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## Two Approaches to Collaborative Information Literacy Instruction at a Small Engineering School

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### Abstract

Two librarians at a small STEM academic library have partnered with professors to develop and teach chemistry and writing courses. These librarians have successfully worked with professors to serve as an active presence within the classroom. This article describes the challenges of navigating the typical obstacles librarians face when attempting to integrate information literacy into the curriculum, reflects on the benefits of these collaborations, and touches on strategies for implementing similar programs at other institutions. It outlines two distinct approaches to collaborating with professors on credit-bearing information literacy courses, along with the key steps involved in planning and implementing these courses, including generating institutional buy-in, identifying potential collaborators, negotiating workload and responsibilities with collaborators, and planning to sustain courses beyond a single academic year. Suggestions for overcoming obstacles, supplemented by experience-based recommendations, are discussed.

Keywords: Information literacy; Engineering; STEM; Teaching faculty

### Introduction

According to recent studies conducted by Project Information Literacy, the need for students to learn information literacy skills in order to be successful during college and after graduation is greater than ever.<sup>1</sup> However, professors are not entirely sold on information literacy instruction and librarians often struggle to convey its importance.<sup>2</sup>

Some institutions have a required information literacy course and librarians are embedded in the classroom. For those librarians who have not yet achieved this level of integration, collaboration with professors on library instruction within a semester long course can be intimidating. Even when potential collaboration exists or is within reach, it does not always translate into a course that is meaningful to students or instructors. Students may not achieve the desired learning outcomes, and professors and librarians fail to create an effective working relationship. Sustaining and improving a course over time can be particularly challenging, and without proper planning, ongoing support for the course can

wane, especially if new professors and librarians are asked to take over teaching responsibilities.<sup>3</sup>

### Background

Montana Tech of the University of Montana is a STEM-focused institution of around 2,500 students located in Butte, MT, and has a long tradition of excellence in engineering and science, with large Mining and Petroleum Engineering departments. Integrating information literacy at Montana Tech has presented several unique challenges due to its focus, organization, and size.

### Engineering Focus

Due to the fact that most Montana Tech students are engineering majors, the library promotes information literacy as a core competency for its engineering graduates. It is especially important to convince stakeholders that information literacy is a skillset needed for postgraduate career success. A gap exists between traditional STEM skills, such as mathematics and the sciences, and the critical thinking and research skills that are



taught as part of information literacy.<sup>4</sup> There is a certain mindset that exists among some professors that students already spend too much time taking non-mathematics and science courses, and this attitude sometimes becomes instilled in our students as well.

Despite this attitude, feedback from employers over the past several years has stressed that while our students are well prepared in technical knowledge, they lack strong communication and critical thinking skills. Barbara Fister confirms this fact, observing that “study after study tells us that employers want students who can think, communicate and solve problems.”<sup>5</sup> In recent years, the college has begun to address these deficiencies. We view this as an opportunity for changing the mindset on campus that information literacy is not a priority for engineering students. We have used these facts to build an argument that information literacy is a key component of an undergraduate engineering education.

### Organizational Model

Sharon Weiner has mapped academic organizational models to different strategies for promoting and institutionalizing information literacy on campus.<sup>6</sup> She describes three levels of information literacy integration on campus including adoption, diffusion, and institutionalization. Montana Tech’s information literacy program is still in a state of diffusion; there have been some attempts at institutionalization, but little progress has been made. Of the four organizational models Weiner describes (Collegial, Bureaucratic, Political, and Organized Anarchy), Montana Tech primarily shares characteristics with the Organized Anarchy model. According to Weiner, institutions that fit into the Organized Anarchy model have “multiple conflicting demands on their attention, priorities, and performance.”<sup>7</sup> Weiner identifies several implications for integrating information literacy within this type of institution, “including focusing on units that are receptive” and “implementing small changes that have large effects.”<sup>8</sup>

In the past, attempts at Montana Tech to create brand new credit-bearing information literacy courses from the top down have stagnated. In-

stead we have found that a more effective strategy is to take a horizontal approach, targeting specific individuals and groups to integrate information literacy components into already existing courses.

### Small Size

One of the most common recommendations given by librarians who have successfully created credit-bearing information literacy courses is to adjust librarian workloads and responsibilities, because credit-bearing courses are time consuming.<sup>9</sup> The Montana Tech Library has two full-time librarians and one part-time librarian who collaborate to provide library instruction across campus in many forms, including for-credit courses. In addition to reference and instruction services, these librarians have other responsibilities that take up a good deal of their time. One of the greatest challenges these librarians face is finding the time to manage increasing teaching loads.

