the questions What impact do you think your feedback had on improving student's work for the later assignments?

> "*I think that my review or feedback would help the student understand more about the in-text citation and how to write a direct quote while giving credit to the writer/author and avoid plagiarism since, in the paper, I noticed a lot of direct quotes without any author or name of the source. Also, I think my feedback helped the student to learn the importance of expanding the ideas and opinions on the body of the paragraph in connection to analyzing the quote thoroughly rather than explaining in the beginning of the paragraph and leaving the direct quote to the end*."

We were eager to find out the impact capstone students thought their feedback had on improving FYS student's assignment:

> *"I feel that after reading my comments and advice, it'll probably encourage them to organize their writing. Often times, many students who come to college do not write on a college level and so feeding feedback about their papers from other college students can actually help them improve their writing and even their grades."*

Another Capstone student wrote:

> *"I found that writing a letter to my FYS student was the most important because it gave them a view of how I have achieved what I have achieved and gave them an opener to respond back. In a way it is showing both of us a path through the other person and learning about one another. In an environment where you can learn from other people is crucial to seeing other people's views and input in a subject matter. I can learn about them and they can learn about me and if they are Amazigh then that's even better. It's sort of like a gateway to another person's mind and culture."*

Clearly, the Capstone students thought that their feedback would help the FYS students to improve the quality of their work. Interestingly, they also felt that the process enabled them to learn from each other, particularly in term of learning about different perspectives and ideas.

6. Discussion

The nature of the interdisciplinary connections and the peer review process conducted across courses at opposite extremes of the academic program had a significant influence on several key issues, including student learning, the quality of their work and pedagogical strategies used by faculty. The outcomes from this project, including student assignments and reflective activities as well as joint class meetings and discussions, served to provide a platform for the faculty participants to assess and understand student learning across courses at opposite extremes of the Liberal Arts program. The peer-reviewing process and connections between the FYS and Capstone classes enhanced learning abilities in terms of thinking more deeply and critically about their work and revising as appropriate. This improved the quality of the work produced by students in both the FYS and Capstone classes in the peer-reviewed assignment as well as in the following assignments. Reflective surveys administered after completing the peer review process showed that, in general, the students enjoyed the peer reviewing activities and thought that the critical thinking that they encouraged helped them to improve the quality of their assignment output in the FYS/Capstone class as well as in other classes.

The major challenge experienced in this work involved encouraging student motivation and enthusiasm to participate fully in the peer review process and connecting students across classes. The lessons learned in terms of revising the pedagogical approaches, from faculty reflections after the Fall 2017 pilot, led to significant improvements and successes in the Spring I 2018 implementation. These refinements included identifying clear goals and objectives for the project and aligning them with those of the relevant courses and academic programs, utilizing a detailed rubric for the process, formally grading all aspects of the process, including the reflection activities, and conducting joint class meetings for the FYS and Capstone pairings. Furthermore, regular communication between faculty participants in scheduled faculty seminar meetings and in faculty pairings was crucial for the overall success of this work. Within this context, the faculty in each pairing developed and sustained excellent connections between students at opposite poles of the academic spectrum at this community college. Overall, working in the project served to provide a platform for the faculty participants to assess and understand student interdisciplinary learning across courses in the Liberal Arts program.

Student benefits from this work comprised the generation of a dynamic, participatory learning experience for students in the paired classes as well as the incorporation of differing viewpoints and perspectives through the collaborative efforts. The interdisciplinary peer-reviewing activities were a crucial feature of the project and they led to the enhancement of student analytical and critical thinking skills in order to improve the quality of their work. The longitudinal aspects also provided a platform for the Capstone students in their final semester before graduating from the college to provide valuable advice and guidance for their freshman peers based on their experiences in the academic environment.

The work conducted in this project has had a significant focus on the College's Core Competencies and Abilities. Each pairing targeted specific Competencies and Abilities based on their central theme, however, due to the nature of the connections successfully developed between the FYS and Capstone classes, Integrative Learning and Oral and Written Communication were common aspects of all pairings. In this context, the course pedagogy and, importantly, the peer-review process were designed to encourage and sustain the linkages between the FYS and Capstone classes. Furthermore, the output of the process, particularly the reviews of the FYS students work by the Capstone students, the FYS students' responses and revised essays and the students perspectives on the process via the reflective exercises served as a means to gauge and show the enhanced level of student learning and progress in the course in terms of the Competencies and Abilities.

7. Conclusion

The work in this pedagogical research project builds on our previous scholarly efforts in terms of connecting FYS and Capstone learning experiences. We have taken our work many steps further by including other faculty members from various departments. We have thus, enhanced student learning through interdisciplinary teaching encompassing shared themes, readings, and assignments. Evidence of student participation and interest were assessed by observing their interactions and dynamics in class discussions, particularly the FYS-Capstone joint class meetings, as well as the output of the peer-reviewing process, including the reflective surveys.

