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Connecting Science and Community: Engaging the ACRL Framework in a Physics Seminar Course

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INTRODUCTION

Many science-based accreditation bodies have a required information literacy component to guide academic departments in meeting the research needs of their students (ACRL-IS, 2020). For these departments, conducting research, analyzing technical publications, and presenting their findings to their peers typically satisfies this requirement. In the fall of 2019, librarians challenged their departmental peers at Juniata College to engage with information and research beyond this traditional sense. Using ACRL's *Framework for Information Literacy for Higher Education* as a guide, an experimental activity was designed and executed through the combined efforts of the Physics and Engineering Physics (P&EP) Department Chair and their library liaison. The assignment was designed as a group project requirement in a Fall Physics Seminar course, where students were grouped into diverse teams that mixed seniors, juniors, sophomores, and first-years. Through an assigned prompt with support materials generated by a librarian, the students and faculty in this course engaged with research beyond academic articles and book chapters. Together they discussed and explored the benefits and disadvantages of social media sources, compared and contrasted academic and popular perspectives, and created multimedia projects that summarized their discoveries in new ways.

CONTEXT

During the 2018-2019 academic school year, the library was involved in redesigning the college's General Education Program, creating three new first-year courses: First Year Composition, First Year Foundations, and First Year Seminar (Initiatives, 2019). Through librarian involvement within the learning communities tasked to build these courses, information literacy was embedded within the course objectives, giving students exposure to primary and secondary sources, and introducing methods to evaluate both library and non-library resources.

To better prepare the involved instructors for the newly designed courses, a multi-day workshop was launched over the summer. Collaborating with other partners, the Learning

Services and Assessment Librarian co-presented at the workshop to share potential methods and techniques to integrate oral communication, written communication, and information literacy learning objectives within their courses. This included how to create activities that highlighted these three areas and how to assess them in a meaningful way and promote student learning.

The workshop component on Information Literacy introduced faculty and instructors from different academic departments to the ACRL's *Framework for Information Literacy for Higher Education*. A majority of them had not heard of the *Framework* before, and significant time was invested explaining each of the six frames. Sample assignments and tools were also shown to help participants understand how they could apply the frames at project, course, and program levels. A particularly helpful tool was a digital map that provided an outline of how the frames could be integrated throughout all four years within an academic program. These clear examples inspired faculty to reach out to the library afterwards.

PARTNERSHIP WITH P&EP

The P&EP Department Chair reached out immediately after the summer workshop, asking to discuss a possible information literacy project that could be integrated into the existing 1-credit Physics Seminar course. The document mapping yearly information literacy goals for programs spurred interest in seeking external expertise to build an innovative project. The course itself was a very unique offering in the P&EP curriculum. The students were a range of first-years to seniors, all majoring in P&EP with varying research experience. The seminar typically consists of "research seminars given by invited speakers and members of the department, both faculty and students. Discussions regarding specific career opportunities and preparation for graduate studies [is] also an integral part of the seminar" (Physics, 2020).

Integrating an information literacy assignment was one of the main course activities that would require students to work as a group to find sources, evaluate information, and synthesize the collective information into a single project output. A key outcome was to enhance science communication ability by using creative techniques to convey complex scientific concepts at a layman's level. After multiple meetings to determine the purpose of the activity, further identify the most applicable ACRL frames, and determine how students would be expected to benefit from such an exercise, the following objectives were drafted:

- Students will be aware of different types of media authority
- Students will examine the impact of certain information based on delivery method (academic article, social media post, news article, book, etc.)
- Students will learn that there is more than one way to find information on a topic
- Students will learn that they are in an ongoing scholarly conversation on their research topic

Once the objectives were ironed out, a six-week long activity was created with detailed instructions to lead each student group to research, discuss, and build a project around their assigned topic. The liaison librarian was invited into class to introduce and explain the purpose of the assignment and to highlight the LibGuide that was built to support their needs. In a dedicated class meeting, the Director of Digital Learning provided guidance on how to plan, create, and publish deliverables using various multimedia modalities such as videos, podcasts, and more.

ACTIVITY

Groups were generally composed of four students from various class levels in an attempt to provide a diversity of skill and experience within each team and to promote increased cross-class socialization. Each individual within the group was tasked with finding specific information in a single perspective: academic perspectives (academic articles), news publication perspective, a historical to current perspective, and a popular perspective (via social media). Individually, they were to find a minimum of two sources and answer the following questions:

- When was your source published and why is this significant?
- Who is the author(s) and what are their credentials?
- What is the focus of the topic discussed? (new study/research presented, literature review, discussion of existing concepts, etc.)
- In what tone is the topic presented? Is it factual or is the author trying to persuade the reader?
- Who is the audience for this source?
- Do you see any gaps in the presented information? What is one question you have after reading these articles?

In the second or third week of the assignment, the students came together to discuss what they found. This was an opportunity for every student to lead a discussion within their group by presenting their sources and providing an overall summary of their findings. They shared any questions they had while exploring the sources, and used the following prompts to encourage discussion:

- What is the overall focus of these sources? In what ways are they similar/different?
- Do you see any gaps in the presented information? What is a question the group has after discussing the sources?
- Did anyone in the group notice any connections between these sources and their own research? Do they fill any previously identified gaps or introduce more questions?

Once every student had the chance to lead a discussion, they collectively worked together to synthesize all of their materials and perspectives into a short one to two-page paper that covered the following:

- What is the consistent message across all of the sources (if there is one)?
- Compare the tone and content covered in the different sources
- Are there any gaps that you identified that can be found in the sources used by your peers?