Another concern that arises from this issue is confusion and inconsistency in the way librarians are compensated for teaching for-credit courses at Montana Tech. In some cases, librarians have been required to add a course as an overload course in addition to their regular full-time hours and are compensated accordingly. This has not always been met with full support by the administration, as there have been legitimate questions as to why they should approve requests for additional pay. In other cases, librarians have expectations to teach as part of full-time regular duties and are therefore not given extra compensation, but this means other responsibilities are forced to take a backseat. This inconsistency has caused some faculty to be hesitant in approaching librarians for help as they fear they would be piling too much extra work on the librarian.

### Obstacles

Despite the specific examples described above, many of the challenges faced by librarians at Montana Tech are common to all types of academic institutions. Montana Tech is no different than other institutions in that promoting and receiving buy-in for information literacy across

campus has been an arduous process. It is an endeavor that has endured many false starts and at times has been left on life support with little attention from the library or the campus.

### Communicating Information Literacy to Professors

One of the biggest challenges we have encountered at Montana Tech is simply communicating to professors what information literacy is. Professors do not always recognize the importance of information literacy and librarians sometimes fail to promote it effectively. The concept of information literacy is often misunderstood by professors. Other authors have observed that using library-specific language when trying to promote information literacy on campus is sometimes counterproductive.<sup>10</sup> Finally, our experiences lead us to agree with Fister, who observes that the best meetings with professors are those that are “informal, equal, improvisatory, and exciting.”<sup>11</sup> Librarians need to be able to clearly and succinctly communicate a definition of information literacy in this type of setting to be successful. For all of these reasons, we created our own working definition of information literacy as a strategy for speaking with professors.

When coming up with our locally-determined definition of information literacy, we asked professors what types of skills they most wanted to see librarians teaching. We drew on our experiences teaching in the classroom in order to map specific information literacy skills to broader concepts that we hoped would be immediately recognizable to professors.

Two of the most important skills that emerged from discussions with professors were critical thinking and the ability to ask good questions. As a result of this feedback, we determined that a starting point for communicating information literacy to professors would be to discuss and promote it as *asking good and important questions about information and its use, regardless of source or format*. While this definition does not even come close to comprising all of the conceptions of information literacy in the literature, we use it as a gateway for discussing information literacy with professors more in-depth. One unexpected bene-

fit of this approach is that it has created more consistency in how information literacy is promoted across campus.

### Collaborating with Professors

Another obstacle that librarians have faced toward implementing a campus-wide information literacy program is that professors do not always recognize librarians as faculty or instructors, but rather as individuals who can simply tell their students how the library works.<sup>12</sup> For example at Montana Tech, when the faculty senate was expanded to be more inclusive to better represent the campus, there were questions as to why the library should be represented despite the fact that librarians are tenure-track faculty.

As Evan Farber notes, one way to overcome these issues is to impress upon professors a high degree of professional expertise.<sup>13</sup> Farber observes that once a professor recognizes librarians’ skills in these areas they will be more likely to consider them as partners in teaching. There are some unexpected advantages to being considered “not-quite” faculty in the eyes of professors, as they are less likely to be “threatened” by librarians interfering with their classes as they would be of regular teaching faculty.<sup>14</sup> Farber also states, “On any campus there are going to be a small number of faculty who will take up a disproportionate amount of a librarian’s time.”<sup>15</sup> On face value this may appear to be a negative perspective. However, if these professors are influential or an important part of the campus community it would be wise to cultivate a relationship with them because they could be instrumental in implementing a strong information literacy presence on campus.

### Overcoming Obstacles

As we have discussed, many of the obstacles we face are not unique to Montana Tech. However, librarians will tackle these obstacles and work towards solutions in their own way. Taking different approaches to the same problems may uncover paths to success that were not previously considered. Both full-time librarians at Montana Tech have taken distinct paths to integrate information literacy, while making an effort to document and discuss their approaches with



one another. The successes and failures of each of these approaches have allowed the librarians to better reflect, learn, and plan for future information literacy integration. Based on our shared experiences we have observed specific benefits, some hoped for and some unexpected. We have also compiled suggestions that we hope will be useful to librarians who are facing similar obstacles.