In spite of some challenges related to the lack of face-to-face interactions between all the pairs as well as the lack of follow-up discussion among all students involved, the difficulty of formulating appropriate common assignments administered in both the FYS and Capstone classes of each pair, the paired faculty all worked extremely effectively together and produced some highly relevant assignments based on central themes of relevance to students and society.

A key aspect of the next steps in this project involves fully exploiting the outcomes and data generated from the research conducted in this proposal. Based on the evaluation and assessment of the impact of the cross-disciplinary, inter-departmental project on the student learning experience, we plan to organize a reflective workshop session with the faculty participants in order to generate ideas to evolve and refine the pedagogical strategies and techniques for promoting the connection and interactions between FYS and Capstone students. Benchmark readings of the deposited assignments will also be conducted to further explore the impact of the work on student learning and academic performance.

A further valuable extension of the work proposed herein concerns the identification of other possible connection points between the FYS and the Capstone experience. The work described herein connected students at the beginning and end of the community college experience. Subsequently, we intend to investigate ways to insert an intermediate bridge and involve faculty at one or more points along the 0 to 60 credits journey in the College. This idea will be explored through dialogue with the faculty participants and we plan to develop and implement such intermediate connections in future implementations of this work

Finally, we plan to assess the longer-term impact of this cross-disciplinary, inter-departmental project by connecting with FYS students involved in the work, perhaps in a year's time, in order to appreciate how they are progressing in terms of their educational learning and retention in the College.

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APPENDIX A

Example of FYS Student Output, the Peer Reviews from Capstone Students and the Revised FYS Assignment

Samples from Students Peer Reviewed Work

1. Capstone student's review of FYS assignment

"The writer has a nice introduction that lead from the general to specific. The introduction includes a summary that cover plot and characters of the story. The author has a clear thesis statement that expresses her position and main arguments. Her three body paragraphs or main points support her thesis statement. The initial topic sentence of first body paragraph does support her primary argument that connects to the thesis statement.

The writer has supported her first argument very well with supporting quotation and related example. However, neither the quotation nor the example are from the actual text" Inherit the Wind". The supporting quotation is "We can't find the faith of science from previous books, and we should find truth from experiments" those are word from famous scientist Galileo that she uses as her evidence to support her initial main point. The second topic sentence establishes main point of the second body paragraph and it connects to the thesis statement. The author provides her personal experience and supporting quote from text to support her main point. The supporting quotation is "It' s not as simple as that. Good or bad, black or white, night or day"(Lawrence and Lee, 5). The quote and analyzing of quote don't fully support the main point of the paragraph which is" The individual has the power to stand the truth." The quote just showing that Bert has different thinking or perspective than the whole society of Hillsboro. So, required more solid quote and analysis from the text that show his standing for what he believes.

The third body paragraph states topic sentence that establishes main point and supports the thesis statement. Again, the writer uses outside source to support her main point. The supporting quote that author uses from main text is "Bible is a book, a good book but not a only book" (Lawrence and Lee, 48).

The quote and analyzing of the quoted don't fully support the main point of the paragraph which is "The individual has the power to fight for the truth." In order to support topic sentence, the writer mentions about Drummond's belief and his fights against the law for his belief. So, what's his belief? How does he fight for his belief? The author needs to provide more supporting materials and clarification to support her main point. Nevertheless, the author has good conclusion that nicely restates the thesis and main points and doesn't introduce any new idea.

At the end, I would like to say that language and grammar usage and mechanics (GUM) impede reading comprehension of the writer's paper. The author needs to work on grammar and sentence structure. However, the strongest point of the essay are the thesis statement and main points that relate to the thesis statement. The writer needs to provide more text relating supporting materials and evidences to support main points of the essay. The writer can consider the idea of freedom of thought, right to think or right to be wrong for essay writing.

2. Capstone peer review based on the play: Jerome Lawrence and Robert E. Lee, *Inherit the Wind*.

"The introduction does not have full summary of the story. Thesis statement was missing. Some of the sentence were not clear, for example "They insist in each other", "...arrested because he teach his student bad things" (What is bad thing and in what context she declared it as bad?"