The paper also included a reflective section, inviting students to share their experiences engaging with the project. They were asked to provide their honest and candid opinions—identifying parts of the activity that worked and parts that they had trouble with.

The final component of the assignment was creating a multimedia-object to share with the community. Using the information they synthesized in the final paper, students were prompted to create podcasts, posters, or any other media-focused project. They were reminded that their intended audience includes individuals with no background knowledge about their topic. To encourage creativity, students had to figure out how to make their research informative while accurately conveying the underlying scientific concepts.

ASSESSMENT

In order to provide the students autonomy, they were given the freedom to decide who in their group was responsible for researching a specific source type on their topic. While their detailed worksheet and LibGuide provided them with step-by-step directions for individual

research and small-group discussions, much of the mechanics for conducting research and working in a group was left up to them. The teams created four podcast episodes, three scientific posters, three videos, and one digital children's book.

Faculty Experience

Based on pre and post-activity discussions, faculty feedback was positive. The library's quick response to the request for an information literacy activity, and the curation of supporting documents and assessments, was greatly appreciated. While there was interest in designing an activity to get students to explore multiple levels of communication and information, there was concern visualizing how this activity would translate as a final product. However, the library liaison was able to easily describe activities that best covered the course's learning objectives by connecting specific ACRL frames to each objective. Over the span of two weeks, the librarian was able to draft a fully detailed outline of the activity which included a LibGuide, a guided worksheet, and a multimedia resource page in collaboration with the college's Director of Digital Learning. They felt that students were challenged to research physics topics in new and impactful ways, and their experience with multimedia software and hardware was also matured. From this assignment, the department would be able to start growing a repository of marketing items that could be used to recruit prospective physics students. The hope was to continue embedding this activity in future offerings of the course.

In response to student feedback about time-management issues, it was decided that more clearly scheduled check-in times and deadlines could be built into the course calendar. Another adjustment would be shortening the six-week timeline of the project to promote continued productivity.

Faculty also hoped to challenge students to explore multimedia that they had not used before. Those who took the time to record podcasts or videos for the first time enjoyed the challenge of doing something new. Some groups opted to stick with more familiar outputs like posters. The podcasts and videos, while very rudimentary in their presentation, were much more enjoyable to grade, and plans were discussed to require students to create a broader spectrum of creative items in future iterations of the exercise.

Student Experience

Student feedback was mixed, though generally positive. Many of the upper level students who had already taken the course felt blindsided by the sudden addition of a project when they

were used to a seminar that consisted mostly of guest speakers. Some found the addition of the activity and its duration troublesome. The comments below highlight that sentiment:

> "Overall, I believe that this project was annoying for many people because it drastically changed the format of seminar compared to previous years. However, I do believe that in the long run it will be beneficial."

> "Though we enjoyed the actual making of the project, the whole group was in agreement that this was not our favorite project."

> "Overall, I think that having this project gave Seminar a dynamic that we were unfamiliar with, compared to classes before."

Discomfort with change notwithstanding, they admitted to seeing the overall value of the project. Among students, another broadly agreed upon complication was timing. Many reported that because of other academic and extracurricular obligations, they struggled to find time to meet outside of class that were viable for all four team members.

> "Overall, the project was a success. The group could have benefitted from meeting a few more times during the semester, but with busy schedules, it was difficult to find times that worked."

> "The worst part was trying to find times when the four of us could meet because it was virtually impossible."

> "The main takeaway, the group as a whole felt there ought to be bi-weekly deadlines for this assignment. By activating such deadlines, students are more encouraged to work ahead on the project along with collaborating with their group mates regularly . . . This implementation would eliminate much of the procrastination and lack of communication that induces unnecessary stress."

Despite these struggles, many students reported positive experiences with the activity. They specifically identified how the research enabled them to explore different perspectives and materials in ways that they haven't been challenged to do so in other courses.

> "This project required us to analyze a portion of physics from several different perspectives, and I believe that this was interesting because most of the time we are only learning from the perspective of the professor or a textbook."

> "Overall, our group enjoyed the project because we got to realize our academic progress. By working together . . . our freshmen member got to see how older students parse through a technical paper and apply their existing idea to new ideas."

> "It is through projects like these that we as students can learn a lot about certain topics, and about research in general. Deeply diving into a certain subject provides us with new insights, thoughts, and knowledge we didn't have beforehand."

> "This was a neat and refreshing way of doing physics without the burden of lengthy equations and fancy terminology. The freedom we had in selecting our topic as well as the length of time we had to complete the assignment were very much appreciated. With this freedom we turned an assignment into something our group truly enjoyed."

Considering the feedback of both faculty and students, the activity has been deemed a success with plans for continued integration into future seminar course offerings. This is a significant achievement in the college's efforts to create and embed meaningful information literacy activities that are applicable to the unique information needs of our students, and offers a tangible example of a meaningful partnership between a department and the library support staff. It is hoped that engagements such as this will effectively demonstrate the expertise and value that librarians can provide in a targeted curricular context.

CONCLUSION

This activity serves as a great prototype for librarian engagement with innovative information literacy assignments. Positive experiences from fruitful partnerships like this ripple across campus as faculty talk with each other about new projects that challenge student learning, encouraging other instructors to reach out to the library for similar collaborations. It is up to librarians to take the lead in identifying new venues for library involvement in teaching and learning, expanding campus understanding of information literacy and how engaging with library liaisons can result in fruitful partnerships.

Sources/Appendix:

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