## Two Approaches

### Approach A

Chemical Literature, from here on referred to as Chem. Lit., has been co-taught by a librarian and chemistry professor at Montana Tech since the early 1990's. This class was developed to meet accreditation standards for the American Chemical Society (ACS).<sup>16</sup> To be accredited by the ACS, a chemistry department must show their students possess information literacy skills. Section 7.0, Development of Student Skills, specifically section 7.2, Chemical Literature, states:

Students should be able to use the peer-reviewed scientific literature effectively and evaluate technical articles critically. They should learn how to retrieve specific information from the chemical literature, including the use of Chemical Abstracts, and other compilations, with online, interactive database-searching tools. Approved programs must provide instruction on the effective retrieval and use of the chemical literature. A specific course is an excellent means of impacting information retrieval skills, though such a course usually would not qualify as an in-depth course. Integrating the use of these skills into several individual courses is also an effective approach. Both library and online exercises should be part of such instruction on information retrieval.<sup>17</sup>

Acknowledging that a specific course would best serve the needs of Montana Tech, the library and chemistry department collaborated to create the Chem. Lit. class. This two credit class is co-taught by a librarian and chemistry professor and takes place in the library. It is required of all chemistry majors and is often a mix of undergraduate and graduate students.

Prior to 2008, all class assignments, syllabus development and grading were done by the chemistry professor; the librarian's role was similar to a TA in that he did not participate in instruction and only answered basic reference questions. Although the librarian had a role in this class, there was no defined instruction program within the library. At this point, librarians working as instructors was a foreign concept at Montana Tech. This was not a collaborative class; it was a chemistry class taking place in the library.

Both the chemistry instructor and the librarian retired in the spring of 2008. This left a brand new librarian and a chemistry professor, who had never met, in charge of a required course. At their first meeting in July, the chemistry professor told the librarian, "I am going to let you take the lead with this class. You know the library and are better able to teach our students about how to use it, its role and function." The librarian was surprised that the professor was letting him take the lead because historically the class was led by the chemistry department. However, the chemistry professor was adamant that since the class was about information literacy the librarian would be best suited to lead this new collaborative effort.

Because the class began in August there was little time for collaborative efforts on assignments, the syllabus or class design. Therefore, the instructors used the previous year's syllabus for class design, with minor changes to assignments to prevent cheating and plagiarism; however, there was no real collaboration in the classroom. Similar to previous years but with the teaching roles reversed, the librarian was the sole teaching presence.

After the first semester of teaching Chem. Lit., the two instructors met to discuss how they would proceed with the class the next fall. Based on their experiences from this first semester, they worked together to redesign the syllabus for the following year. Fast forward five years. Chem. Lit. has changed for the better. Both the librarian and chemistry professor take an active role in the class, effectively changing the class dynamics and creating a true collaborative partnership.



During most class sessions the librarian is still the main teaching presence in the classroom, because the bulk of class time revolves around the use of databases, print and electronic resources, and search engines. The chemistry professor offers his insights and advice during these sessions, however he is the lead instructor when the class session involves in-depth subject knowledge of chemistry topics and theory. It is a positive aspect to have the librarian in front of the class for most sessions. This allows the students to get to know the librarian outside the librarian role and in the role of instructor. Also, the chemistry professor is in the background during class time and reiterates to the students the librarian is the expert who can assist them in their academic career. When questions arise in class, both instructors take turns answering the queries. It is a joint effort which often turns into a class discussion led by both instructors with each adding thoughts when appropriate.

The students have weekly assignments based around both print and electronic chemistry and chemical resources, with the class culminating in a semester long annotated bibliography. Because the weekly assignments are based around library resources the librarian took the lead developing them. The instructors worked together to create the annotated bibliography. Both instructors meet throughout the academic year to discuss the class and class materials. It is through these discussions that ideas for new assignments or changes to current assignments occur. Most of these discussion take place through email; both parties often approve of the other's work with nominal changes or remarks concerning what the other has done.

Grading is also collaborative. Each week one of the instructors grades the assignments. Once they are graded they are sent to the other instructor for review and agreement on the grade. This collaborative process works well for both parties and there have been no disagreements about grades. The chemistry professor checks the chemistry component of assignments and the librarian checks the information literacy components.

According to personal conversations with students and comments in course evaluations, stu-

dents find Chem. Lit. helpful to their academic careers. Many say that a class such as this should be available to all students, an idea these students have obviously shared with their peers because some non-chemistry majors have begun participating in the class.