3. FYS student revising an assignment (highlighted in bold):

The individual has the power to fight for the truth. Some people explored the truth and they are not brave enough to fight for that. Some individuals are fearless to fight with others for what they stick to. Galileo Galilei is a good example. He did an experiment in a public place and show people there is no relationship between the velocity of something falling down and the mass of it. He protests the law of the deities. He supports Nikolaj Kopernik's heliocentric theory. He went to Roman for at least four times. Every time he stated his support and ask for the equal right to teach people heliocentric theory and the essence of things. Even though he failed again and again, he still fought for what he stands till he died. When he was old, he got under house arrest and died in poor and miserable condition. In this case, Galileo

fought with church for his belief. I believe that it's more important for him to stick to his belief than protect his life. In the movie, Drummond fought the law for his belief. Many people didn't understand him and persuaded him to give up defensing for Cates. **Brady persuaded Drummond to give up because people in Hillsboro Village don't need science, but they need religion to believe (Lawrence and Lee, 29). However, Drummond said. "It's not as simple as that. Good or bad, black or white, night or day."(Lawrence and Lee, 23) ,"I came here to defend his right to be different, and that's the point." (Lawrence and Lee, 23). Both religious side and Scientific side are right. The right of choosing either one is equal. If we choose different side from other people, don't be afraid and get brave to fight for that. Mr. Drummond supported Cates and helped him to win the law. His persisting contributed to the spread of faith.**

4. Capstone student's review of FYS assignment:

The assignment was based on the film: *House in the Fields* by Tala Hadid, a documentary about the lifestyle of women in a Moroccan Amazigh community.

"In his assignment titled "on the outside looking in," T. R. does have a thesis: "it's essential to see what the world looks like from other people and cultures perspective." T.R. supports his thesis with his own opinion and explanation from the film."

Another sample:

"Upon reading D.'s essay and specifically the introduction, I have not found a thesis or statement for her essay."

Another sample:

"D. does have strong body paragraphs that have good supporting details to answer questions on Moroccan lifestyle, gender roles, and weddings. However, she uses too much of her own personal anecdotes instead of elaborating more on the film about the gender identity of the main characters. (...) While the flow of the essay was smooth it did not have a thesis statement but more of a historical background."

5. FYS student responding to Capstone student review (Cover Letter)

"Revising this research paper, taking into consideration the suggestions given by my reviewer, S. L. T., I was able to enhance the information given resulting in a clearer view on my perspective of the resistance against the expectations of women's roles in the society of the Berber people. Adding more details to a couple of events, to give the reader a better understand of what life was like living and being a Berber citizen is one of the many ways I was able to revise this essay.

In the first paragraph, I agreed with my reviewer, to mention more of the resistance against women in addition to the information I had already given. Doing this, made the introduction flow better, and will prepare as well as give a better understanding on what to expect while reading the gender construction of the Berber people, giving the reader a richer experience. The second and third paragraphs were well organized and each argument was supported by details from the film. Having no need to add or take away from, I kept these two paragraphs the same. My conclusion as well was well organized, and clear to understand for the reader. My reviewer states that i referenced the film more than the article. In response to this, I'd say that in my prompt for this paper, it was addressed to me to focus primarily on the film than any other reference. Also, even though the article "Berbers and the Nation-State in North Africa", might not have been referenced as much, it really did give me all of the background information i needed to understand the people historically, as well as understand the film better while watching it. In addition, giving me a stronger knowledge on how to write this paper."

6. FYS student revising an assignment (in bold) following a Capstone student comments:

"In both Bruce Maddy-Weitzman's article "Berbers and the Nation State in North Africa", and Tala Hadid's film " House in the fields", I was able to observe and examine various characters such as Khadija and Fatima. Along with understanding their way of life and how it impacts them. **Information on the Berber people, especially of the roles of each individual in a household are provided, showing what the expectations, of the Berber people, were for men and women. Unfortunately, expectations of women were much less of man concerning free will, such as speaking for herself, or making her own decision."**

"**The Berbers in the film are oppressed because of the gender roles, lifestyle and expectations set upon them**. **The film depicts the social norms of the Berbers and how gender roles can play a big part of their everyday life.**"

APPENDIX B

LMF101 Student Survey

Reflecting on THIS LMF101 course and its assignments, please respond to the following statements by using the scale:

(5) Strongly Agree, (4) Agree, (3) Neutral, (2) Disagree, (1) Strongly Disagree,

This will really help me do a better job for the remainder of this semester and beyond.

You do not have to put your name on this (unless you want to).

Please circle your response.

		SA	A	N	D	SD
1	I did not know about the under-representation of Women in Science before this class started	5	4	3	2	1
2	I know a lot more about the under- representation of Women in Science now	5	4	3	2	1
3	I enjoyed our class discussions about Women in Science	5	4	3	2	1

4	The peer review of my work by the LIB200 student helped me improve that assignment	5	4	3	2	1
5	The peer review of my work provided helpful feedback	5	4	3	2	1
6	The peer review of my work by the LIB200 student helped me improve my work for the later assignments	5	4	3	2	1
7	I enjoyed doing the assignments based on the Women in Science topic	5	4	3	2	1
8	The skills and knowledge I acquired during my LMF101 class this semester might help me succeed in other courses	5	4	3	2	1

9. What were the biggest challenges you encountered in this course? Please explain:

10. Is there anything else you would like to add about the assignments, peer reviewing or the course in general?