This collaborative effort began slowly; however, as the instructors gained knowledge of the other and what they could offer the class they created a collaborative teaching process that benefits the students, the library and the chemistry department. Chem. Lit is a true collaborative partnership that uses the expertise of each instructor. The success of Chem. Lit. led to another collaborative class taking seed in another department on campus.

### Approach B

A second approach to collaborative information literacy instruction at Montana Tech developed under different circumstances than the one outlined above. Rather than being assigned to the librarian as a part of his duties, this teaching partnership grew out of informal discussions. Upon being hired, this librarian discovered there were no pre-established librarian-taught courses scheduled in any of his subject areas including the health sciences, biology, mathematics, communication, and business. As a new member to the Montana Tech community tasked with incorporating information literacy in the classroom, this librarian had to assess a complex organizational network in a short time span.

The librarian initially set up meetings with his liaison departments, providing an opportunity to meet professors and to tailor library services to their individual needs. This gave the departments a fresh perspective on the services that librarians at Montana Tech offer to other faculty members, including library instruction. In the case of the college's professional and technical communication department, these conversations centered on the overall lack of critical thinking and writing skills found among students at Montana Tech, particularly when conducting research online. The librarian was invited back for a second meeting and was given five minutes to explain how information literacy instruction could address the observed deficien-

cies. Fortunately, lessons learned from past efforts to implement information literacy in courses allowed the librarians to communicate a definition of information literacy that professors could easily understand and appreciate.

The librarian was tasked with creating and teaching an experimental sophomore writing course in partnership with a professor from the professional and technical communications department. By honing in on a particular need – critical thinking skills – and offering to retool an existing course that had long been on the department’s to do list, the librarian was able to fit information literacy instruction into a semester long credit-bearing course. New to the profession with relatively little instructional experience, this was also an opportunity for the librarian to learn from a more experienced instructor.

The department chair decided that the course would best be introduced as an experimental version of the standard second-level writing course, WRIT201, meaning that the curricular framework had already been laid out but needed to be revised to fit the new vision for the class. Several of the course’s competencies were modeled after Oregon State University Library’s *Undergraduate Information Literacy Competencies*.<sup>18</sup> In order to better collaborate on envisioning the course, the instructors conducted concept mapping exercises utilizing both writing and information literacy competencies to develop a plan for the course that successfully integrated key concepts from both areas. These concept maps helped the instructors communicate a shared vision for the course and to visualize a weekly timeline.

One of the early challenges in this partnership was scheduling time to work on designing the new course that worked well for both the writing professor and the librarian. Because the librarian and the professor had busy schedules and were used to working independently on their courses, maximizing productivity in these meetings was essential. It became clear that certain roles were best filled by the writing professor, both due to her seniority and her expertise. She carried out the logistics of proposing the experimental course and registering it as an option for students. Finding students who would

enroll in an experimental course became a concern. In order to attract students, the librarian and writing professor created flyers and posted them across campus to encourage students to enroll.

One of the challenges to collaboration that emerged was how to divide class time. As a three credit class, the course load was divided unevenly between the writing professor and the librarian. The librarian was responsible for one credit hour while the writing professor was responsible for two. In order to best maximize class time in this situation, the class met twice a week for one hour and fifteen minutes. This allowed for longer sessions that focused on both lecture and workshop time. Utilizing this approach, the librarian scheduled ten library workshops throughout the semester that were designed to complement concepts taught and assigned in the writing workshops.

Both instructors decided that while it was important to cover some of the information literacy concepts early on, it was also essential that the library workshops be distributed throughout the semester so that students would be encouraged to use the library as they completed each assignment. To augment this, the librarian offered students one-on-one assistance outside of class to encourage students to use library services. The students appreciated this “hands on” time and were more engaged when some class time could be utilized toward making real progress on their assignments.

The course itself included a set of iterative assignments that built up to creating an annotated bibliography. These assignments involved identifying a research question, conducting a literature review, and performing peer reviews. The annotated bibliography served as a major component of the students’ mid-term grade, and was ultimately incorporated into their final assignment for the class, an argumentative essay. Students were also required to keep a research notebook that included work at each stage of the class, along with completed handouts from in-class activities. Throughout the semester, the students were asked to provide feedback on the class and assignments in this notebook, which ultimately proved very helpful to the instructors

when assessing the students' comprehension over the course of the class.

At the end of the course, students were asked to complete a narrative self-reflection on the course. Based on student evaluations and performance on their assignments, students seemed to struggle most when asked to come up with meaningful questions about their topic or the readings they were doing. Both the librarian and the writing professor found that one of the best ways to engage students in critical thinking was to discuss current events as a warm up. This put students in a mindset to think more critically from the beginning of class. Also, while students did not necessarily demonstrate a natural aptitude for technology and social media skills, they had a strong interest in these areas.<sup>19</sup> The instructors also found that relating information literacy concepts to social media, by asking students to assess the quality of news links found on Facebook for example, helped engage students in conversation.

### Suggestions

Successful collaboration in the classroom is the result of a lot of time and work on the part of librarians. Although professors may recognize the need for information literacy, they are often too busy to initiate collaborative efforts.<sup>20</sup>

Additionally, crossing professional boundaries is unacceptable to some professors and can result in defensive attitudes towards librarians and the library.<sup>21</sup> As Juskiewicz and Garlish mention, a lot of collaborative projects will simply not get support from every professor; however, this should not discourage librarians' efforts to work with the professors who do make an effort.<sup>22</sup> After comparing and contrasting two distinct experiences collaborating with professors on credit-bearing information literacy courses, we have developed the following suggestions that we hope will be helpful to others.

*Play to your strengths.* Despite librarians' perceptions, the authors found that the professors they worked with were very willing to allow the librarians to demonstrate their expertise in matters of information literacy. In the experience of both authors, collaboration worked best when

the librarians and professors took the lead in the aspects of the course that best played to their strengths. For the same reason, librarians should not be afraid to take the lead in certain aspects of the class. While in the second example the writing professor was the natural leader due to her years of teaching experience, in the first case, the librarian was encouraged to take the lead in the course as the majority of the subject matter was more familiar to him than to the chemistry professor.

*Don't be afraid to fail.* Collaborators on information literacy instruction should bear the responsibility for aspects of the class that fail equally. For example, Chem. Lit. culminates with a very specific in-depth annotated bibliography and throughout the semester the students are taught about plagiarism and ethics. Additionally, they have multiple assignments that address these topics. However, in the recent past the instructors were confronted with a case of plagiarism. Rather than placing blame on one another, the instructors' reaction was to ask, what did we do wrong, what did we miss with this student, and how can we adjust the course to better deal with this issue in the future?

*Be a conversationalist rather than a salesman.* At Montana Tech, we often approach faculty members with the question, "How can we help you help your students?" In general, we try to downplay our role as information literacy "salesmen," but instead work on communicating a consistent and concise understanding of information literacy that will interest professors and help us to engage them in meaningful discussion. This sometimes means being willing to let go of aspects of information literacy that faculty do not agree with or incorporating ideas that do not traditionally correlate with commonly found definitions of information literacy instruction.

*Be flexible and responsive.* In addition to developing a "local" definition for information literacy, we have found that it is essential to communicate to professors how these skills might be specifically applied in their courses. For example, a writing instructor might be interested in information literacy as it relates to critical thinking, a member of the biology faculty might be especial-



ly interested in developing research topics, while a nursing faculty member may be particularly interested in evaluating the quality of nursing sources. While information literacy encompasses all of the above concepts, the authors worked with these professors to address their specific classroom needs. Sometimes these open-ended discussions have led to new and creative ways of integrating information literacy in the classroom.

## Conclusion

Collaborating with professors to teach a course is difficult. It takes an exceptional amount of librarians' time and effort. Librarians sometimes have to work with departments and individuals who are hesitant to collaborate, as professors often resist information literacy being incorporated into their courses.<sup>23</sup> We do not look at these issues as barriers to success; we see them as merely areas that need improvement. Instead, we have focused on cultivating relationships with professors that are interested in the library, and we found that opportunities begin to flourish. The more librarians support professors in their efforts, the more professors will support librarians in theirs.

Some promising developments toward proliferating information literacy at Montana Tech have recently been demonstrated by increased faculty interest in incorporating information literacy in their classrooms. In fact, after learning about the Chem. Lit., a biology professor at Montana Tech has incorporated a librarian in her freshman seminar for three class sessions. Recent campus-wide efforts to revise and improve the first year curriculum have included librarians as part of the planning process.

## Endnotes

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